Role of Societal Quality-of-Life in National Entrepreneurial Ecosystems:

A Cross-National Analysis

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Declaration

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

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STATEMENT 1

This thesis is the result of my own investigations, except where otherwise stated. Where correction services have been used the extent and nature of the correction is clearly marked in a footnote(s). Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

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STATEMENT 2

I hereby give consent for my thesis, if accepted, to be available for deposit in the University's digital repository.

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Abstract

Purpose: This study examines the extent to which various societal quality-of-life (QOL) factors affect entrepreneurial behaviours (EB) across countries to evaluate the role of QOL in an entrepreneurial ecosystem (EE) at the societal level. Adopting the ecological perspective of entrepreneurship, two hypotheses are developed: H1, societal QOL has significant direct effects on entrepreneurship; H2, entrepreneurial intentions (EI) mediate the effects of societal QOL on entrepreneurship.

Design/methodology/approach: This study is based on a quantitative approach where secondary data is retrieved from open databases of public bodies including the Global Entrepreneurship Monitor (GEM) of the Global Entrepreneurship Research Association (GERA), World Development Indicators (WDI) and Worldwide Governance Indicators (WGI) of the World Bank, Human Development Reports (HDR) of the United Nations Development Programme (UNDP), and Global Burden of Disease Study (GBD) of the Institute for Health Metrics and Evaluation (IHME). The sample is an unbalanced short panel consisting of 444 observations of 76 different economies for the period 2010-2018. The data is examined via Fixed Effect and system GMM specifications following rigorous econometric traditions.

Findings: Both main hypotheses are confirmed. More importantly, significant dynamics in the effects of various societal QOL factors on entrepreneurship are presented. The results indicate that EI mediates the effects of personal economic resources and health on entrepreneurship; unemployment, public safety and formal education are directly associated with entrepreneurship, societal inequality has both direct and indirect effects on entrepreneurship, while no significant direct or indirect associations between environmental sustainability and entrepreneurship are unveiled.

Limitations: The study adopts a quantitative approach which analyses a dataset of a highly unbalanced short panel dominated by observations for high- and medium-income economies. In addition, the measures selected may not fully capture the complex, multi-dimensional, multi-faceted characteristics of each societal QOL factor. These issues may lead to limited generalisation, measurement biases and the lack of in-depth inference which invite future studies.

Originality/value: Although QOL has been argued to be an important predictor in entrepreneurship, little empirical evidence has been generated in the literature. By addressing this gap, this study contributes to both entrepreneurship research and practice. The academic contributions are threefold. First, this study is the first comprehensive and systematic empirical evaluation of the effects of QOL on entrepreneurship across countries based on the entrepreneurial ecosystem perspective. Second, this study provides empirical evidence to support the EE perspective, the Human Capital Theory, TPB, and PMM model in entrepreneurship. Third, this study establishes an EE model which formalises the interactions between macro-level factors of society and the individual-level factors in explaining EB. The practical contributions rest with the managerial implications that are informative to the recipients of the study. First, the study informs policymakers in governmental organisations that entrepreneurship policies are contingent on distinctive socio-economic contexts and are subject to constant modifications. Second, the study informs various non-governmental organisations about their supportive role in motivating EI and facilitating high-quality business creations. Third, this study also informs entrepreneurs and potential entrepreneurs regarding their ventures' orientational and geographic positioning.

Keywords: Entrepreneurship, Entrepreneurial Ecosystem (EE), quality-of-life (QOL), entrepreneurial behaviours (EB), entrepreneurial intentions (EI)

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Abbreviations

EE	Entrepreneurial Ecosystem
EI	Entrepreneurial Intentions
EB	Entrepreneurial Behaviours
EU	European Union
FE	Fixed Effect
GBD	Global Burden of Disease Study
GDP	Gross Domestic Product
GEM	Global Entrepreneurship Monitor
GMM	Generalised Method of Moments
GNI	Gross National Income
GNP	Gross National Product
HALE	Health-Adjusted Life Expectancy
HDI	Human Development Index
HDR	Human Development Report
LSDV	Least Squares Dummy Variable
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
QOL	Quality-of-life
RBV	Resource-Based View
RE	Random Effect
SDG	Sustainable Development Goals
SME	Small- and Medium-Sized Enterprise
TEA	Total Early-Stage Entrepreneurial Activity
UN	United Nations
UNDP	United Nations Development Programme
WDI	World Development Indicators
WGI	Worldwide Governance Indicators
WHO	World Health Organisation
WTO	World Trade Organisation

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1 Introduction

As the world economy becoming increasingly dynamic and entrepreneurial, the last several decades have witnessed substantial transformations in both economic and social behaviours across the globe (Pothen and Welsch, 2019). The vital role of entrepreneurship in today's knowledge-based economy has been widely accepted due to its close relationship to innovation, fast economic growth and job creation which have motivated both researchers and policymakers to explore effective ways of nurturing entrepreneurial activity (Morris, Neumeyer and Kuratko, 2015; Michálek and Výbošťok, 2019). As socio-economic theories suggest economic behaviours like entrepreneurship are dependent on various economic and social factors, quality-of-life (QOL), being an important indicator for social development, has been theorised to be an important predictor of entrepreneurial behaviours (EB). However, there are few comprehensive empirical studies to probe into their causal relations. To address this gap, this study examines the extent to which QOL affect entrepreneurship at the societal level based on the entrepreneurial ecosystem (EE) perspective.

This chapter will first introduce the research background. Then the research aims and objectives, hypotheses, research methods, findings and implications, and contributions will be outlined. The chapter will end with an illustration of the structure of the thesis.

1.1 Research Background

Due to its significant role in facilitating fast economic growth and job creation, entrepreneurship has become one of the most popular themes in the economics literature and one of the key considerations in economic policymaking around the world (Acs *et al.*, 2012; Diaconu and Duţu, 2015; Boh, De-Haan and Strom, 2016). With the growing awareness of its social benefits in alleviating poverty, facilitating innovation, promoting social connectedness, driving sustainable development, and enhancing QOL, nurturing entrepreneurial activities has been promoted to

be a national policy in both developed and developing countries (Tamvada, 2010; Nataraajan and Angur, 2014; Woodside, Bernal and Coduras, 2016; Maridal, 2017).

However, the limited understanding of the entrepreneurship phenomenon often leads to generic strategies such as financial support and simplified business registration procedures (World Economic Forum, 2013, 2014). Although these policies to some extent have lowered the barriers to business creation, the focus on the general needs of businesses with little acknowledgement of the diversity of entrepreneurial activity in the dynamic socio-economic contexts has significantly constrained their effectiveness.

In recent years, entrepreneurship studies adopting the sociological perspective have generated mounting evidence that entrepreneurship is not only an economic but also a social phenomenon which suggests individuals' career choices are both motivated and constrained by a wide range of social factors such as culture, social relationship, social network and so on (Anderson, Jack and Dodd, 2005; Stuart and Sorenson, 2005; Perry-Smith, 2006; Hoang and Yi, 2015). The increasing awareness of the social embeddedness of EB has helped to develop more effective strategies to promote business creation. Take China as an example, with the increasing acknowledgement of the positive effects of entrepreneurship education, the module of *Innovation and Entrepreneurship* has been formalised by the Ministry of Education to be a compulsory program for all undergraduate students. Various entrepreneurship and innovation competitions have been held by both governmental and non-governmental organisations which have made significant contributions to the creation of an entrepreneurial culture. Besides, governments at different levels also developed various policies to encourage employees in public institutions such as university lecturers and professors to engage in entrepreneurial activities to enhance knowledge spill-over and commercialisation.

The great achievements in entrepreneurship and innovation of the Silicon Valley in terms of the emergence of various business Unicorns and gazelles as well as its capacity to ensure sustainable business creation and innovation suggest a new way of thinking in entrepreneurship research and policymaking, the ecological perspective in entrepreneurship or the EE perspective (Cohen, 2006; Isenberg, 2010, 2011, 2016; Klepper, 2010). Since its emergence, EE has become one of the most popular themes in entrepreneurship literature and the focus of entrepreneurship policymaking in governments around the world. Both national and regional governments have developed more proactive immigration and business policies to attract entrepreneurial talents and ventures. City-level entrepreneurial parks, technology parks and campus-based incubators have become commonplace in almost all metropolitan areas in both developed and developing countries.

However, despite the great efforts to adopt the Silicon Valley model in various countries, few have ever succeeded which reflects the current limited understanding of EE (Cooke, 2016; Isenberg, 2016; Raible, 2016). For example, the EE perspective suggests the system consists of various actors with entrepreneurs assuming the role of leadership, while most resources are controlled by the governments in many countries, especially developing countries (Auerswald, 2015; Stam, 2015; Stam and Spigel, 2017; Malecki, 2018). Although governmental interventions such as government-run incubators and venture funds to some extent can stimulate venture creation, those ventures are mostly policy-motivated and the limited participation of the private sector can significantly undermine their sustainability (World Economic Forum, 2013, 2014). Additionally, the EE perspective suggests that entrepreneurship is a complex socio-economic phenomenon that cuts through various disciplines, while most governments in effect still adopt the traditional view by considering entrepreneurship as the responsibility of the business and economic administrative agencies (Audretsch, 2004; Ahmad and Seymour, 2006; Morris, Neumeyer and Kuratko, 2015). The

lack of support from other governmental organisations imposes significant barriers to the development of EE (Isenberg, 2010). Furthermore, World Economic Forum (2013a, 2014a) suggests finance, accessible market and human capital are equally important EE factors for nascent entrepreneurs, while most entrepreneurship policies are still generic and generally focus on providing financial aids such as low-interest loans, rent reimbursement and tax reduction.

The EE perspective differs from traditional theories in entrepreneurship by combining both the supply- and the demand-side of entrepreneurship and suggests business creation is subject to both contextual and individual factors. Thus, the challenge for the development of effective policies to promote entrepreneurship is the exploration of the mechanism of how contextual and individual factors interactively affect EB.

1.2 Research Aim and Objectives

The EE perspective suggests that entrepreneurship is not an isolated phenomenon but subject to complex interactions among both contextual and individual factors which offers a more holistic view for entrepreneurship research and an effective way to foster entrepreneurial activity (Acs *et al.*, 2016; Spigel, 2016, 2017; Stam and Spigel, 2017; Spigel and Harrison, 2018). Although some literature suggests QOL predicts EB (Bruno and Tyebjee, 1982; Kim, Kim and Yang, 2012; Autio *et al.*, 2014; Kline *et al.*, 2014; Nicotra *et al.*, 2018), relative empirical studies tend to be fragmented and unsystematic. To address this gap, this study aims at enriching the understanding of entrepreneurship and EE by providing a comprehensive evaluation of the associations between QOL and entrepreneurship at the societal level. The research aim is supported by three objectives:

a) to critically assess the concepts of entrepreneurship and EE, and consolidate prior strands of the EE literature to develop a theoretical framework of EE;
b) to critically review the concept of societal QOL and identify its key dimensions;

and

c) to examine to what extent various societal QOL factors affect entrepreneurship; additionally, to evaluate the mediating effects of EI.

To this end, two main hypotheses are developed regarding the causal links between societal QOL and entrepreneurship:

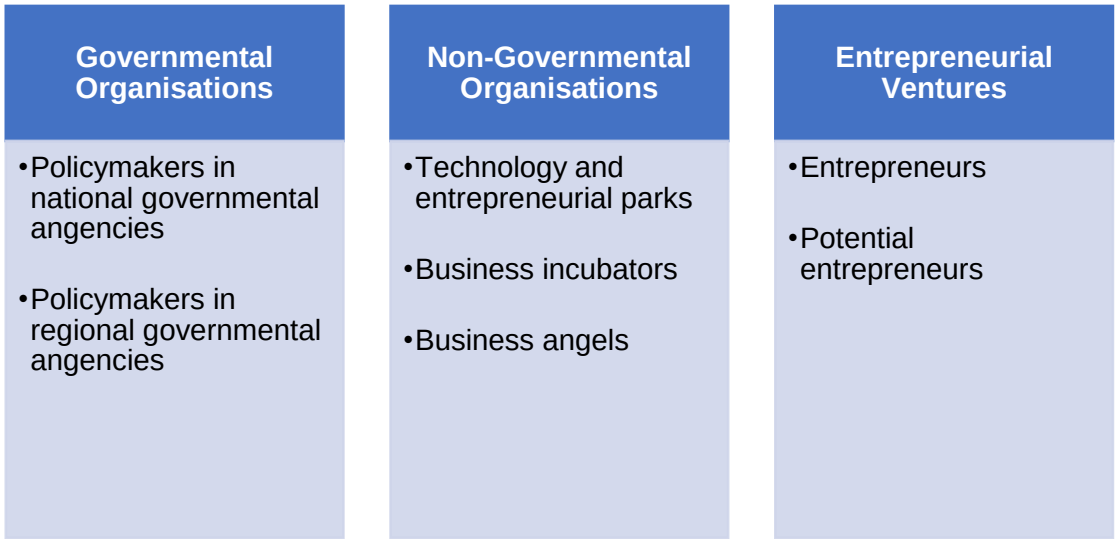
H1: societal QOL has significant direct effects on entrepreneurship;

H2: EI mediates the effects of societal QOL on entrepreneurship.

This study has both substantial academic and practical values. Academically, this study makes a threefold contribution to the literature. First, this study is the first comprehensive and systematic empirical evaluation of the effects of QOL on entrepreneurship across countries through the theoretical lens of the EE perspective, whereas previous empirical work tends to be fragmented and one-sided. Second, this study provides empirical evidence to support the EE perspective, the Human Capital Theory, TPB, and PMM model in entrepreneurship. Third, unlike most previous EE literature emphasising the identification of EE constructs, this study establishes an EE model which highlights the interactions between the societal-level and the individual-level factors in explaining EB.

The practical contributions rest with the managerial implications that are informative to various stakeholders of entrepreneurial ventures (see Figure 1-1). First, the study informs policymakers in governmental organisations that entrepreneurship policies are contingent on distinctive socio-economic contexts and are subject to constant modifications. Second, the study informs various non-governmental organisations about their supportive role in motivating EI and facilitating high-quality business creations. Third, this study also informs entrepreneurs and potential entrepreneurs regarding their ventures' orientational and geographic positioning.

Figure 1-1 Recipients of the managerial implications



1.3 Thesis Structure

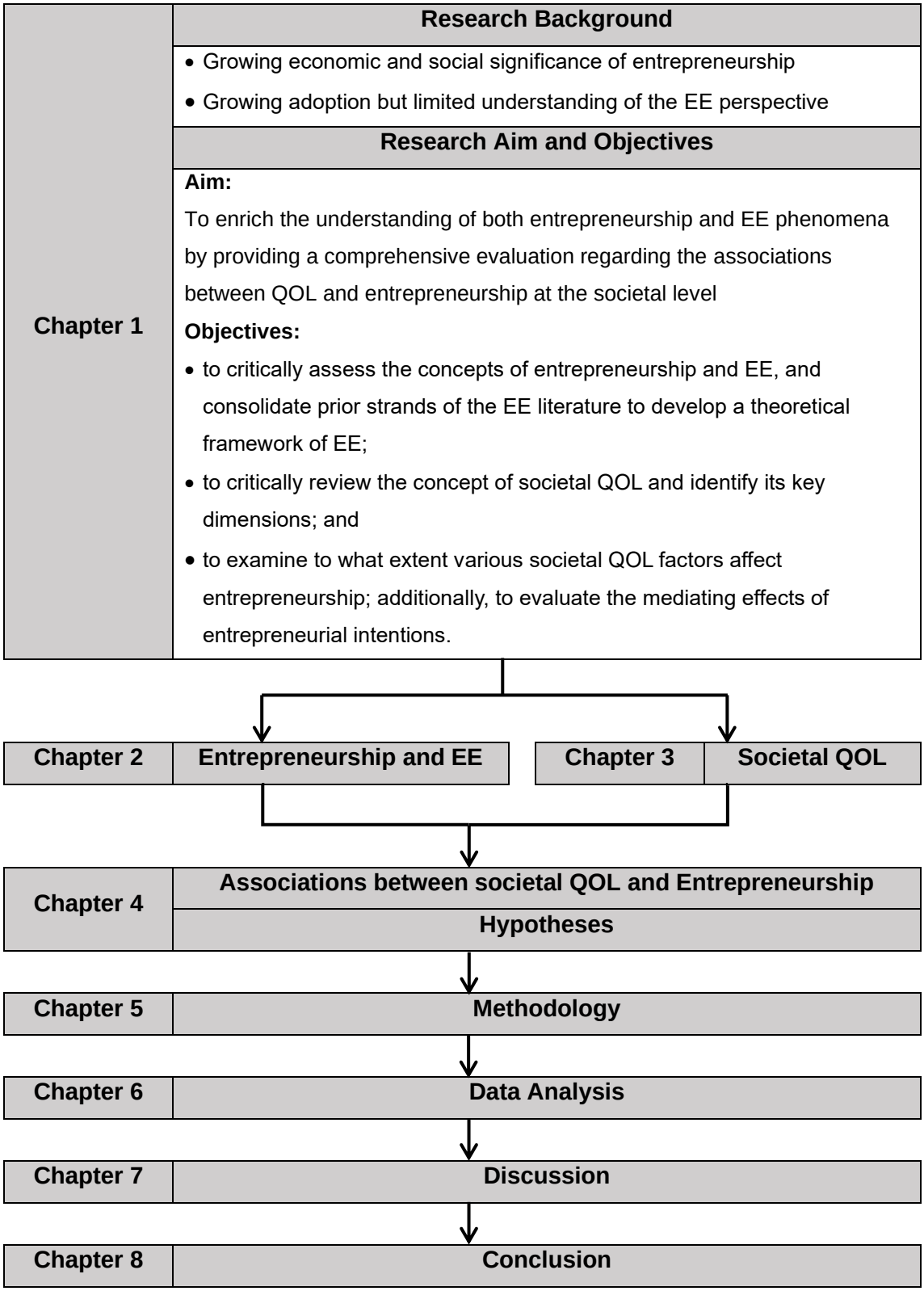
This study consists of 8 chapters, and Figure 1-2 presents a route map of this research.

Chapter 1 is an overview of the rationale and procedure of the research that introduces the research background, research aim and objectives, research recipients, and the structure of this thesis.

Chapter 2, Chapter 3 and Chapter 4 are literature reviews to lay theoretical foundations for the analysis and discussion. By critical review of the literature on different theories and research traditions in entrepreneurship, Chapter 2 will clarify the concepts and identify the characteristics of entrepreneurship and EE to justify the rationale of adopting the ecosystem perspective in entrepreneurship in this study. Chapter 3 will present a critical review of QOL literature to clarify the concepts and identify the key dimensions of QOL at the societal level. This chapter will also justify the use of objective indicators to evaluate societal QOL to facilitate the subsequent empirical analysis. Chapter 4 chapter is the review of the extant literature on the associations between societal QOL and entrepreneurship. Apart from the direct associations, this chapter also justifies the rationale to include both contextual and individual factors in EE modelling.

Conceptual models and hypotheses are developed to cover the research objectives respectively.

Figure 1-2 Research route map



Chapter 5 will outline the philosophical assumptions, including ontology, epistemology and axiology, the research strategy and the research design of this study. Based on the methodological approaches, this chapter will also introduce the procedures regarding data collection, data processing and data analysis. Furthermore, this chapter will also cover the discussion regarding the validity, reliability and limitations of the research methods.

Based on the theoretical foundations laid in Chapter 2, 3 and 4 as well as the research methods introduced in Chapter 5, Chapter 6 will demonstrate the analysis procedures and report the detailed statistics of the results. By linking the literature to the results generated from the data analysis in Chapter 6, Chapter 7 will discuss and interpret the research findings. This chapter will also update the empirical model and provide research and managerial implications. Chapter 8 will sum up the study by referring to the whole research process. This chapter will also conclude the academic and practical contributions of this study and propose future research opportunities.

2 Entrepreneurship and EE

2.1 Chapter Overview

As the global economy becomes increasingly knowledge-based and dynamic, entrepreneurship has been generally accepted as a key source of innovation and job creation, and the major driver of social and economic development (Diaconu and Duţu, 2015; Maridal, 2017). Practically, promoting entrepreneurial activity is one of the priorities of policymaking in governments around the world; academically, entrepreneurship is one of the most popular themes in both theoretical and empirical studies which draws the attention of scholars from various backgrounds such as economics, sociology, psychology, etc. (Audretsch, 2004; Ahmad and Seymour, 2006; Morris, Neumeyer and Kuratko, 2015). The emergence of various theories has substantially reshaped the understanding of the entrepreneurship concept and entrepreneurship policymaking (Liñán and Fayolle, 2015; Alvedalen and Boschma, 2017; Kerr, Kerr and Xu, 2017).

In this chapter, a body of literature is critically reviewed to assess the concepts of entrepreneurship and EE to address the first objective and to justify the adoption of the EE perspective as the theoretical lens. To this end, this chapter includes the following contents. First, through the assessment of the key concepts and the characteristics of entrepreneurship, the appropriate conceptualisation and practical operationalisation will be established. Second, the significant role of entrepreneurship in economic and social development is introduced by presenting its major benefits and costs. Third, various theories in entrepreneurship literature are outlined to highlight the effectiveness of the EE perspective in entrepreneurship research and practice. Fourth, based on the clarification and justification, a conceptual framework is to be developed.

2.2 The Concept of Entrepreneurship

Despite the growing recognition of its significantly positive role in economic and social welfare, the concept of entrepreneurship remains elusive and debatable

which is attributable to its diverse and complex nature (Audretsch and Thurik, 2001; Drucker, 2002; Kobia and Sikalieh, 2010). Nonetheless, it is generally accepted that entrepreneurship is a multi-faceted, multi-dimensional and multi-level phenomenon that cuts through various disciplines such as economics, management, sociology and psychology (Thorton, 1999; Shane and Venkataraman, 2000; Audretsch, 2004; Keister, 2005; Ahmad and Seymour, 2006; Morris, Neumeyer and Kuratko, 2015). Besides, the diversity of entrepreneurship is reflected by the different theoretical traditions, various types of entrepreneurial activities, and distinctive conceptualisations and operationalisations in the literature.

To further the understanding of the entrepreneurship concept, three necessary steps need to be taken. The first step is to distinguish entrepreneurship from managerial functions to identify its basic characteristics. The second step is to identify different types of entrepreneurial activity which can increase the understanding of the heterogeneity of the phenomenon. The third step is to synthesise various theoretical conceptualisations and empirical operationalisations to identify the rationale and limitations of different definitions and measurements in entrepreneurship research and practice.

2.2.1 Entrepreneurship and Management

Although entrepreneurship and management share many common elements such as administration, coordination, leadership and decision-making, they differ from each other significantly. Managers are individuals who supervise “activities and decisions encompassed in our traditional models” (Baumol, 1968, p.65). Rather than being the vocational positions or ranks bonded by some personality traits, specific individuals, certain organisations or institutions, entrepreneurship can only be observed through the behaviours of individuals in specific spatial and temporal settings (Gartner, 1988; Thurik and Wennekers, 1999; Drucker, 2002).

Further, managers often operate in established markets using mature business models; by contrast, entrepreneurs create something new, regardless of a new

venture, a new niche, a new supply or a new way of organisation, as they are in constant pursuit of discontinuous opportunities which implies that entrepreneurship is more about qualitative changes while management quantitative ones (Schumpeter, 1934; Carton, Hofer and Meeks, 1998). Thus, entrepreneurship can only be defined by relative functions and behaviours.

2.2.2 Different Types of Entrepreneurship

It is widely accepted that entrepreneurship consists of various forms of entrepreneurial and managerial activities (Drucker, 2002; Ahmad and Seymour, 2006). Hence, it is necessary to distinguish different types of entrepreneurial activities because each type has unique economic and social influences; overlooking the diversity of entrepreneurial activity will not only undermine the understanding of this phenomenon but also mislead entrepreneurship policymaking (Shane and Venkataraman, 2000; Morris, Neumeyer and Kuratko, 2015).

Individuals' involvement in entrepreneurship is determined by various factors, such as motivations, purposes, experiences, knowledge, and economic and cultural contexts; moreover, entrepreneurial ventures differ from each other in terms of sizes, availability of resources, orientations, industries, access to markets, and growth trajectories (Carton, Hofer and Meeks, 1998; Thurik and Wennekers, 1999; Bosma and Levie, 2010; Singer, Amorós and Moska, 2015; Kelley, Singer and Herrington, 2016; GERA, 2017, 2018; Bosma and Kelley, 2018). An entrepreneurial society should nurture all types of entrepreneurial activities because each type of entrepreneurship makes distinctive contributions to economic development and social welfare (Morris, Neumeyer and Kuratko, 2015). In the literature, many criteria for the typology of entrepreneurship have been proposed, those that have been widely referred to are presented in Table 2-1.

Table 2-1 Types of entrepreneurship in the literature

Types of Entrepreneurship	Criteria	Source
N-entrepreneurship & Routine entrepreneurship	Presence of innovation	(Leibenstein, 1968)
High-potential entrepreneurship & Low-potential entrepreneurship	Potential of entrepreneurial ventures	(Carton, Hofer and Meeks, 1998)
Private entrepreneurship & Community entrepreneurship & Cultural entrepreneurship & Social entrepreneurship	Business orientations	(Spilling, 1991; Zhhra *et al.*, 2008)
Schumpeterian entrepreneurs & Intrapreneurs & Managerial business owners	Entrepreneurial and managerial functions & occupational status	(Thurik and Wennekers, 1999)
Nascent entrepreneurship & Novice entrepreneurship & Habitual entrepreneurship & Serial entrepreneurship & Portfolio entrepreneurship	Entrepreneurial experience and prior entrepreneurial knowledge	(Ucbasaran, Westhead and Wright, 2001)
Subsistence entrepreneurs & Social entrepreneurs	Value creation and value capture	(Ahmad and Seymour, 2006)

Inventive entrepreneurship & Innovative entrepreneurs	Behaviour toward entrepreneurial opportunities	(Hisrich, Langan-Fox and Grant, 2007)
Survival ventures & Lifestyle ventures & Managed growth ventures & Aggressive/high-growth ventures	A portfolio of criteria including business orientations, business returns, principal stakeholders, and primary managerial challenges	(Morris, Neumeyer and Kuratko, 2015)

(Source: developed by the author based on literature)

Despite their obvious differences, these criteria are not mutually exclusive and share two common characteristics: the acknowledgement of the diversity of entrepreneurship and the emphasis on the quality of the entrepreneurial activity. Being one of the most widely accepted and used criteria in the literature, the GEM approach which categorises various entrepreneurial activities into necessity-driven and opportunity-driven entrepreneurship based on their distinctive motivations is adopted by this study. In GEM terminology, opportunity entrepreneurship refers to the phenomenon of people being “pulled into entrepreneurship by the prospect of opportunity”, while necessity entrepreneurship depicts the situation where people being “pushed into starting a business because they have no other opportunities for work and need a source of income” (Bosma and Sternberg, 2014, p.1019, 1021).

2.2.3 The Conceptualisation and Operationalisation of Entrepreneurship

The diversity and complexity of entrepreneurship are also reflected by its vague theoretical conceptualisation and empirical operationalisation in the entrepreneurship literature. Generally speaking, there are two different approaches to defining entrepreneurship: the function (role)-based and the task (behaviour)-based perspectives (Carton, Hofer and Meeks, 1998; Casson and Wadeson, 2007).

The function (role)-based approach of entrepreneurship is characterised by observing, identifying and theorising the functions performed by entrepreneurs; and scholars and practitioners who adopt the function (role)-based perspective primarily define entrepreneurship as functions performed or roles assumed by entrepreneurs who are individuals with specific capacities and characteristics (Spilling, 1996; Carton, Hofer and Meeks, 1998; Chen, Greene and Crick, 1998). This perspective is pioneered by Schumpeter (1934) who claimed that entrepreneurs represent the force of creative-destruction in the economy and play the role of creating new combinations. The literature suggests that the major functions undertaken by entrepreneurs include innovation, risk-taking, resource mobilisation, value creation, etc (Carton, Hofer and Meeks, 1998; Rauch and Frese, 2007). Typical roles assumed by entrepreneurs in the literature are illustrated in Table 2-2.

Table 2-2 Roles of entrepreneurs

Role of entrepreneurs	**Source**
Innovator	(Schumpeter, 1934; Shane, 1992; Baron, 1998; Thurik and Wennekers, 1999; Shane and Venkataraman, 2000; Drucker, 2002; Shane, Locke and Collins, 2003; Eckhardt and Shane, 2003; Hisrich, Langan-Fox and Grant, 2007; Dyre, Gregersen and Christensen, 2008; Acs *et al.*, 2009, 2012; Isenberg, 2011, 2016; Auerswald, 2015; Roundy, 2017; Kreuzer *et al.*, 2018; Kremer, 2019; Link and Sarala, 2019)
Risk taker and bearer	(Hisrich, Langan-Fox and Grant, 2007; Isenberg, 2011, 2016)
Decision maker	(Thurik and Wennekers, 1999; Alvarez and Busenitz, 2001; Drucker, 2002; Baumol and Strom, 2007; Casson and Wadeson, 2007)
Executive manager	(Thurik and Wennekers, 1999)
Business leader	(Baumol, 1968)

Value creator	(Baron, 1998; Carton, Hofer and Meeks, 1998; Drucker, 2002; Ahmad and Seymour, 2006; Hisrich, Langan-Fox and Grant, 2007; Acs *et al.*, 2009, 2012; Isenberg, 2011, 2016; Stam, 2015; Diaconu and Duţu, 2015; Roundy, 2017)
Gap filler and input-completer	(Leibenstein, 1968; Diaconu and Duţu, 2015; Boh, De-Haan and Strom, 2016)
Goal achiever	(Baumol, 1968; Carton, Hofer and Meeks, 1998; Chen, Greene and Crick, 1998; Shane and Venkataraman, 2000)

(Source: developed by the author based on literature)

Although the function (role)-based perspective provides a comprehensive way to conceptualise entrepreneurship by taking individual differences into account, it leads to the difficulty of operationalisation. For example, different indicators including organisational R&D expenditure, government R&D expenditure and the number of patents employed by the researchers only capture the technological aspect of innovation in entrepreneurship, while the absence of a universal consensus on the characteristics of entrepreneurship inevitably leads to the subjective selection of the criteria to identify qualified samples in the entrepreneurship literature (Audretsch and Thurik, 2001; Van Praag and Versloot, 2007; Acs *et al.*, 2009; Kim, Kim and Yang, 2012; Audretsch and Link, 2019; Hechavarría and Ingram, 2019).

As a more practical alternative, the task (behaviour)-based approach conceptualises entrepreneurship based on the tasks performed by entrepreneurs and related behaviours (Carton, Hofer and Meeks, 1998; Rauch and Frese, 2007). Gartner (1988) conceptualised entrepreneurship as the creation of new ventures and the definition has been widely adopted in the literature. Thus, the entrepreneurship concept is closely associated with the process and related behaviours involved in business formation including EI, opportunity recognition, business creation and opportunity exploitation. In the entrepreneurship literature

adopting the task (behaviour)-perspective, frequently used proxies are shown in Table 2-3.

Table 2-3 Frequently used proxies for entrepreneurship

Proxies for Entrepreneurship in the Literature	**Source**
Creation and operation of a venture	(Low and MacMillan, 1988; Thorton, 1999; Neck *et al.*, 2004; Cohen, 2006; Zhhra *et al.*, 2008; Foley, 2008; Acs *et al.*, 2009, 2014; Chandra and Fealey, 2009; Kantis and Federico, 2012; Kim, Kim and Yang, 2012; Qian, Acs and Stough, 2013; Kline *et al.*, 2014; Morris, Neumeyer and Kuratko, 2015; Autio and Levie, 2015; Mack and Mayer, 2016; Autio and Rannikko, 2016; Sussan and Acs, 2017; Spigel and Harrison, 2018; De Oliveira and Vitale Torkomian, 2019)
Start-up, newly founded firm or early-stage firm	(Kenney and Patton, 2005; Acs, 2006; Van Praag and Versloot, 2007; Shane, 2009; Acs *et al.*, 2012; Suresh and Ramraj, 2012; World Economic Forum, 2013, 2014; Arruda, Nogueira and Costa, 2013; McKeon, 2013; Stam, 2014; Spigel, 2017; Audretsch and Belitski, 2017; Nylund and Cohen, 2017; Theodoraki, Messeghem and Rice, 2018; Neumeyer *et al.*, 2018; Park and Park, 2018; Roundy, Bradshaw and Brockman, 2018)
SMEs	(Audretsch and Thurik, 2001; Audretsch, 2004; Van Praag and Versloot, 2007; McKeon, 2013; Rahatullah Khan, 2013; World Economic Forum, 2013, 2014; Soto-Rodríguez, 2014)

Self-employment	(Audretsch and Thurik, 2001; Audretsch, Carree and Thurik, 2001; Van Praag and Versloot, 2007; Acs *et al.*, 2009; Kobia and Sikalieh, 2010; Ács, Autio and Szerb, 2014; Stam, 2014; Morris, Shirokova and Tsukanova, 2017)
Business ownership	(Ucbasaran, Westhead and Wright, 2001; Westhead, Ucbasaran and Wright, 2005; Rauch and Frese, 2007; Tajeddini and Mueller, 2009; Kreiser *et al.*, 2010)

(Source: developed by the author based on literature)

Based on the observation that the highest level of entrepreneurial activity occurs not in any of the developed economies but in some of the most under-developed areas such as Africa and South America where a significant share of the labour force is forced into low-quality self-employment, some scholars argued that the task (behaviour)-based perspective tends to overlook some of the key characteristics of entrepreneurship such as the presence of innovation, the quality of entrepreneurial opportunity, and value creation (Drucker, 2002; Morris, Neumeyer and Kuratko, 2015; Brown and Mason, 2017). Typical start-ups, SMEs, or self-employment are generally characterised by lower productivity than incumbent firms, marginal involvement in innovation, limited contribution to economic growth and job creation, and declining importance in the economy (Audretsch, 2004; Shane, 2009; Isenberg, 2016). Insufficient empirical evidence for the positive correlations between the total number of entrepreneurial activity and regional economic growth & employment implies that entrepreneurship studies should focus on a small fraction of newly founded ventures, the high-growth firms, that are capable of generating extraordinary values (Mason and Brown, 2014; Autio and Rannikko, 2016; Isenberg, 2016; Brown and Mason, 2017; Miller and Acs, 2017).

In contrast, there is substantial empirical evidence regarding the fundamentally different roles of diverse types of entrepreneurial activities along the trajectory of

economic development (Acs, 2006; Pinillos and Reyes, 2011; Liñán and Fernandez-Serrano, 2014). The interactions among different types of entrepreneurship create profound social changes beyond economic growth and job creation, such as individual empowerment, competition enhancement and sustainability (Carton, Hofer and Meeks, 1998; Thurik and Wennekers, 1999; Morris, Neumeyer and Kuratko, 2015). Thus, it is necessary to adopt a general entrepreneurship concept with a clear acknowledgement of the diversity of entrepreneurial activities because “An entrepreneurial society is one with a growing pool of ventures of all types” (Morris, Neumeyer and Kuratko, 2015, p.722) and “Over time, failing to encourage ventures other than those focused on high growth will systematically undermine economic well-being and quality of life” (Morris, Neumeyer and Kuratko, 2015, p. 724-725). Further, taking the multi-level nature of entrepreneurship into account, although the task (behaviour)-based approach has limitations of overlooking individual differences in defining individual-level entrepreneurship, it is a reasonable way to conceptualise entrepreneurship at an aggregate level (Davidsson, 1995).

Aiming to provide a cross-national assessment of entrepreneurship at the societal level, this study adopts the task (behaviour)-based perspective and defines entrepreneurship to be *business creation*. The GEM approach is adopted to measure national-level entrepreneurial activity because it provides a more inclusive conceptualisation and practical operationalisation which has been widely used in the literature.

2.3 The Benefits and Costs of Entrepreneurship

2.3.1 Economic Benefits of Entrepreneurship

The positive role of entrepreneurship in promoting fast economic growth and job creation has been widely discussed in a large body of literature based on different theories, measurements, methods, and datasets. For example, Audretsch, Carree and Thurik (2001) and Audretsch and Thurik (2001) found that entrepreneurial activity, measured either by the aggregate performance of small

firms or by self-employment rate, is positively correlated with the growth rate of GNP and negatively correlated with the long-term unemployment rate in OECD countries. Based on GEM 2004 dataset, the study of Acs (2006) suggests that the opportunity-necessity entrepreneurship ratio is a key indicator to explain the variations in GDP per capita across countries. Van Praag and Versloot's (2007) review of extant literature concludes that, regardless of its measurements by small firms, young firms, business entries or self-employment, entrepreneurship makes significant contributions to economic development through facilitating innovation, job creation, productivity, and growth. They further argued that, in terms of innovation measured by R&D expenditures and patents, entrepreneurial firms not only produce innovative knowledge more effectively but also commercialise them more efficiently; in terms of job creation, entrepreneurial firms create more employment opportunities in the long run and generate higher levels of job satisfaction among the employees; in terms of productivity and growth, entrepreneurial firms catch up and exceed the incumbents quickly, especially the value-added productivity, due to their fast growth.

Further, some literature suggests two major mechanisms in terms of how entrepreneurship promotes economic growth: the introduction of innovation and the reallocation of resources (Baumol, 1968; Thurik and Wennekers, 1999). Schumpeter (1934) first linked entrepreneurship to innovation by arguing that economic development was attributed to the emergence of five types of new combinations, a new good, a new method of production, a new market, a new source of supply or a new way of organisation; and entrepreneurs are the individuals who create and practice these new combinations.

According to Drucker (2002), innovation, rather an economic and social concept than a technical term, emerges from the successful commercialisation of new knowledge, and the last 100 years have witnessed a major shift in terms of the driver of economic development from the factors of resources and production to the factors of knowledge. Countries that commit to more knowledge-intensive

investments are generally characterised by significantly higher innovative outputs (Audretsch and Thurik, 2001). Entrepreneurial opportunities arise from the emergence of new technological, economic and managerial knowledge, and entrepreneurship brings innovations and changes to the economy through the exploitation of these opportunities (Casson and Wadeson, 2007; Acs *et al.*, 2009). Being a key mechanism for commercialising new knowledge, entrepreneurial activity is an essential determinant in technological change and industry reorganisation to generate outstanding economic growth (Baumol, 1968; Audretsch, 2004; Boh, De-Haan and Strom, 2016). For example, the knowledge spill-over theory suggests that entrepreneurship promotes economic growth by serving as the conduit to facilitate new knowledge flows from incumbent firms to new ventures (Acs *et al.*, 2009, 2012). In addition, the quality of entrepreneurs' judgement to exploit change as an opportunity is vital to economic performance as economic growth is positively correlated to successful attempts to commercialise new technological and economic knowledge and negatively to failed ones (Baumol and Strom, 2007; Casson and Wadeson, 2007).

Furthermore, entrepreneurship mitigates economic inefficiency because entrepreneurship, in essence, is a process of resource allocation (Acs *et al.*, 2012; Diaconu and Duţu, 2015). Due to the market imperfection, resources consumption is not always efficient, and entrepreneurs assume the critical roles of resource allocators in the process of economic development due to its distinct capabilities of gap-filling and input-completing that enable them to discover market deficiencies, mobilise necessary resources and create desirable outputs (Leibenstein, 1968). For example, by extending the resource-based view (RBV) to entrepreneurial cognition, Alvarez, Busenitz and Sampieri (2001) argued that the individual-specific resources of entrepreneurs can facilitate their opportunity recognition through detecting market failure, assembling and organising necessary resources to produce heterogeneous and superior outputs. The entrepreneurial learning theory suggests that entrepreneurs' effectiveness in

resource mobilisation and utilisation are subject to their experience and knowledge (Politis, 2005). The Dynamic Capability theory indicates that entrepreneurs implement innovation and change through their ability to modify existing routines and resource configurations (Zahra, Sapienza and Davidsson, 2006). The social network theory suggests entrepreneurs exploit their social ties to access markets, information, knowledge, finance and supply to transform under-used resources into desirable outputs (Shane and Cable, 2002; Zhang, 2010; Zhang, Soh and Wong, 2010; Arregle *et al.*, 2015). Besides, entrepreneurship contributes to economic growth through enhancing market competition, improving product and service quality, and promoting economic flexibility (Hisrich, Langan-Fox and Grant, 2007; Morris, Neumeyer and Kuratko, 2015).

2.3.2 Social Benefits of Entrepreneurship

Apart from economic gains, entrepreneurship brings about social and cultural changes such as promoting social cohesion and integration, facilitating cultural transformation and enhancing QOL (Ahmad and Seymour, 2006; Hisrich, Langan-Fox and Grant, 2007; Zhhra *et al.*, 2008). Firstly, entrepreneurship plays an important role in enhancing societal stability and social cohesion and mitigating social marginalisation through alleviating inequality and poverty (Yanya, Abdul-Hakim and Abdul-Razak, 2013; Bonito *et al.*, 2017; Halvarsson, Korpi and Wennberg, 2018; Naminse and Zhuang, 2018; McAdam, Harrison and Leitch, 2019). Secondly, entrepreneurship promotes overall well-being and life satisfaction. For example, according to Van Praag and Versloot (2007), the higher levels of job satisfaction among entrepreneurs and employees in entrepreneurial firms indicate positive effects of entrepreneurship on the subjective well-being and life-satisfaction. Based on the dataset of a national survey of India, Tamvada (2010) found that entrepreneurship, which is measured by business ownership and self-employment, significantly improves the per capita consumption expenditure, a direct measurement of welfare. The multi-country comparisons

conducted by Nataraajan and Angur (2014) adopting the Global Entrepreneurship Index approach and Woodside, Bernal and Coduras (2016) adopting the GEM approach both indicated that entrepreneurship has significantly positive influences on the overall societal wellbeing.

2.3.3 Cost of Entrepreneurship

However, special considerations need to be given to the fact that entrepreneurial activity is also economically and socially costly. Start-ups are typically characterised by massive new business entries but extremely low survival rates and limited long-term prospects of job creation because they tend to be less productive, have low growth potential and amass in competitive markets (Audretsch, 2004; Van Praag and Versloot, 2007; Shane, 2009). In entrepreneurial firms, employees tend to face higher levels of unemployment risks and lower levels of income (Van Praag and Versloot, 2007). Entrepreneurship does not necessarily increase household income at the individual level, while it tends to increase inequal wealth distribution at the aggregate level (DaCosta and Li, 2017).

The cost-focused perspective has redirected much of the entrepreneurship research focus to business gazelles (growth-oriented firms) and unicorns (high-growth firms) due to their outstanding capacity for sustainable value and job creation (Shane, 2009; Mason and Brown, 2014; Brown and Mason, 2017). Nevertheless, it can be argued that, although the functional and dysfunctional effects of entrepreneurship impose both positive and negative impacts on QOL and well-being, the societal good of entrepreneurial activity outweighs its costs (Morris and Lewis, 1991; Morris, Neumeyer and Kuratko, 2015).

To summarise, in the context of globalisation and technological advancement, the world economy is becoming increasingly dynamic, knowledge-based and entrepreneurial (Acs, 2006; Acs, Desai and Hessels, 2008). In an entrepreneurial society, entrepreneurship is the key determinant of both economic well-being and social welfare as it functions as a mechanism of technical transfer, identifying and

addressing temporal and spatial inefficiency and a major driving force of societal change (Shane and Venkataraman, 2000; Morris, Neumeyer and Kuratko, 2015). Such a significant role entrepreneurship plays in society makes it a promising field of both academic and practical values.

2.4 Research Traditions and Theories in Entrepreneurship

The diversity of entrepreneurship is reflected by the different research traditions and various theories in the literature such as the supply-side and the demand-side in terms of research schools, the trait approach, the behaviour approach and the network approach in terms of traditional theories. It can be argued that the various research traditions and theories have produced informative results and furthered the understanding of entrepreneurship but suffer from the limitation of one-sidedness that necessitates the development of a more holistic approach for entrepreneurship research and practice.

2.4.1 The Supply- and Demand-Side of Entrepreneurship

Broadly speaking, there are two distinctive schools of economic theory in entrepreneurship literature, the supply-side and the demand-side perspectives (Thorton, 1999; Acs and Audretsch, 2010; García, 2014; Link and Sarala, 2019). According to Leibenstein (1968, p78-79), the supply of entrepreneurship is generally decided by “the set of individuals with gap-filling and input-completing capacities, the sociocultural and political constraints which influence the extent to which entrepreneurs take advantage of their capacities, and the degree to which potential entrepreneurs respond to different motivational states, especially where nontraditional activities are involved”. Traditionally, researchers and policymakers adopting the supply-side school are primarily interested in identifying the distinctive capabilities and attributes that characterise entrepreneurs and developing strategies to expand the supply of entrepreneurship (Baumol, 1968). In contrast, the last several decades have witnessed a major shift of entrepreneurship research focus from the supply-side to the demand-side perspective which is primarily established on the assumption

of context-dependence of entrepreneurship indicating entrepreneurial activity is both enabled and constrained by a combination of economic, social, cultural and ecological elements such as national wealth, social network, education, cultural norms and so on (Thorton, 1999; García, 2014; Link and Sarala, 2019).

Both schools have generated valuable results and enriched entrepreneurship research and practice; nevertheless, they both suffer from the limitation of one-sidedness. From one perspective, entrepreneurial activity is constantly shaped by a wide range of stakeholders and environmental forces, excessive reliance on individual factors tends to overlook the contextual dependence of entrepreneurship. By contrast, entrepreneurs are inherently the pivotal players in entrepreneurship, hence the proactive and central role of entrepreneurs and entrepreneurial ventures should never be under-estimated. A combination of the two schools is necessary to generate more holistic theories to underpin entrepreneurship research and practice.

2.4.2 The Trait Approach

Inspired and enlightened by Schumpeter's (1934) work, the trait approach adopts the supply-side perspective and is built on the assumption that entrepreneurship is “a particular personality type, a fixed state of existence, a describable species” (Gartner, 1988, p.48). Thus, entrepreneurs are assumed to be a distinctive group of individuals who share some common and enduring characteristics and clear personality variations can be identified to differentiate entrepreneurs from other individuals or to categorise different groups of entrepreneurs (Low and MacMillan, 1988; Mitchell *et al.*, 2002). Hence, the objective of entrepreneurship research is to expand the supply the entrepreneurship through searching and identifying those unique traits and characterise (Baumol, 1968; Kerr, Kerr and Xu, 2017).

2.4.2.1 Empirical Findings of the Trait approach

Most of the classic economic literature on entrepreneurship is theoretical and descriptive conceptualising entrepreneurs as individuals with distinctive characteristics such as innovativeness, creativity, inspiration, willingness to take

risks and so on (Schumpeter, 1934; Gartner, 1988; Low and MacMillan, 1988; Rauch and Frese, 2007). While more recent trait-based literature tends to be more empirical and rigorous. In these studies, personality traits refer to some enduring propensities and overarching style of an individual's experiences and actions that predict EB, and the behaviour-based perspective is generally adopted to define entrepreneurship as venture creation or self-employment (Rauch and Frese, 2007; Brandstätter, 2011).

One strategy in trait-based literature is the application of a popular psychological framework, the five-factor or the Big-5 model which refers to a dominant multi-dimensional theoretical and analytical instrument to define personalities and measure relative influences (John, Naumann and Soto, 2008; Brandstätter, 2011; Kerr, Kerr and Xu, 2017). According to Zhao and Seibert (2006, p.260-261), this model covers the five broad personality dimensions: Extraversion ("the extent to which people are assertive, dominant, energetic, active, talkative and enthusiastic"), Agreeableness ("one's interpersonal orientation"), Conscientiousness (an individual's degree of organisation, persistence, hard work, and motivation in the pursuit of goal accomplishment"), Neuroticism ("individual differences in adjustment and emotional stability"), and Openness to Experience ("a personality dimension that characterises someone who is intellectually curious and tends to seek new experiences and explore novel ideas"). Empirical studies suggest that variations in the personality dimensions can explain the differences between entrepreneurs and non-entrepreneurs and the divergences among different categories of entrepreneurship (Zhao and Seibert, 2006; Nga and Shamuganathan, 2010; Zhao, Seibert and Lumpkin, 2010). However, some researchers argued that the five-factor model was too general and sought to identify personality traits specifically associated with entrepreneurship to explain the entrepreneurial process such as need for achievement, risk taking propensity, tolerance for ambiguity, internal locus of control, self-efficacy, proactivity, innovativeness and creativity, autonomy and

independence, and passion and aspiration (Chen, Greene and Crick, 1998; Lüthje and Franke, 2003; Shane, Locke and Collins, 2003; Baum and Locke, 2004; Segal, Borgia and Schoenfeld, 2005; Rauch and Frese, 2007; Stewart and Roth, 2007; Altinay *et al.*, 2012; Smith, Bell and Watts, 2014; Kerr, Kerr and Xu, 2017).

2.4.2.2 Values and Limitations

The trait approach informs entrepreneurship research and practice the central role of entrepreneurs in entrepreneurial activity. However, it has been seriously challenged due to its problematic fundamental assumptions and mixed empirical findings. Firstly, the trait approach is to a large extent built on the rationale that entrepreneurial activity is directly determined by some entrenched personal characteristics which can easily lead to the "once an entrepreneur, always an entrepreneur" fallacy (Gartner, 1988; Low and MacMillan, 1988; Baron, 1998; Mitchell *et al.*, 2002; Brandstätter, 2011). In practice, personality is some sort of enduring and deeply embedded quality of individuals, while entrepreneurship is spatially and temporally bonded behaviours that can only be observed at certain phases or aspects of individuals (Thurik and Wennekers, 1999; Drucker, 2002; Nga and Shamuganathan, 2010).

Secondly, the trait approach tends to overlook the diversity and complexity of entrepreneurship. The primary task of the trait approach seems to be answering the question "who an entrepreneur is" which is dependent on a series of clearly defined and universally accepted entrepreneurial characteristics (Gartner, 1988). However, the diversity and complexity of entrepreneurship make it debatable whether such an objective can ever be achieved. Thus, the subjective selection of personality traits is often unavoidable in trait-based studies which have generated conflicting results. For example, some scholars characterised entrepreneurs to be risk-taking (Stewart and Roth, 2001; Zhao, Seibert and Lumpkin, 2010; Brandstätter, 2011; Altinay *et al.*, 2012), while Schumpeter (1934, p.137) clearly stated that "the entrepreneur is never the risk bearer". The diversity

of entrepreneurship also causes issues such as a lack of well-justified research subjects and defective sampling methods in trait-based studies (Low and MacMillan, 1988; Crant, 1996; Thorton, 1999; Stewart and Roth, 2001, 2007; Collins, Hanges and Locke, 2004). A common flaw is drawing samples from successful entrepreneurs that can give rise to post hoc fallacy and undermine the inference of causality (Thorton, 1999). In addition, in some cross-cultural and cross-national studies, variations within samples are even greater than those between the sample and the population which may lead to less robust and empirically testable results (Gartner, 1988).

Thirdly, the trait approach has been criticised for failing to establish solid causal relationships between personality traits and entrepreneurship (Baron, 1998; Thorton, 1999; Mitchell *et al.*, 2002; Baum and Locke, 2004; Stewart and Roth, 2007). Empirical arguments indicate that the associations between personal characteristics and EB are subject to a wide range of contextual factors such as prior entrepreneurial exposure, social structure, family wealth, and entrepreneurial barriers and support (Crant, 1996; Blanchflower and Oswald, 1998; Chen, Greene and Crick, 1998; Lüthje and Franke, 2003; Baum and Locke, 2004; Altinay *et al.*, 2012). It can be argued that the contributions of the trait approach to entrepreneurship research and practice are the vague knowledge that entrepreneurs differ from other individuals somehow, while little causal logic between personality characteristics and EB has been empirically confirmed (Gartner, 1988; Davidsson, 1995; Blanchflower and Oswald, 1998; Thorton, 1999; Stewart and Roth, 2001; Mitchell *et al.*, 2002; Kerr, Kerr and Xu, 2017).

Despite the issues, some scholars suggest that precluding the trait approach may be premature and can hinder the development of entrepreneurship theories, the correlations between personality traits and entrepreneurship should not be ignored, and the emergence of new research tools, application of new theoretical lens and use of more advanced data sources can renew the understanding of the role of personality characteristics in entrepreneurship and generate more

meaningful insights (Zhao and Seibert, 2006; Rauch and Frese, 2007; Stewart and Roth, 2007; Zhao, Seibert and Lumpkin, 2010; Kerr, Kerr and Xu, 2017). Although a set of personality variables to characterise all entrepreneurs are yet to be established, the trait approach increases the understanding of the central role of entrepreneurs in the heterogeneous entrepreneurial phenomena and highlights the necessity to include the individual variables in empirical modelling.

2.4.3 The Behaviour Approach

Following the theories of cognitive behaviours, scholars adopting the behaviour approach generally assumes that EB is the outcome of "the way entrepreneurs think and the individual decision-making processes or heuristics adopted by entrepreneurs" (Ucbasaran, Westhead and Wright, 2001, p.58). According to Mitchell *et al.* (2002, p.97), entrepreneurial cognitions refer to "the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth" which are shaped by historical, economic, social and cultural contexts. It is the distinctive cognitive framework of entrepreneurs developed from the unique combination of their knowledge, experience, perceptions and personalities that explains various aspects of their entrepreneurial journeys and enables them to identify and exploit entrepreneurial opportunities (Baron, 1998, 2004, 2006, 2007; Ucbasaran, Westhead and Wright, 2001; Mitchell *et al.*, 2002; Ward, 2004; Zahra, Korri and Yu, 2005; Dyre, Gregersen and Christensen, 2008). In contrast to the trait approach, the cognitive perspective can not only facilitate researchers to probe into the entrepreneurs' thinking patterns but also produce empirically testable results by using rigorous and well-developed instruments in cognitive psychology (Gartner, 1988; Low and MacMillan, 1988; Lee and Peterson, 2000; Krueger, 2003; Baron, 2004; Zahra, Korri and Yu, 2005; Hisrich, Langan-Fox and Grant, 2007).

2.4.3.1 The Cultural Perspective of Entrepreneurship

One important stream of the behavioural perspective literature is the exploration of the cultural influences on entrepreneurship which is pioneered by Max Weber who suggested the perceivable systematic differences in EB in different cultures indicated the culturally embedded characteristics of entrepreneurship (Thomas and Mueller, 2000; Basu and Altinay, 2002; Hayton, George and Zahra, 2002; Liñán and Fernandez-Serrano, 2014). Defined as "a set of shared values, beliefs and norms of a group or community" (Basu and Altinay, 2002, p.376), culture is closely associated with the economic structure of the society and individuals' behaviours. A significant body of empirical studies has confirmed and reiterated the variances of religious and cultural variables in explaining the variations in entrepreneurial activities (Liñán and Chen, 2009; Tajeddini and Mueller, 2009; Kreiser *et al.*, 2010; Mueller and Conway Dato-on, 2013; Hoque, Mamun and Mohammad Ahshanul Mamun, 2014; Huggins and Thompson, 2014; Liñán and Fernandez-Serrano, 2014). For example, the National Cultural Dimensions Index developed by Hofstede is a powerful tool that facilitates empirical arguments to identify the most influential cultural determinants of entrepreneurship such as power distance, individualism and uncertainty avoidance (Lee and Peterson, 2000; Mueller and Thomas, 2001; Hayton, George and Zahra, 2002; Kreiser *et al.*, 2010; Pinillos and Reyes, 2011; Hofstede Insights, 2018).

2.4.3.2 The Cognitive Perspective of Entrepreneurship

As the most direct antecedent and robust predictor of EB, EI is one of the most heavily focused themes in the task (behaviour)-based literature which has been examined based on various cognitive theories such as the Theory of Cognitive Bias, the Theory of Planned Behaviour (TPB) and the Entrepreneurial Event Theory (Krueger and Carsrud, 1993; Baron, 1998; Van Gelderen *et al.*, 2008; Liñán and Chen, 2009; Looi, 2020). Literature adopting the Theory of Cognitive Bias suggests that entrepreneurs are characterised by serious cognitive biases due to their constant exposure to uncertainty, novelty, emotion and time pressure

(Baron, 1998; Simon, Houghton and Aquino, 2000; Forbes, 2005; Barbosa, Gerhardt and Kickul, 2007; Hmieleski and Baron, 2009), while those adopting the TPB and the Entrepreneurial Event Theory suggest that the development of EI is determined by individuals' attitudes and perceptions which are shaped by a wide variety of environmental factors (Liñán, Urbano and Guerrero, 2011; Kautonen, Van Gelderen and Tornikoski, 2013; Zhang, Duysters and Cloodt, 2014; Kautonen, van Gelderen and Fink, 2015; Anjum *et al.*, 2018).

Another particular interest of the behavioural perspective arises from the observation that not all individuals are equally capable of recognising entrepreneurial opportunities which are defined as "a perceived means of generating economic value that previously has not been exploited and is not currently being exploited by others" (Baron, 2006, p.107). Opportunity recognition is the key step of a entrepreneurial process and one of most important aspects distinguishing entrepreneurs from other individuals (Shane, 2000; Shane and Venkataraman, 2000; Gaglio and Katz, 2001; Ardichvili, Cardozo and Ray, 2003; Eckhardt and Shane, 2003; Zahra, Korri and Yu, 2005; Baron, 2006; Alvarez and Barney, 2007; Dyre, Gregersen and Christensen, 2008; George *et al.*, 2016). Due to the determining role of contextual changes in opportunity emergence and the proactive role of entrepreneurs in opportunity identification, the literature suggests that the opportunity recognition process is composed of multiple interrelated elements such as the active and systematic search for opportunities, alertness, and information asymmetry and prior knowledge (Krueger, 2003; Baron, 2004; Ward, 2004; Westhead, Ucbasaran and Wright, 2005; Corbett, 2007; Shane, 2009; Tang, Kacmar and Busenitz, 2012; Venkataraman, 2019).

2.4.3.3 Value and Limitations

The behaviour approach is valuable to both entrepreneurship research and practice. Firstly, it has established and enhanced the process-based perspective of entrepreneurship conceptualising entrepreneurship as a process involved in a business start-up or opportunity exploitation which includes several components

such as opportunity recognition, resource mobilisation, and venture creation (Gartner, 1988; Shane and Venkataraman, 2000). Secondly, the behaviour approach attributes entrepreneurship to the distinctive entrepreneurial mindsets and emphasises the culture- and context-dependence of entrepreneurship by highlighting the significant effects of exogenous factors such as cultural experience, knowledge, education, demographic and geographic factors (Shane, 2000; Liñán and Fernandez-Serrano, 2014). Thirdly, the employment of rigorous and robust theories and methods in cognitive psychology has enabled the behaviour approach to generate fruitful and empirically testable results and inform subsequent entrepreneurship research (Low and MacMillan, 1988; Lee and Peterson, 2000). Fourthly, the behaviour approach embraces the heterogeneity of entrepreneurship and ascribes the diversity to the interaction between both internal factors, such as the uniqueness of personal knowledge bundle, intuitive and analytic cognitive styles, and external factors, such as the cultural differences, demographic and geographic factors (Krueger and Carsrud, 1993; Thomas and Mueller, 2000; Baron, 2004, 2006; Barbosa, Gerhardt and Kickul, 2007; Tajeddini and Mueller, 2009; Mueller and Conway Dato-on, 2013).

However, the behaviour approach also suffers from certain limitations. The cognitive perspective primarily focuses on the individual level of entrepreneurship by bridging a wide range of internal and external factors to an individual's thinking and behaviour patterns. Taking the multi-level nature of entrepreneurship into account, the cognitive perspective is insufficient to address issues involved in the entrepreneurial phenomena at the societal level. Due to the lack of systemic search and identification of influential factors of entrepreneurship, the literature adopting the behaviour approach is frequently characterised by random and subjective selection of indicators and tends to overlook the complexity entrepreneurship.

To conclude, the behaviour approach adopts principles of both the supply- and the demand-side of entrepreneurship and provides links between the individual

characteristics and contextual factors. It also reflects the preliminary attempt to probe into the entrepreneurship phenomenon at both the individual level and the aggregate level, and the fruitful theoretical and empirical findings have dramatically enriched the understanding of entrepreneurship and informed subsequent studies.

In terms of this study, the behaviour approach provides rigorous theoretical underpinnings and fruitful empirical findings for the proactive role of entrepreneurs in entrepreneurship which necessitates the inclusion of individual factors in entrepreneurship modelling. Further, it has generated growing evidence regarding the context-dependence of the individual factors which suggests the mediating role of the individual factors in the associations between socio-economic influences and EB.

2.4.4 The Network Approach

The increasingly dynamic and competitive business environment poses major challenges for entrepreneurs to actively engage in various social transactions beyond traditional business relationships (Möller and Halinen, 1999). Besides the economic role, there has been an increasing interest in the social role of entrepreneurship in the literature which suggests that not only the entrepreneurial attitudes and behaviours are deeply embedded in interpersonal relations but also the availability of opportunities and presence of barriers and related payoffs are determined by the social structure and network (Granovetter, 1985; Brüderl and Preisendörfer, 1998; Ruef, 2002; Hoang and Antoncic, 2003; Rodan and Galunic, 2004; Anderson, Jack and Dodd, 2005; Stuart and Sorenson, 2005; Perry-Smith, 2006; Hoang and Yi, 2015). In contrast to the trait or behaviour approach, the network perspective is characterised by intensive use of sociological theories to investigate and interpret EB along with economic, psychological and sociocultural perspectives (Starr and Macmillan, 1990; Jenssen, 2001) which “focuses on entrepreneurship as embedded in a social context, channelled and facilitated or

constrained and inhibited by people's positions in social networks" (Aldrich and Zimmer, 1986, p.14).

An entrepreneurial network is a dynamic and personalised web of social relationships that can be intentionally modified by entrepreneurs according to their various objectives (Nijkamp, 2003; Anderson, Jack and Dodd, 2005; Elfring and Hulsink, 2007; Ebbers, 2014; Henry *et al.*, 2017). There are four major themes in the network-based literature, namely, the network function, social ties, network dynamics and network governance.

2.4.4.1 Network Function

Although the configurations of the social networks vary significantly, entrepreneurs' social networking activities are closely related to four entrepreneurial processes: opportunity recognition, venture performance, resource mobilisation, and legitimacy. By exposing entrepreneurs to a wide variety of information, viewpoints and knowledge, social networking enriches their knowledge base and facilitates the establishment and refinement of their cognitive framework of opportunity recognition (De Carolis and Saparito, 2006; Dyre, Gregersen and Christensen, 2008; De Carolis, Litzky and Eddleston, 2009; George *et al.*, 2016).

Some empirical research reported significant correlations between entrepreneurs' social networking activities and overall entrepreneurial outcomes which highlighted the role of social networks in entrepreneurial success. For example, Brüderl and Preisendörfer (1998) surveyed 1700 new business ventures in Germany to examine the relationship between network support and business performance, and the result indicated that the social network of the business founders positively affected the survival and growth of their ventures. The investigation of Chell and Baines (2000) on business service microbusinesses in England reported close associations between network activity and business performance. Lee, Lee and Pennings (2001) sampled 137 Korean technological start-ups to examine the effects of internal capabilities and external networks on

business performance. The findings suggested that only some external linkages were found to predict business sales growth and the performance of the start-ups can be explained by the presence of interactions between internal capabilities and external linkages. The study of Jenssen (2001) based on a group of entrepreneurs in the city of Kristiansand in Norway suggests both direct and indirect effects of social networking activities on start-up success which is measured by the total revenue growth.

To start and run their ventures, entrepreneurs heavily rely on their social relations to access various tangible and intangible resources (Witt, Schroeter and Merz, 2008; Zhang, 2010; Zhang, Soh and Wong, 2010; Arregle *et al.*, 2015). Empirical studies suggest that advice, information and knowledge are of paramount importance among the resources entrepreneurs access from their social contacts; besides, entrepreneurs also seek emotional support, capital, human resources and market access (Birley, 1985; Lee, Lee and Pennings, 2001; Shane and Cable, 2002; Hoang and Antoncic, 2003; Nijkamp, 2003; Rodan and Galunic, 2004; Stuart and Sorenson, 2005).

One major barrier confronting entrepreneurs is the liability of newness which refers to the challenge to legitimatise themselves to the current and potential stakeholders, and social networks can provide reputational or signalling content such as business referencing for entrepreneurial ventures to gain necessary legitimacy (Shane, 2000; Elfring and Hulsink, 2003; Hite, 2005; Stuart and Sorenson, 2005).

Due to the essential role of social networks in the entrepreneurial process, entrepreneurship, to a large extent, is a managerial activity of networking, and the viability of an entrepreneurial venture largely depends on how well an entrepreneur mobilises and exploits his/her social networks (Starr and Macmillan, 1990; Dubini and Aldrich, 1991; Renzulli, Aldrich and Moody, 2000; Jenssen, 2001; Hoang and Antoncic, 2003; Nijkamp, 2003)

2.4.4.2 Social ties

Entrepreneurs' social networks are the gathering of complex professional and social relations such as business contacts, friendship and kinship which provide different but equally important benefits to entrepreneurial activity (Chell and Baines, 2000; Renzulli, Aldrich and Moody, 2000; Ruef, 2002; Jack, Dodd and Anderson, 2004; Rodan and Galunic, 2004; Foley, 2008, 2010; Baer, 2010; Martinez and Aldrich, 2011; Arregle *et al.*, 2015). Based on the frequency of contact, social ties can be broadly categorised into strong ties, referring to friends, relatives and those who are in frequent contact, and weak ties, referring to acquaintances who are in infrequent contact (Granovetter, 1973, 1983; Anderson, Jack and Dodd, 2005; Kim and Aldrich, 2005).

In terms of the effects of strong ties on entrepreneurship, empirical studies have generated mixed results. From one perspective, strong ties are characterised by a high level of trust and knowledge of others and often serve as an important conduit of critical resources such as entrepreneurial motivation, trustworthy information, emotional support, and key resources at low costs for entrepreneurial ventures; by contrast, overreliance on strong ties can limit the sources of information, restrain the expansion of the social networks, reduce the likelihood of venture creation, and cause exclusion and marginalisation (Ruef, 2002; Aldrich and Cliff, 2003; Elfring and Hulsink, 2003; Ruef, Aldrich and Carter, 2003; Jack, Dodd and Anderson, 2004; Anderson, Jack and Dodd, 2005; Carr and Sequeira, 2007; Foley, 2008, 2010; Arregle *et al.*, 2015).

Weak ties are significantly more work-related, thus entrepreneurs prefer to consult weak ties when they need information and opinions on professional and career issues (Granovetter, 1983). Empirical evidence indicates that weak ties contribute to creativity and entrepreneurship through providing heterogeneous and non-redundant content, and bridging various social networks to expand entrepreneurs' personal contacts (Ruef, 2002; Elfring and Hulsink, 2003; Perry-

Smith and Shalley, 2003; Ruef, Aldrich and Carter, 2003; Levin and Cross, 2004; Perry-Smith, 2006; Zhou *et al.*, 2009; Baer, 2010).

Due to the diverse functions of different social ties, the performance of new ventures is highly dependent on the effective creation and management of social networks (Jenssen, 2001; Ruef, 2002; Davidsson and Honig, 2003; Elfring and Hulsink, 2007; Martinez and Aldrich, 2011). Empirical studies show that entrepreneurs mobilised different social connections for different purposes; for example, they sought entrepreneurial motivations from family (Jack, Dodd and Anderson, 2004), financial resources through formal ties (Birley, 1985), professional opinions from work associates or business contacts (Granovetter, 1973, 1983), complementary resources from friends (Zimmer and Aldrich, 1987; Dubini and Aldrich, 1991), emotional supports from the spouse, relatives and close friends (Birley, 1985; Brüderl and Preisendörfer, 1998; Renzulli, Aldrich and Moody, 2000; Arregle *et al.*, 2015).

2.4.4.3 Network Dynamics

Apart from mobilising different social connections for different purposes, entrepreneurs of various genders, cultural backgrounds, or sectors have alternate networking behaviours (Zimmer and Aldrich, 1987; Chell and Baines, 2000; Ruef, 2002; Liao and Welsch, 2005; Foley, 2008, 2010; Henry *et al.*, 2017). Additionally, the patterns of entrepreneurs' networking behaviours vary along their entrepreneurial journey which implies network dynamics along the lifecycle of entrepreneurial ventures (Greve and Salaff, 2003; Hoang and Antoncic, 2003; Hite, 2005; Jack *et al.*, 2010; Slotte-Kock and Coviello, 2010). The path-dependent nature of social networks and the proactive role of entrepreneurs in managing social networks imply the close link between systematic management of networking behaviours and entrepreneurial success (Baer, 2010; Jack *et al.*, 2010; Martinez and Aldrich, 2011; Ebbers, 2014).

2.4.4.4 Network Governance

Unlike their counterparts in incumbent firms, entrepreneurs mostly base the governance of their social networks on social contracting and trust (Starr and Macmillan, 1990; Hoang and Antoncic, 2003). For example, Larson (1992) investigated the network structures of seven high-growth entrepreneurial ventures in detail and found that entrepreneurs primarily control their relational networks by informal and implicit social contracting derived from social norms of trust and reciprocity where prior personal relations and reputational knowledge were critical. By examining the social networks of business owners in Scotland, Anderson, Jack and Dodd (2005) suggested that the complex social relations, both affective and instrumental, involved in the entrepreneurs' social networks are bonded by trust. The role of trust as the key governing mechanism in entrepreneurs' social networks was further confirmed by the case study of Hite (2005).

According to the study of Levin and Cross (2004), the trust-based governance mechanism can be explained by the positive effects of trust on knowledge exchange, especially tacit knowledge. Smith and Lohrke (2008) further argued that entrepreneurs' heavy reliance on trust-based relationship exchanges can be explained by the capacity of trust to facilitate entrepreneurs to overcome the liability of newness and information asymmetry and to enhance the flow of information and resources.

2.4.4.5 Value and Limitations

The network approach contributes to entrepreneurship research and practice by highlighting entrepreneurship to be a socially embedded, multi-level and dynamic phenomenon. Firstly, the network approach enhances the understanding of the social role of entrepreneurship. Since the social environment regulates people's behaviours, entrepreneurship is the result of the complex interactions among various social actors within a specific social context (Autio et al., 2014). Secondly, entrepreneurship is traditionally viewed as an individual activity, while the network

approach suggests the social embeddedness of entrepreneurship which connects the individual level characteristics to a wide range of social factors (Slotte-Kock and Coviello, 2010). Thirdly, the network approach reflects the shift from the traditional static view of entrepreneurship to the dynamic perspective indicating that entrepreneurs not only constantly engage in social transactions but also continuously adapt to the development of their ventures and contextual changes (Greve and Salaff, 2003; Hoang and Antoncic, 2003; Hite, 2005; Jack *et al.*, 2010; Slotte-Kock and Coviello, 2010; Martinez and Aldrich, 2011).

However, entrepreneurship is a multi-faceted and complex socio-economic phenomenon that cuts through various disciplines. Although the sociological perspective of entrepreneurship has generated fruitful results and furthered the understanding of entrepreneurship, the increasing acknowledgement of the complexity and diversity of entrepreneurship calls for a more holistic view to probe into this phenomenon. Nonetheless, the social embeddedness of entrepreneurship indicates that both EI and EB are subject to the social context which informs this study of the presence of significant associations between entrepreneurship and a range of societal factors.

2.5 The EE Perspective

The supply-side of entrepreneurship highlights the proactive role of entrepreneurs in entrepreneurial activity, while the demand-side emphasises the dynamics of the contextual effects on EB (Thornton and Flynn, 2003; Suresh and Ramraj, 2012; Alvedalen and Boschma, 2017; Cavallo, Ghezzi and Balocco, 2018). Although both perspectives have generated fruitful and valuable findings, they also suffer from the weakness of one-sidedness. Thus, it is necessary to develop a more systematic and holistic view to facilitate entrepreneurshhip research and practice.

According to Gladwell (2008, p.8), “the tallest oak in the forest is the tallest not just because it grew from the hardiest acorn; it is the tallest also because no other

trees blocked its sunlight, the soil around it was deep and rich, no rabbit chewed through its bark as a sapling, and no lumberjack cut it down before it matured".

With the acknowledgement of the importance of contextual influences and the appreciation of the central role of entrepreneurs, the ecological perspective of entrepreneurship integrates both supply- and demand-side views and has attracted much research attention and become one of the most popular themes in entrepreneurship literature because it is believed to be a more promising way in entrepreneurship research despite its newly emergence (Suresh and Ramraj, 2012; Autio *et al.*, 2014; Autio and Levie, 2015; Spigel, 2016; Alvedalen and Boschma, 2017).

2.5.1 Antecedents of the EE Perspective

The EE perspective came into being from multiple sources. Acs *et al.* (2017) identified two major lineages: the regional development literature and the strategic management literature.

The earlier and established work of industrial districts, clusters and innovation systems in the regional development literature focusing on the associations between the geographic agglomeration of economic activities and the superior regional economic performance laid foundations for the EE approach (Cohen, 2006; Isenberg, 2011; Acs *et al.*, 2017). Industrial districts refer to "geographically defined productive systems, characterised by a large number of firms that are involved at various stages, and in various ways, in the production of a homogeneous product" which emphasise the interactions of a population of firms within a specific territory (Pyke, Becattini and Sengenberger, 1990, p.2). Clusters denote the "geographic concentrations of interconnected companies and institutions in a particular field" which emphasise the locality and regional competitiveness (Porter, 1998, p.78). Regional innovation systems (RIS) are "the networks and institutions linking knowledge producing hubs such as universities and public research labs with innovative firms within a region" which are

concerned with the regional innovative activities such as knowledge creation, knowledge transfer and knowledge commercialisation (Acs *et al.*, 2017, p.2).

Drawing many main principles of geographical clustering from the above theories, the EE perspective provides explanations for the observation that entrepreneurial activities are much more active in certain regions (Mason and Brown, 2014; Brown and Mason, 2017; Cavallo, Ghezzi and Balocco, 2018). In line with these antecedent perspectives, the EE approach underlines the capacity of regional contexts to enable and constrain entrepreneurial activities (Isenberg, 2011, 2016; Suresh and Ramraj, 2012; Stam, 2015; Spigel, 2017; Stam and Spigel, 2017; Maroufkhani, Wagner and Wan Ismail, 2018).

However, the EE approach differs from regional development theories in three aspects: territorial boundedness, leadership and knowledge (Acs *et al.*, 2017). Firstly, the regional development literature aims to provide insights into the aggregate economic performance within a bounded region, while the multi-level nature of EEs suggests they are not confined to any administrative territories (Thornton and Flynn, 2003; Qian, Acs and Stough, 2013; Mason and Brown, 2014; Brown and Mason, 2017). Secondly, the regional development literature assumes no actors in the system play a clear role in leadership, while the EE approach focuses on the competitiveness of entrepreneurial firms in an area where entrepreneurs are explicitly the focal and central players of the system (Stam, 2015; Spigel, 2016; Acs *et al.*, 2017; Cavallo, Ghezzi and Balocco, 2018). Thirdly, industrial districts, clusters, and innovation systems emphasise the spill-over of technical knowledge among firms, while the EE approach underlines the entrepreneurship-specific knowledge (Acs *et al.*, 2009; Klepper, 2010; Qian, Acs and Stough, 2013; Spigel, 2016; Qian, 2018; Yoon *et al.*, 2018). It can be argued that the EE perspective “either replaces, or at least is a necessary complement, or even pre-condition to, cluster strategies, innovation systems, knowledge-based economies, and national competitiveness policies” (Isenberg, 2011, p.1).

The strategic management literature on the business ecosystem coined by Moore (1993) is another important source of the EE perspective (Acs *et al.*, 2017). Based on the observation that business environments, akin to natural ecosystems, evolve from chaos to structured communities, Moore (1993) suggested a new way of thinking in strategic management in which firms do not operate in isolation but co-exist and co-evolve with a variety of other actors within the cross-industry business ecosystems. Peltoniemi and Vuori (2004) further argued that the business ecosystem perspective is theoretically underpinned by the complexity theory and characterised by self-organisation, emergence, co-evolution and adaptation. Today, the application of ecosystem metaphor to business and management has become commonplace, e.g. industrial ecosystem, social ecosystem, economic ecosystem, small-business ecosystem and innovation ecosystem, the EE perspective can be considered as a stream of the business ecosystem perspective (Isenberg, 2016; Malecki, 2018).

Besides the above two lineages, there is a third important predecessor, the perspective of the entrepreneurial system (Alvedalen and Boschma, 2017; Malecki, 2018). Spilling (1996, p.91) analysed the dynamic process of the Olympics Games with a focus on entrepreneurship and suggested that an entrepreneurial system “consists of a complexity and diversity of actors, roles, and environmental factors that interact to determine the entrepreneurial performance of a region or locality”. Neck *et al.* (2004) enriched the entrepreneurial system perspective by investigating the high-tech companies in Boulder County. The study demonstrated the evolutionary process of the Boulder County entrepreneurial system and argued that a healthy entrepreneurial system can contribute to regional economic prosperity through facilitating new venture creation, job creation, wealth creation, and business growth.

By emphasising the dynamic interactions between entrepreneurs and a variety of contextual factors, including people, organisations, networks and institutions, the EE perspective synthesises antecedent theories and approaches and offers a

new way of thinking in the geographical clustering of entrepreneurial activity with entrepreneurs being the central player and entrepreneurship being both the primary inputs and outcomes of the system (Isenberg, 2011; Stam, 2015; Stam and Spigel, 2017; Malecki, 2018).

2.5.2 The Characteristics of EE

The term “entrepreneurial ecosystem” consists of two components. The first component, “entrepreneurial”, refers to entrepreneurship that explicitly theorises the central role of entrepreneurs within the system (Stam, 2015; Stam and Spigel, 2017). The objective of an EE in promoting entrepreneurship indicates entrepreneurial activity is the primary output of the system (Mason and Brown, 2014; Stam, 2015). Although the EE approach can lead to economic growth, job creation and many social benefits, it can be argued that these positive outcomes are fundamentally the side effects of an increased level of entrepreneurial activity. More importantly, the broad spill-over effects of successful and productive entrepreneurs create an entrepreneurial culture and motivate the formation of EI (Stam, 2015; Spigel, 2016; Stam and Spigel, 2017; Maroufkhani, Wagner and Wan Ismail, 2018). Although entrepreneurial cognitions and behaviours are highly dependent on contextual infrastructures, the presence of such a virtuous cycle and positive feedback loop implies that precedent entrepreneurship is the critical determinant and the key input of an EE (Isenberg, 2016). Thus, as the entrepreneurial activity is both essential input and primary output of an EE, entrepreneurs are inherently the leader of an EE and the focus of the EE approach.

Through the observation that a majority of the economic growth and jobs are created by a few high-quality entrepreneurial ventures, some scholars insist that “entrepreneurship” in the EE approach is intrinsically different from self-employment, business ownership or SME and exclusively refers to those characterised by risk-taking, innovation, growth and productivity (Shane and Venkataraman, 2000; Mason and Brown, 2014; Stam, 2015; Brown and Mason,

2017; Stam and Spigel, 2017). However, due to the complex and diverse nature of entrepreneurship, such a quality-based perspective tends to overlook the distinctive social and economic benefits of various types of entrepreneurial activities and undermine the effectiveness of entrepreneurship policymaking (Morris, Neumeyer and Kuratko, 2015). The coexistence of the conflicting viewpoints implies that both quantity and quality matter in entrepreneurship and the EE perspective must take both issues into account.

The second component is the “ecosystem” which is an metaphor borrowed from the “natural ecosystem” typically referring to a system of interacting living organisms and their physical environments (Isenberg, 2016). The metaphor highlights the characteristics of an EE such as complexity, dynamics, diversity and path-dependence (Auerswald, 2015; Boulton, Allen and Bowman, 2015; Stam and Spigel, 2017).

Akin to a natural ecosystem, an EE consists of both “biotic” components, which refer to various individual and organisational stakeholders, and “abiotic” components, which denote the diverse influencing factors such as the physical infrastructures, institutions, cultures, etc. (Acs *et al.*, 2014; Autio and Levie, 2015; Sussan and Acs, 2017). These components can both enable and constrain entrepreneurship (Suresh and Ramraj, 2012), while the positive and negative effects are not static but dynamic (Mack and Mayer, 2016). For example, the studies of Acs (2006) and Acs, Desai and Hessels (2008) indicate dynamic influences of economic development on entrepreneurship which are manifested as the presence of both “push” and “pull” effects on the career choices of the labour force. Drawing from the GEM data of the US in 2001 and 2012, Hechavarria and Ingram (2014) reported the diminishing effect of several aspects of the EEs which resulted in the declining birth rates and increasing death rates of early-stage entrepreneurial activity.

The ecosystem analogy also implies a path-dependent process as EEs typically emerge from locations with fertile soil for entrepreneurship because history exerts

profound influences on the development of an EE and small differences in its early stages can lead to massive variations in later outcomes (Mason and Brown, 2014; Boulton, Allen and Bowman, 2015). The various configurations of the diverse components derived from the diversity, dynamics and path-dependence imply the uniqueness of each EE which necessitate a distinctive combination of factors to facilitate its development. The uniqueness increases the understanding that, although the great achievements of the Silicon Valley have made it the ideal type of EE and encouraged governments around the world to replicate its success in other areas, few attempts have ever succeeded (Isenberg, 2010).

In practice, the understandings of the term “ecosystem”, especially the extent to which an EE resembles a natural ecosystem, remain debatable among researchers and practitioners. According to some scholars, the ecosystem approach is the heuristics based on evolutionary biology assuming no overarching purpose to direct the ecosystem for some specific positive or negative outcomes due to the massive variances in the objectives of different players; thus, the emerging patterns of the system derive from a self-organising, self-sustaining and self-regulating process (Auerswald, 2015; Boulton, Allen and Bowman, 2015; Stacey and Mowles, 2016). Self-organisation refers to the emergence of patterns of relationships among various actors within a specific context, self-regulation depicts the dynamic balance of the relationships among various actors within the system (Boulton, Allen and Bowman, 2015), and self-sustainment describes “a system in which one part produces the resources required by another part” (Isenberg, 2016, p.568). It is also argued that, since the process of self-organisation, self-sustainment and self-regulation cannot be designed, predicted and do not follow any principle (Boulton, Allen and Bowman, 2015), an EE is not “typically designed, created, established, or built” and cannot be owned or controlled but can be “affected, influenced, facilitated, and occasionally restored” (Isenberg, 2016, p.568).

In contrast, some scholars argued that the ecosystem analogy should not be taken too literally but refers to an extension of entrepreneurial context to more actors and factors (Stam, 2015; Bruns *et al.*, 2017; Stam and Spigel, 2017). They further argued that this approach focuses on the entrepreneurial activity taking place within a community of various actors; by emphasising the cultural, social and institutional influences on entrepreneurial activities, this new way of thinking aims to build a holistic view for entrepreneurship research and practice.

The ecosystem analogy also implies that an EE should be perceived as a spatial concept (Kenney and Patton, 2005; Kline *et al.*, 2014; Audretsch and Belitski, 2017; Audretsch and Link, 2019). The geographic perspective arises from the observation of the uneven distribution of entrepreneurship across regions (Bosma and Sternberg, 2014; Bruns *et al.*, 2017). The agglomeration of entrepreneurial activities has various explanations such as an individualistic culture, the rich resources of a specific area, the leadership effects of successful entrepreneurs, or the knowledge flows among different sectors (Thornton and Flynn, 2003; Kenney and Patton, 2005; Cavallo, Ghezzi and Balocco, 2018). The commonly referred aims of the entrepreneurship literature adopting the geographic view are shown in Table 2-4.

Table 2-4 Research aims of the geographic view literature

Research Aims	Sources
The effect of a community of various actors on individual entrepreneurial activity	(Neck *et al.*, 2004; Suresh and Ramraj, 2012; McKeon, 2013; Geometry, 2014; Boh, De-Haan and Strom, 2016; Rampersad, 2016; Jennen, Rigby and Allum, 2016; Roundy, 2017; Miller and Acs, 2017; Morris, Shirokova and Tsukanova, 2017; Neumeyer *et al.*, 2018; Olutuase *et al.*, 2018; Theodoraki, Messeghem and Rice, 2018; Audretsch and Link, 2019; De Oliveira and Vitale Torkomian, 2019; Link and Sarala, 2019)

The effects of geographic concentration of entrepreneurship on regional economic performance	(Spilling, 1996; Kenney and Patton, 2005; Kim, Kim and Yang, 2012; Qian, Acs and Stough, 2013; Bosma and Sternberg, 2014; Guerrero *et al.*, 2014; Kline *et al.*, 2014; Szerb *et al.*, 2015; Yoon *et al.*, 2015; Raible, 2016; Spigel, 2016, 2017; Mack and Mayer, 2016; Audretsch and Belitski, 2017; Nylund and Cohen, 2017; Bruns *et al.*, 2017; Erina, Shatrevich and Gaile-Sarkane, 2017; Harper-Anderson, 2018; McAdam, Harrison and Leitch, 2019; Reichert, 2019)
The entrepreneurial characteristics within a specific political, cultural and institutional environment of a country OR The cross-national differences in terms of entrepreneurial activity and entrepreneurial context	(Chandra and Fealey, 2009; Kantis and Federico, 2012; Rahatullah Khan, 2013; Arruda, Nogueira and Costa, 2013; Acs *et al.*, 2014, 2016; Soto-Rodríguez, 2014; Stam, 2014; Acs *et al.*, 2018; Ács, Autio and Szerb, 2014; Hechavarria and Ingram, 2014; Autio and Levie, 2015; Raible, 2016; Autio and Rannikko, 2016; Jha, 2018; Park and Park, 2018; Bosma *et al.*, 2018; Hechavarría and Ingram, 2019; Kremer, 2019; Yan and Guan, 2019)

(Source: developed by the author based on literature)

Like a natural ecosystem, an EE is a highly diverse phenomenon that is not confined to any specific administrative or spatial scales which can be either as small as a university campus or as large as a nation-state and a smaller system can be the sub-system of a large one as long as they share some key homogeneous influential agents and factors (Thornton and Flynn, 2003; Qian, Acs and Stough, 2013; Mason and Brown, 2014; Brown and Mason, 2017). Besides, the effects of the widespread of the Internet and the development of telecommunication on the interactions between entrepreneurship and geography have enabled the emergence of trans-national and global EEs that imply the trend of an increasingly integrative entrepreneurial context around the globe (Thornton and Flynn, 2003; Brown and Mason, 2017). Nevertheless, the unbalanced nature and the centripetal forces of an economy suggest that an EE is inherently a

geographic concept (Acs *et al.*, 2017; Brown and Mason, 2017; Cavallo, Ghezzi and Balocco, 2018).

2.5.3 The Definition of EE

Despite the extensive discussions in the literature, the EE concept remains vague in the literature. Some of the definitions are presented in Table 2-5.

Table 2-5 A selected list of EE definitions

Source	Definitions of EE
(Cohen, 2006, p.3)	"an interconnected group of actors in a local geographic community committed to sustainable development through the support and facilitation of new sustainable ventures"
(Qian, Acs and Stough, 2013, p.561-562)	"those economic, social, institutional and all other important factors that interactively influence the creation, discovery and exploitation of entrepreneurial opportunities"
(Kline *et al.*, 2014, p.306)	"The entrepreneurial ecosystem refers to the interdependent set of physical, legal, cultural, financial, human, and organizational elements within a community that has the potential to support or thwart an entrepreneur's activity."
(Mason and Brown, 2014, p.5)	"a set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organisations (e.g. firms, venture capitalists, business angels, banks), institutions (universities, public sector agencies, financial bodies) and entrepreneurial processes (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"

(Ács, Autio and Szerb, 2014, p.479)	"A National System of Entrepreneurship is the dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures"
(Acs *et al.*, 2014, p.3)	The National Entrepreneurial Ecosystem refers to "the dynamic institutionally embedded interaction between individuals characterized by entrepreneurial attitudes abilities and aspirations, which drives the allocation of resources through the creation and operation of new ventures"
(Stam, 2014, p.1)	"An entrepreneurial ecosystem is an interdependent set of actors that is governed in such a way that it enables entrepreneurial action."
(Auerswald, 2015, p.10)	"An entrepreneurial ecosystem implies cooperative and productive relationships among different organizations. In many countries, these relationships are between startups, established companies, universities, and research institutions. In a vibrant ecosystem, people and ideas flow between these organizations, starting new ventures, joining existing ones, and linking innovations together." (defined by Global Entrepreneurship Congress)
(Stam and Spigel, 2017, p.408)	"a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory"
(Bruns *et al.*, 2017, p.31)	"a multidimensional set of interacting factors that moderate the effect of entrepreneurial activity on economic growth".
(Spigel, 2017, p.50)	"Entrepreneurial ecosystems are combinations of social, political, economic, and cultural elements within a region that support the development and growth of innovative startups and encourage nascent entrepreneurs and other actors to take the risks of

	starting, funding, and otherwise assisting high-risk ventures”
(Audretsch and Belitski, 2017, p.1031, 1045)	“institutional and organisational as well as other systemic factors that interact and influence identification and commercialisation of entrepreneurial opportunities” “efficient entrepreneurial ecosystem as a complex system of interactions between agents within various socioeconomic, institutional and informational contexts which generate more new businesses and growth”
(Roundy, 2017, p.240)	The small town entrepreneurial ecosystem refers to “a community of individuals, social structures, institutions, and cultural values, located in a city of limited reach, scope or size, whose interactions produce entrepreneurial activity”.
(Nicotra *et al.*, 2018, p.642)	“a set of interdependent factors (or, as we call them, eco-factors) coordinated in a way that enables entrepreneurship”
(Kreuzer *et al.*, 2018, p.10)	“the entrepreneurial ecosystem is defined as a product of three elements: 1. the surrounding environment, more precisely the business environment and investment climate, 2. its interacting actors, and 3. the evolving culture and attitudes.”
(Jha, 2018, p.179)	“an embedded view of new business ventures and their evolution. In other words, the ecosystems view acknowledges that firms do not operate in a vacuum and are in fact embedded in the broader social, cultural and institutional context that shapes their growth and contributes to their chance of success”

(Spigel and Harrison, 2018, p.164)	"EE can be seen as ongoing processes through which resources develop within an ecosystem, flow between entrepreneurs and other actors, and create or attract more resources over time, changing the overall structure of the ecosystem."
(Roundy, Bradshaw and Brockman, 2018, p.5)	"An entrepreneurial ecosystem is a self-organized, adaptive, and geographically bounded community of complex agents operating at multiple, aggregated levels, whose non-linear interactions result in the patterns of activities through which new ventures form and dissolve over time."
(Hechavarría and Ingram, 2019, p.431)	"Entrepreneurial ecosystems are communities consisting of many independent actors (e.g., governments, universities, investors, mentors, service providers, media, and large companies) that can play a key role in the development of and level of entrepreneurial activity for a given geography."

(Source: developed by the author based on literature)

From various attempts in defining an EE, Jennen, Rigby and Allum (2016) identified five shared themes: the interdependency of the entities, the encouraging aspect, the evolutionary nature, the geographic boundedness, and multiple ecosystem domains. Apart from the common elements, each definition was developed by the researchers to suit their respective research objectives. For example, Cohen's (2006) study focused on sustainable entrepreneurship, thus his definition emphasises the sustainability of the EE. Mason and Brown's (2014) study is mainly concerned with the growth orientation of entrepreneurship, hence their version explicitly emphasised high growth firms. The work of Stam and Spigel (2017) highlights the community within which the entrepreneurial activities take place, their definition underscored the combination and coordination of different local stakeholders and factors. While Audretsch and Belitski (2017) attach more emphasis on entrepreneurial opportunities.

Through scrutiny of the literature, this study identifies four key elements that characterise an EE:

a) a unique configuration of commonly shared factors,
b) inclusion of both contextual and individual factors,
c) interactions among the factors,
d) and geographic boundedness.

Aligning to the research objective of this study, an EE is thus defined as:

A unique configuration of contextual and individual factors within a geographic area that interactively affects entrepreneurship of the area.

2.5.4 The EE Models

Each EE is unique (Isenberg, 2010; Mason and Brown, 2014; Brown and Mason, 2017). The uniqueness is not attributed to the fundamentally different structures but to the distinctive configurations of shared elements such as history, culture and institutions, governments, universities, support services, social networks, and so on (McKeon, 2013; Diaconu and Duţu, 2015; Mack and Mayer, 2016; Rampersad, 2016). Thus, an essential theme in the EE literature is the identification of those common components that has led to the development of various models and frameworks.

Through the review of literature on the entrepreneurial environment, Bruno and Tyebjee (1982) listed a series of frequently cited factors, including venture capital availability, presence of experienced entrepreneurs, technically skilled labour force, accessibility of suppliers, accessibility of customers or new markets, favourable governmental policies, the proximity of universities, availability of land or facilities, accessibility of supporting services, and attractive living conditions.

Based on the study the Silicon Valley, Bahrami and Evans (1995) built a EE framework that is capable of promoting regional knowledge recycling and high-tech entrepreneurship. The major constituents of the system include venture

capital, support infrastructure, entrepreneurial spirit, lead users, talent pool, universities & research institutes.

By observing the impact of the Winter Olympics 1994 on regional entrepreneurship of Norway, Spilling (1996) developed a dynamic model illustrating emphasising the interactions between environmental factors and entrepreneurial events. A mega-event, like the Olympic Games, creates a new entrepreneurial climate in short term by motivating various actors and generating new entrepreneurial opportunities, and catalysts a series of entrepreneurial events, such as the creation of new businesses, products, services and markets, and the process of entrepreneurial learning. The presence of feedback loops enables the entrepreneurial events and learning process to reshape the economic and socio-cultural structure and lead to long-term change in the regional entrepreneurial context.

Based on the study of the entrepreneurial environment in Victoria, British Columbia, Cohen (2006) developed a sustainable EEs model. Considering the important role of social network in promoting entrepreneurship, Cohen's (2006) framework emphasise the function of both informal and formal networks and the various components involved. Informal networks mainly provide advice, mentoring and moral support; and formal networks can include factors such as research university, government, professional and support services, capital sources, talent pool, large corporations, technology parks, physical infrastructure and culture.

Based on his long-term research and practice in entrepreneurship, Isenberg (2011, 2016) developed a multi-dimensional EE model which has been widely adopted in the literature (see Table 2-6).

Table 2-6 Isenberg's EE model

Policy	**Leadership**	• Unequivocal support • Social legitimacy • Open door for advocate • Entrepreneurship strategy • Urgency, crisis and challenge
	Government	• Institutions • Financial support • Regulatory framework incentives • Research institutes • Venture-friendly legislation
Finance	**Financial Capital**	• Micro-loans • Angel investors, friends and families • Zero-stage venture capital • Venture capital funds • Private equity • Public capital markets • Debts
Culture	**Success Stories**	• Visible successes • Wealth generation for founders • International reputation
	Societal Norms	• Tolerance of risk, mistakes, failure • Innovation, creativity, experimentation • Social status of entrepreneurs • Wealth creation • Ambition, drive, hunger
Supports	**Infrastructure**	• Telecommunications • Transportation & logistics • Energy • Zones, incubators, co-working, clusters
	Support Professions	• Legal • Accounting • Investment bankers • Technical experts, advisors
	Non-Government Institutions	• Entrepreneurship promotion in non-profits • Business plan contests • Conferences • Entrepreneur-friendly associations
Human Capital	**Labour**	• Skilled and unskilled • Serial entrepreneurs • Later generation family

	Educational Institutions	• General degrees (professional and academic) • Specific entrepreneurship training
Markets	**Early Customers**	• Early adopters for proof-of-concept • Expertise in productising • Reference customer • First reviews • Distribution channels
	Networks	• Entrepreneur's networks • Diaspora networks • Multinational corporations

(Source: Isenberg（2011, 2016))

By analysing the cases of two entrepreneurial ventures, Suresh and Ramraj (2012) developed an EE framework comprising eight support systems: moral support, financial support, network support, government support, technology support, market support, social support and environmental support. They also developed a set of questionnaires with the application of the framework to a pilot study, the validity and reliability of which seemed satisfying. However, since the interviews were conducted with successful entrepreneurs while the surveys with potential entrepreneurs, the different sampling methods generated some contrasting results. Both financial support and government support emerged to be important influencing factors in the survey but appeared to be insignificant in the interviews.

The triple helix framework which denotes the university-industry-government interactions in regulating entrepreneurship is also commonly used in the literature. For example, Kim, Kim and Yang's (2012) study based on the state-level data of the US suggested the variables and their interrelationships of the triple helix model and habitat factors jointly determined the regional innovative and entrepreneurial activities.

Ács, Autio and Szerb (2014), and Acs *et al.* (2014) adopted the GEDI approach which includes both individual-level variables and institutional variables to make cross-regional or cross-national comparisons of EEs.

The World Economic Forum (2013, 2014) developed an eight-pillar framework of EE covering various influential factors in an entrepreneurial context (see Table 2-7).

Table 2-7 The 8-pillar EE model

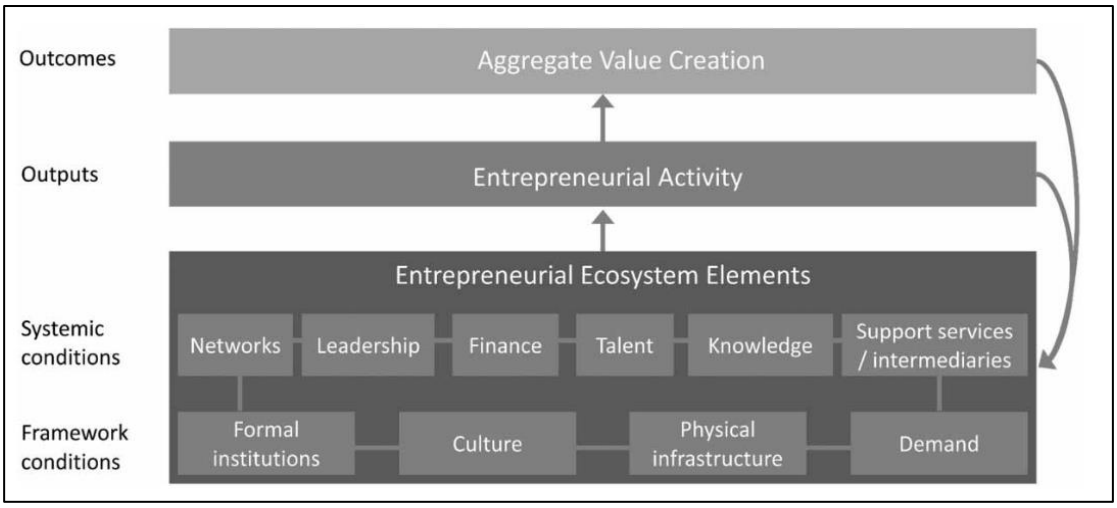
EE Pillars	Components of the Pillars
Accessible Markets	• Domestic Market – Large Companies as Customers • Domestic Market – Small/Medium Companies as Customers • Domestic Market – Governments as Customers • Foreign Market – Large Companies as Customers • Foreign Market – Small/Medium Companies as Customers • Foreign Market – Governments as Customers
Human Capital/Workforce	• Management Talent • Technical Talent • Entrepreneurial Company Experience • Outsourcing Availability • Access to Immigrant Workforce
Funding and Finance	• Friends and Family • Angel Investors • Private Equity • Venture Capital • Access to Debt
Support System	• Mentors/Advisors • Professional Services • Incubators/Accelerators • Network of Entrepreneurial Peers
Regulatory Framework and Infrastructure	• Ease of Starting a Business • Tax Incentives • Business-Friendly Legislation/Policies • Access to Basic Infrastructure (e.g. water, electricity) • Access to Telecommunications/Broadband • Access to Transport
Education and Training	• Available Workforce with Pre-University Education • Available Workforce with University Education • Entrepreneur-Specific Training
Major Universities as Catalysts	• Major Universities Promoting a Culture of Respect for Entrepreneurship • Major Universities Playing a Key Role in Idea-

	Formation for New Companies • Major Universities Playing a Key Role in Providing Graduates for New Companies
Cultural Support	• Tolerance of Risk and Failure • Preference for Self-Employment • Success Stories/Role Models • Research Culture • Positive Image of Entrepreneurship • Celebration of Innovation

(Source: World Economic Forum (2013, p.6-7))

Autio *et al.* (2014) suggested that the influencing contextual factors of the EEs that regulate entrepreneurial innovation include industry and technological contexts, organizational contexts, institutional and policy contexts, social contexts, and temporal and spatial contexts.

Figure 2-1 Multi-layer EE model



(Source: Stam (2015, p.1765))

Through synthesising the extant literature, Stam (2015) designed a four-layer EE model which highlights the upward and downward causation and intra-layer casual relation (see Figure 2-1). The EE elements consist of framework conditions, which include formal institutions, culture, physical infrastructure and demand, and systemic conditions, which include networks, leadership, finance, talent, knowledge and support services/intermediaries. The complex interactions among the EE elements generate the ecosystem outputs of entrepreneurial

activities which further lead to the outcomes of aggregate value creation. Moreover, the outcomes and the outputs of the system reversely influence the interactions and configurations of the EE elements.

Based on the survey of 552 people who lived and worked in the Bay of Plenty region in New Zealand, Jennen, Rigby and Allum (2016) established an EE model from the stake-holder perspective, the major components of which include culture, government, infrastructure, education, support & innovation hubs, collaboration and networking.

Based on the data of 70 European cities from the Eurostat Statistical Database and previous literature on EEs, Audretsch and Belitski (2017) identified four domains that were essential for the effective city-wide EEs, namely, culture and norms, infrastructure and amenities, formal institutions, internet access and connectivity.

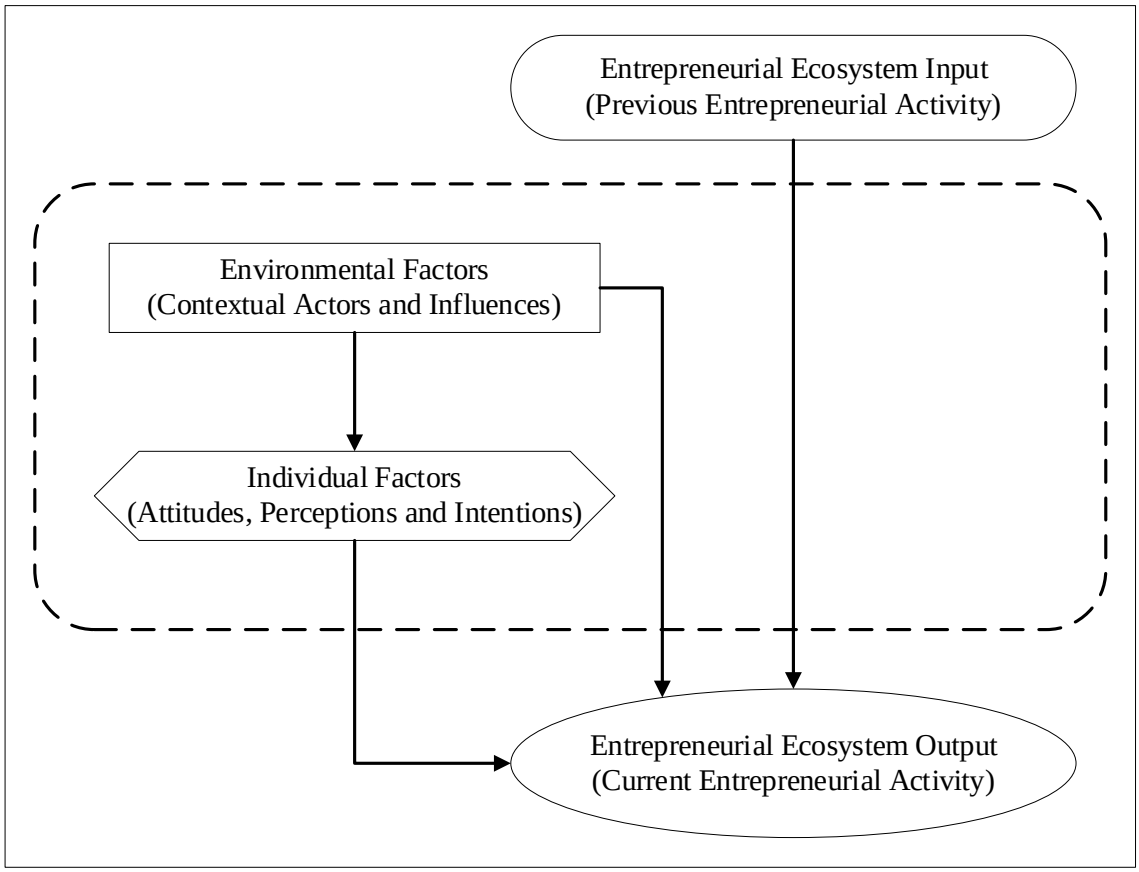
The presence of shared factors in various EE suggests that the development of an EE is to a large extent dictated by its distinctive configurations. Thus, to enrich understanding of entrepreneurship and EE which can pave the way for entrepreneurship policymaking to nurture entrepreneurial activity more effectively, it is meaningful to undertake cross-EE studies to examine to what extent various configurations affect entrepreneurship.

2.5.5 A Theoretical Framework of EE

The ecosystem perspective provides a more holistic way to probe into entrepreneurship, and the proposed EE models pave the way for the evaluation of the entrepreneurial contexts. However, most empirical studies tend to focus on identifying the contextual determinants while few have examined the causal links between exogenous and endogenous factors and their joint impacts on entrepreneurial activity. To address this gap, this study proposes a mechanism regarding the joint effects of both contextual and individual factors on EB.

Further, much of the empirical arguments are local and regional level studies, the limited application of the ecosystem approach to the national level significantly constrains its capacity to inform entrepreneurship policymaking. The growing importance of entrepreneurship in today's knowledge-based economy has validated and accelerated nurturing entrepreneurial activity to be a national policy in many countries which calls for more efforts at the societal level. To this end, this study provides a cross-national analysis to advance the EE research at the national level which can be more informative for entrepreneurship policymaking. Thus, by synthesising various EE models, this study offers a theoretical framework shown in Figure 2-2.

Figure 2-2 A Theoretical framework of EE



(Source: developed by the author)

In the model, an EE that is bounded by the dotted line consists of both environmental and individual factors. Thereinto, the environmental factors refer

to contextual actors and influences that either promote or restrict entrepreneurial activity. By contrast, individual factors denote the individual characteristics of entrepreneurs that may include diverse attitudes, perceptions and intentions. Additionally, the primary input and output of the system are previous and current entrepreneurial activity respectively.

The model demonstrates the key characteristics of an EE. First, the model suggests both entrepreneurial activity and individual factors are subject to the effects of various environmental factors that highlight the context-dependence of entrepreneurship. Second, the model indicates the direct effects of individual factors on entrepreneurship which underlines the proactive role of entrepreneurs in an EE. Third, the model shows that previous entrepreneurial activity is a strong predictor of subsequent entrepreneurial activity that emphasises the path-dependence of an EE and the dynamics of entrepreneurship.

2.6 Chapter Summary

This chapter is the critical assessment of the key concepts and the justification of the theoretical lens adopted in this study to address the first objective of the study. Entrepreneurship is defined as business creation in consideration of its characteristics and practical operationalisation for cross-national comparison. Various research traditions and theories in the entrepreneurship literature are discussed to justify the EE perspective as the appropriate theoretical lens for this study. Through synthesising definitions of EE in the literature, an EE is conceptualised to be a unique configuration of contextual and individual factors within a geographic area that interactively affect entrepreneurship of the area, and is characterised by dynamics, diversity, complexity, path-dependent and geographical boundedness with entrepreneurial activity being both the key inputs and outputs. The critical evaluation of the various EE frameworks in the literature suggests each EE is unique due to its distinctive configuration of commonly shared factors. Based on the arguments, a general conceptual model of an EE is proposed.

3 Societal QOL

3.1 Chapter Overview

Due to its close association with economic growth and social development, QOL has been one of the most popular themes in the literature of sociology and economics for the last several decades (Lambiri, Biagi and Royuela, 2007). Although various models have been developed in the literature, the multi-dimensional, multi-faceted and multi-level characteristics of QOL highlight the necessity for the identification of its key dimensions to suit the specific research aim in this study. To address the second objective of the study and to facilitate the subsequent empirical analysis, this chapter presents a critical review of the QOL literature to identify the key constructs of QOL at the societal level. To this end, this chapter is divided into the following sections. Firstly, the different approaches to QOL evaluation are assessed to justify the employment of the objective indicators in this study. Secondly, the characteristics and a definition of societal QOL are introduced. Lastly, various QOL models are reviewed to facilitate the identification of the key domains of societal QOL to construct a societal QOL framework for this study.

3.2 Social Indicators

Since there is no clearly articulated and generally accepted definition for QOL in the literature, it is often used as the synonym for a range of similar but distinctive concepts such as welfare, wellbeing, happiness and satisfaction (Veenhoven, 2001; Sousa Gomes, Luís Rocha Pinto and Gomes dos Santos, 2010; Raibley, 2012). Due to the close associations between social development and economic growth, residents' welfare is traditionally assumed to be solely dependent on the availability of economic resources which indicates that the more affluent the wealth of a society is, the higher level of well-being the individuals in the society should have (Sirgy *et al.*, 2006). Based on the assumption, QOL is presumably a focus of economics and is predominantly measured by economic indicators such

as GDP, GNI or personal income in the literature (Diener and Suh, 1997; Bognar, 2005).

However, with the increasing acknowledgement of the social and ecological issues and costs brought by economic growth, the philosophy of “economic growth as the major goal of social progress” was seriously challenged by the Social Indicators Movement during the 1960s and 1970s (Noll, 2004, p.152). The public preference for quality over quantity of living necessitates the inclusion of other social factors such as education, housing and personal safety in welfare evaluation. Defined as the “statistic that is supposed to have some significance for measuring the quality of life” (Sirgy *et al.*, 2006, p.344), social indicators that combine a variety of socio-economic measures have been widely accepted as the dominant approach in QOL research and practice.

3.2.1 Objective and Subjective Approaches

Within the social indicator approach, there are two distinctive methods to evaluate QOL which are established on different theoretical assumptions: the objective approach and the subjective well-being (SWB) (Diener and Suh, 1997; Michalos, 2004; Pissourios, 2013). The objective approach refers to the “societal measures that reflect people’s objective circumstances in a given cultural or geographic unit” (Diener and Suh, 1997, p.192) that is underpinned by the Scandinavian philosophy assuming the availability of resources promotes welfare (Noll, 2004; Bognar, 2005). This approach primarily bases the measurement of welfare on the “relatively easily observable and measurable” quantified statistics (Sirgy *et al.*, 2006, p.344). This approach is valuable because it reflects “the normative ideals of a society” (Diener and Suh, 1997, p.194) which protects the best interests of the vulnerable and disadvantaged (Felce and Perry, 1995). However, doubts have been raised about whether such normative ideals can be established due to the absence of a universal agreement on the direction of social progress (Diener and Suh, 1997; Noll, 2004).

For example, Michalos (2004) categorised various objective indicators into three groups: the positive indicators, the increase of which predicts the improvement of QOL such as literacy rate and life expectancy; the negative indicators, the increase of which leads to the deterioration of QOL such as crime rate and infant mortality rate; and unclear indicators, the increase of which may cause QOL to go either way such as income inequality. It is controversial to claim that the reduction of income inequality is beneficial to social progress. The extreme imbalance in wealth distribution can cause a series of social issues such as instability, turmoil and a loss of social justice. By contrast, it can be argued that economic development does not necessarily reduce inequality and excessively even distribution of wealth can hinder economic growth and efficiency (Goudie and Ladd, 1999; Noll, 2004; Abida and Sghaier, 2012; Shin, 2012; Delbianco, Dabús and Caraballo, 2014; Fawaz, Rahnama and Valcarcel, 2014; Sztaudynger, 2018).

Diener and Suh (1997) mentioned the methodological issue involved in the objective approach about the choices between using a combination of indicators and using individual indicators separately. The combination of indicators provides simplicity to the analysis and enriches the general understanding of data, while individual indicators provide more detailed information which enables observations from multiple angles. Since the data used in the objective approach tends to be descriptive, it is difficult to compare the indicator value of one feature with another (Sirgy *et al.*, 2006). Thus, reliance on a single indicator or single case can result in subjective biases due to the prejudgement of favourable or unfavourable conditions based on researchers' own values or beliefs.

The most outstanding advantage of the objective approach is that the indicators are relatively easy to define, quantify and access without heavy reliance on personal evaluation (Diener and Suh, 1997). With the increasing availability of data published by various international organisations, governments and private

institutions, the objective approach captures most of the important aspects depicting the quality of a society and allows cross-national comparisons.

The major challenge to the objective approach is “the inevitable role of subjective decisions in selecting and measuring the variables” due to the absence of consensus on the antecedents of welfare (Diener and Suh, 1997, p.195). Different researchers use different indicators and measurements, often in an ad hoc fashion, to evaluate QOL to adapt to their distinctive objectives and values (Diener and Suh, 1997; Noll, 2004). For example, Sirgy (1986) and Hagerty (1999) based the dimensions of QOL on the five levels of Maslow’s hierarchy of needs, Peterson and Malhotra (1997) adopted the 7 dimensions of International Living, and EUROSTAT (2019), OECD (2019) and UNDP (2019) developed their own criteria to assess different dimensions of QOL. Mustunsir (2015) argued that the current sustainable development paradigm is beneficial for developed countries but can lead to more deprivation for third-world economies. Even for a generally accepted dimension, various researchers may use different variables and measurements. A typical example is the adoption of GDP-based, GNI-based and consumption-based variables in the literature to evaluate the economic dimension of QOL. Thus, to ensure the valid and reliable application of the objective approach, it is imperative to synthesise different evaluation strategies to establish the QOL dimensions, variables and measurements suitable to the research objectives.

Researchers following the American approach believe that QOL is a subjective sense of well-being and rely the assessment of SWB on people’s perceptions and judgements (Noll, 2004; Bognar, 2005; Sirgy *et al.*, 2006). Defined as individuals’ cognitive and affective evaluations of their lives, SWB consists of four major conceptualisations, positive affect, negative affect, life satisfaction and happiness (Diener, Oishi and Lucas, 2003). SWB approach has two major strengths. First, SWB provides insights into the personal experience which increase the understanding of the causal relationships between individual well-

being and related influencing factors (Oishi *et al.*, 1999; Michalos, 2004; Tay and Diener, 2011). Second, SWB makes it possible to generate a general index, such as the overall satisfaction, to allow cross-sectional or cross-regional comparisons (Diener and Suh, 1997; Tov and Diener, 2007; Diener, Tay and Oishi, 2013).

However, it suffers from serious critiques over validity and reliability issues. First of all, as the basis of SWB, personal perception and judgement are subject to individual differences such as personality traits, values and personal experience and contextual effects such as culture and social norms (Diener, Oishi and Lucas, 2003; Bognar, 2005; Abbott and Wallace, 2012; Raibley, 2012). For example, the studies of Sandvik, Diener and Seidlitz (1993), DeNeve and Cooper (1998), and Steel, Schmidt and Shultz (2008) based on different samples and instruments reported significant variances in SWB caused by personality traits. Culture, especially the individualism-collectivism dimension, is also found to be a strong and persistent predictor of individual SWB in empirical studies (Diener *et al.*, 2000; Oishi, 2000; Tov and Diener, 2007; Camfield and Skevington, 2008). The literature also suggests high correlations between SWB and a range of personal and contextual factors such as individuals' physical attractiveness, health, relationship status, and historical factors (Diener, Wolsic and Fujita, 1995; Dush and Amato, 2005; Tov and Diener, 2007; Diener and Chan, 2011).

Then, SWB literature typically adopts self-reported surveys as the primary research tool which can introduce significant biases and distortions (Diener and Suh, 1997; Schalock, 2004; Gasper, 2010). The literature suggests that there is still scepticism towards the construct validity of various self-report happiness & satisfaction scales because respondents tend to over-report their happiness, their evaluations are contingent on factors such as memory, current mood, instant judgement or researchers' manipulation of research context, and the interpretation of the analysis is highly dependent on the researchers' own values and beliefs (Bognar, 2005; Kahneman and Krueger, 2006). For example, Sandvik, Diener and Seidlitz's (1993) assessment of different self-report and non-self-

report SWB instruments showed noticeable variations which indicate the situational and momentary effects in the outcomes of SWB studies. According to Kahneman and Krueger (2006, p.6), a respondent's answer is "retrospective judgment, which in most cases is constructed only when asked and is determined in part by the respondent's current mood and memory, and by the immediate context".

The most significant controversy of the SWB approach arises from the weak associations between individual subjective well-being and social progress. Some wide-accepted good societal qualities, such as state welfare and personal intelligence, seem not correlated to or even reduce individuals' happiness and satisfaction (Veenhoven, 2001; Kahneman and Krueger, 2006). Thus, some scholars argue that QOL and SWB are two different phenomena, and what the subjective evaluation measures is in fact how well people adapt to social and economic changes (Veenhoven, 2001; Noll, 2004; Camfield and Skevington, 2008). For example, the work of Diener, Diener and Diener (1995) and McBride (2001) indicate significant differences between the long-term effects of absolute and relative income on SWB that suggest people adapt to their incomes quickly. The meta-analysis based on longitudinal data from 188 publications conducted by Luhmann *et al.* (2012) also showed significant adaptation effects in SWB on major family and work events.

A more recent strategy widely adopted by researchers and policy-makers is the combination of both objective and subjective indicators in QOL assessment (Noll, 2004; Sirgy *et al.*, 2006). However, the low correlations between objective and subjective approaches in empirical studies suggest that living conditions do not necessarily decide people's perception, evaluation and judgement (Felce and Perry, 1995). Combining both objective and subjective indicators can generate multiple possibilities of conclusions due to the significant variations in terms of the values, theories and criteria adopted by different researchers; since people's preference differs significantly, the ideal conditions of QOL depend on the general

agreement among researchers, citizens and policymakers about whether their judgement is based on moral or rational assessment (Sirgy *et al.*, 2006).

3.2.2 QOL in Micro and Macro Systems

Empirical studies based on the objective indicators and SWB generate mixed results when applied at different levels. At the individual level, the correlations between the objective approach and SWB tend to be insignificant and inconsistent (Diener and Oishi, 2000; McBride, 2001; Diener and Biswas-Diener, 2002; Tov and Diener, 2007). The divergence indicates the significant role of personal and micro-contextual differences in assessing individual well-being and highlighted the indispensable role of the subjective measurements in micro-level QOL studies (Diener and Suh, 1997; Helliwell, 2003; Bognar, 2005; Camfield and Skevington, 2008).

In contrast, empirical findings based on the objective approach and SWB seem to converge at the societal level. Various studies confirmed that national characteristics, such as absolute personal income, human rights, equality and national culture, are strong and consistent predictors of the average SWB of a society because the use of the mean of individual-level variables averages out the individual differences (Diener, Diener and Diener, 1995; Diener and Suh, 1997; Diener and Oishi, 2000) and suggests that objective indicators can serve as satisfactory proxies of QOL at the aggregate level due to the absence of individual heterogeneity.

Both objective and subjective approaches have their respective values and limitations, their applications are contingent on the objective, theme and level of the research (Gasper, 2010; Sirgy, 2011b, 2011a). Schalock (2004) suggests that QOL studies should focus on the subjective appraisal of living when applied to microsystems (the individual level) and a typical research strategy is self-report surveys, while the QOL of macrosystems (societal level) should be measured by various indices and statistics which objectively depict the socio-economic conditions of the society as a whole. Thus, the above arguments suggest that

individual wellbeing and societal QOL are two closely interrelated but distinctive phenomena. SWB is more appropriate in individual-level QOL studies, while the objective approach is more suitable for societal-level assessments. Hence, focusing on the QOL issues at the societal level, this study adopts the objective approach.

3.3 Societal QOL

3.3.1 Characteristics of Societal QOL

Traditionally, societal QOL was considered as the combination of the individual QOL within a society which has led to the applications of individual QOL measurements to the societal context. For example, based on Maslow's hierarchy of needs, Sirgy (1986, p.341-342) defined QOL as "the hierarchical level of need satisfaction of the aggregate members of a society". Sirgy (1986) further argued that developed and developing economies are characterised by most members satisfied with higher-order and lower-order needs respectively which suggests that the societal QOL refers to the level of needs fulfilment of the majority of the residents.

However, such a perspective neglects the needs of minorities and has been seriously challenged by more recent studies. Hagerty (1999) tested Sirgy's (1986) proposition to analyse the relationships between different levels of needs fulfilment and the national QOL development based on the time-series data from 88 countries over 35 years and the hypotheses were only partially supported. The study corroborated the multi-dimensional nature of QOL and validated the necessity of adopting both economic and non-economic factors (Pennings, 1982; Bleys, 2012; Pissourios, 2013). However, the limited conformity of the results to Maslow's theory highlights the differences between individual-level and society-level QOL and implies societal QOL emphasise the macro issues such as environmental protection and economic decision-making which cannot be adequately addressed by individual-level QOL studies (Sirgy, 2011a).

As an important stream of the QOL literature which explicitly focuses on the macro-social influences on people's lives, societal QOL is beyond the aggregate of happiness of citizens and the application of individual-level approaches to the societal level can be misleading (Sirgy, 2011a; Abbott and Wallace, 2012). Thus, societal QOL should be interpreted and measured by either "a synthesis of individual assessment of collective QOL" or "collectively determined collective QOL" (Gasper, 2010, p.358), and need to take various factors closely connected to social progress into accounts, such as social norms and values, societal quality and social structures, which individual-level QOL lacks. Furthermore, the common objectives or standpoint of societal QOL studies focus on the evaluation and decision-making of public policies where objective measurements are essential (Schalock, 2004; Gasper, 2010).

3.3.2 Definition of Societal QOL

Concerning the aggregate life quality in the macro-economic, social, cultural and ecological contexts, societal QOL is a multi-dimensional and multi-faceted phenomenon (Berger-Schmitt, 2002; Gasper, 2010; Abbott and Wallace, 2012). Several definitions have been developed in the literature.

Some scholars based the conceptualisation of societal QOL on need satisfaction. For example, societal QOL is defined according to Maslow's hierarchical theory of human motivation (Hagerty, 1999), or as "the hierarchical need satisfaction level of most of the members of a given society" (Sirgy, 1986, p.329), the "fulfilment of physiological needs" (Diener and Diener, 1995, p.277), "individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (The WHOQOL Group, 1995, p.1405), the "satisfaction of preference" (Islam and Clarke, 2002, p.205), "meeting various human needs" (OECD, 2011, p.18). Other scholars tried to define societal QOL based on individuals' evaluations such as "the general state of well-being experienced by society's members" (Morris and Lewis, 1991, p.24), "an evaluation (an evaluative

judgement) about major aspects, or the entirety, of a life or a society" (Gasper, 2010, p.351), "overall wellbeing, a multidimensional construct consisting of the underlying dimensions of evaluative and affective wellbeing" (Maridal, 2017, p.2).

However, the above definitions are clearly derived from individual-level approaches and tend to overlook the society-level characteristics. To facilitate human prosperity and development, societal QOL should be conceptualised to include a range of factors characterising a good society and valued by the general public (Thomas and Evans, 2010; Sirgy, 2011a; UNDP, 2019). Thus, to adapt to the research objectives of this study which focus on the associations between QOL and entrepreneurship at the societal level, societal QOL is defined as:

the multi-dimensional aggregate life quality which reflects the economic, social and environmental development of a society.

Based on the definition, several issues regarding the measurements of societal QOL need to be clarified based on discussions in previous sections. Firstly, the concept of societal QOL expands the notion of societal development to include both economic and non-economic considerations (Berger-Schmitt, 2000, 2002; Bleys, 2012; Kobus, Półchłopek and Yalonetzky, 2019). A good society is not only characterised by affluent economic resources but also by harmonious inter-individual and individual-society relations, prosperous human development and environmentally friendly habitats (Moldan, Janoušková and Hák, 2012). Secondly, the considerable variations between macro- and micro-level QOL suggest that the dimensions and measurements of societal QOL significantly differ from those in individual SWB (Bleys, 2012). Thus, the societal QOL framework is highly dependent on indicators capable of monitoring economic, social and ecological changes of a society. Thirdly, due to the descriptive nature of objective indicators, it is necessary to evaluate the effects of each societal QOL variable respectively (Kobus, Półchłopek and Yalonetzky, 2019). Further, panel data with both cross-sectional and time dimensions are valuable to assess the dynamics in societal QOL and enable cross-national comparisons (Bleys, 2012).

3.3.3 Societal QOL Domains

Acknowledging the multi-dimensionality of societal QOL, various models and frameworks have been established by different researchers and policymakers. To establish a societal QOL framework suitable for this study, it is necessary to review and synthesise incumbent models in the literature to avoid biases and subjective selection of criteria. Among the various QOL models and frameworks in the literature, those with an explicit focus on the societal level are listed in Table 3-1.

Table 3-1 A selected list of societal QOL models

Source	Dimensions	Sub-dimensions
(Morris and Lewis, 1991)	economic	
	health	
	social	
	technological	
	work	
	institutional	
	ecological	
(The WHOQOL Group, 1995)	Physical domain	
	Psychological domain	
	Level of independence	
	Social relationships	
	Environment	
	Spirituality/religion/personal beliefs	
(Peterson and Malhotra, 1997)	Costs	Cost of Living
		Culture
	Benefits	Economy
		Infrastructure
	Sustainability	Freedom
		Health
		Environment
(Hagerty, 1999)	Physiological	
	Safety	
	Belongingness and Love	
	Esteem	

	Self-Actualisation	
(Berman and Phillips, 2000)	Socio-economic security	Material security
		Employment security
		Housing security
		Maintenance of health
	Social inclusion	Inclusion in social security
		Labour market inclusion
		Housing market inclusion
		Health service coverage
		Inclusion in education system and services
		Political inclusion
		Inclusion in community services
		Social status inclusion
	Social cohesion	Economic cohesion
		Social status cohesion
		Political cohesion
		Public safety
		Altruism
	Empowerment	Social and cultural empowerment
		Political empowerment
		Economic empowerment
		Social psychological empowerment
(Sirgy *et al.*, 2004)	economic well-being	
	consumer well-being	
	social well-being	
	health well-being	
(Economist Intelligence Unit, 2005)	Material well-being	
	Health	
	Political stability and security	
	Family life	
	Community life	
	Climate and geography	
	Job security	
	Political freedom	
	Gender equality	
(Bleys, 2012)	Well-being	

	Economic welfare	
	Sustainability	
(White and Wynne, 2014)	Public safety	
	Public education	
	Child welfare	
	Recreation	
(OECD, 2019a)	Material living conditions	Housing
		Income
		Jobs
	Quality of life	Community
		Education
		Environment
		Governance
		Health
		Life Satisfaction
		Safety
		Work-Life Balance
	Sustainability	
(Maridal, 2017)	Community and Relationships	Community life
		Family life
	Freedom and Opportunity	Political freedom
		Civil liberties
		Religious freedom
		Economic freedom
		Perceived opportunities
		Entrepreneurship
		Education
	Health and Environment	Physical health
		Mental health
		Environmental health
	Living Standard	Income
		Poverty
		Essential resources
	Peace and Security	Violence and human rights
		Law and order
(EUROSTAT, 2019)	material living conditions	
	housing conditions	
	employment	
	time use	

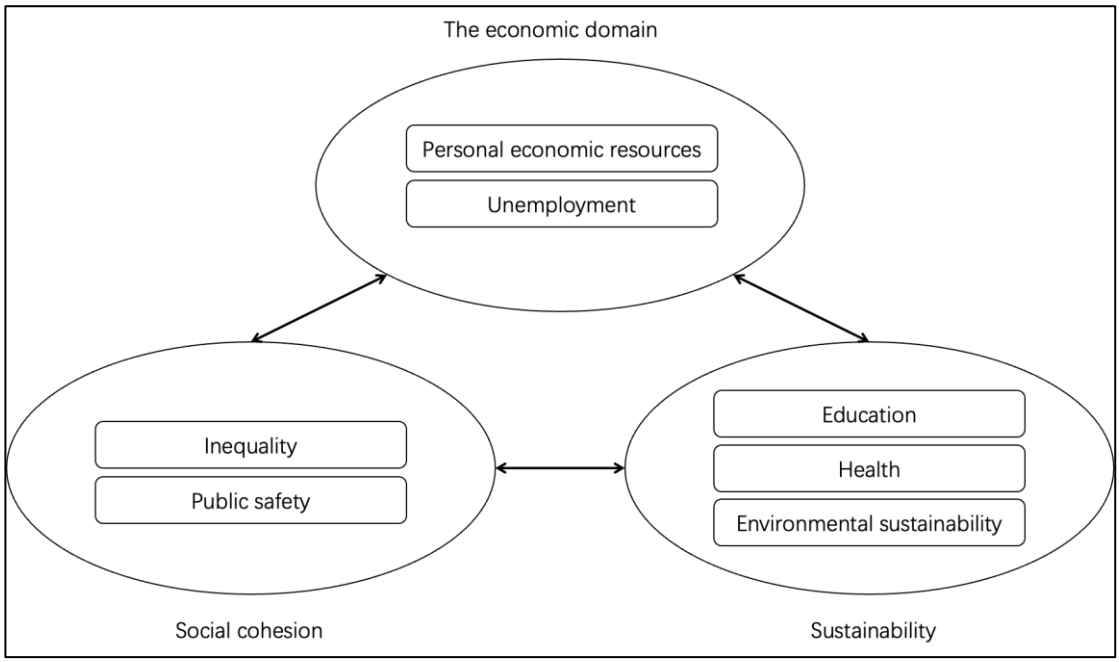
	education health social relationships safety governance environment
(UNDP, 2019)	A Decent Standard of Living Knowledge Long and Healthy Life
(Joshanloo, Jovanović and Taylor, 2019)	Socio-Economic progress Psycho-Social functioning Negative affectivity
(OECD, 2019b)	Perceptions of social risks and government effectiveness General context Self-Sufficiency Equity Health Social Cohesion

(Source: developed by the author based on literature)

These models were built by different organisations and researchers according to their specific research purposes and specific contextual settings. For example, the WHOQOL Group (1995) model was designed for health professionals and researchers to assess the cultural embedded, health-related and subjective QOL of individuals to enable cross-cultural comparisons. The QOL framework of EUROSTAT (2019) was built with a clear aim of illustrating different aspects of life conditions in European countries. While the UNDP (2019) ratings were developed specifically to evaluate human development in different countries. Such differences lead to variances in the identification of QOL domains and the selection of indicators. By synthesising the various domains involved in the

different societal QOL models, a societal QOL model established by this study is shown in Figure 3-1.

Figure 3-1 Societal QOL model



(Source: developed by the author)

It can be argued that societal progress is reflected by economic, social and environmental objectives; thus, three broad inter-connected and inter-dependent dimensions emerge, the economic domain, social cohesion and sustainability, that suggest, besides the material sector of living, societal QOL assessment also underscore the institutional, social-structural and ecological concerns such as safety, equity, education, health and so on (Pennings, 1982; Berger-Schmitt, 2000, 2002; Giovannini, 2008; Bleys, 2012). The economic domain can be measured by two frequently referred indicators, personal economic resources and unemployment. Social cohesion can be assessed via situations regarding how resources are evenly distributed and how citizens feel safe in a society. And sustainability highlights prosperous human development and a sustainable environment. Although societal QOL can be affected by other factors such as political and institutional issues, it can be argued that the above indicators are the most direct measures of the quality of a society and citizens' lives.

3.3.4 The Economic Domain

The role of the economic domain in societal QOL is built on three premises. Firstly, material prosperity is generally accepted as a major aim of social progress in most societies and people's welfare is primarily determined by the availability of the economic resources to satisfy their physical needs (Bognar, 2005; Sirgy, 2011b). Secondly, economic factors account for most of the variance in societal QOL (Diener and Suh, 1997). For instance, Diener and Diener (1995) examined the relationship between national wealth and national QOL by processing the data from the World Bank's World Development Report 1994 and relative UN documents of 101 different countries. The results indicated that economic development, measured by GDP per capita, could explain 79% of the variances in total societal QOL, and strong correlations to GDP per capita could be identified in 19 out of the 32 QOL measurements. Thirdly, economic development is closely associated with various aspects of residents' social lives which implies the over-influence and multi-linear effects of economic factors (Tov and Diener, 2007). For example, various empirical studies show that economic growth significantly alleviates poverty (Bonito *et al.*, 2017; Michálek and Výbošťok, 2019). Additionally, wealthier counties tend to have better education and healthcare system which dully promotes the overall human capital.

However, empirical studies also indicate that economic growth does not necessarily improve overall life satisfaction but can cause a series of social and environmental issues such as rising suicide rates and increasing greenhouse emissions (Islam and Clarke, 2002; OECD, 2011; Bleys, 2012; Oishi and Kesebir, 2015; Cavalletti and Corsi, 2018; Joshanloo, Jovanović and Taylor, 2019). The substantial social and ecological costs brought by economic growth necessitate the utilisation of both economic and non-economic indicators (Berger-Schmitt, 2000, 2002; Bognar, 2005; Bleys, 2012).

Nevertheless, the economic domain assumes a vital role in societal QOL because "wealth can provide an important first approximation to the material quality of life

in nations" (Diener and Suh, 1997, p.193). Through reviewing various societal QOL models in the literature and taking the research objective of this study which is the examination of the associations between societal QOL and entrepreneurship into account, the economic domain is evaluated based on the two most frequently referred indicators: the personal economic resources and unemployment. From the macro perspective, these two indicators denote the wealth creation and job creation capacity of society respectively; from the micro perspective, they reflect the economic resources at one's disposal and the deprivation of one's opportunities to participate in economic activity.

3.3.5 Social Cohesion

Social cohesion is an important societal attribute focusing on the connectedness within a society, the reduction of disparity, social marginalisation, social exclusion, social isolation and violence which is closely associated with individuals' health and life satisfaction, and a reflection of economic and social progress (Noll, 2004; Klein, 2013; Schiefer and van der Noll, 2017; Bottoni, 2018). Social cohesion depicts the relational quality experienced by citizens in their daily lives which has a direct effect on individual behaviours and well-being (Berger-Schmitt, 2000; Michalos and Zumbo, 2001; Abbott and Wallace, 2012; Yang *et al.*, 2013; Smith and Kawachi, 2014). Furthermore, social cohesion can be conceived as the manifestation of social institutions and social structure which are decisive to social quality. Hence, social cohesion is inherently an important construct of QOL (Bottoni, 2018).

Despite the absence of a clear definition, social cohesion is generally recognised as a multi-dimensional and multi-level concept focusing on the inter-personal relationships which denote individuals' attitudes and behaviours of identification, membership and participation at the community level (Berger-Schmitt, 2000; Berman and Phillips, 2000; Michalos and Zumbo, 2001; Friedkin, 2004), and emphasise the individual-society relationships and depicts the extent to which citizens are equal and safe at the societal level (Bottoni, 2018; Goubin, 2018;

OECD, 2019b). Thus, at the societal level, social cohesion can be evaluated by two main sub-dimensions: societal inequality which evaluates the extent to which resources and opportunities are evenly distributed across society, and societal stability which depicts the extent to which a society is stable, and citizens feel safe.

Societal inequality emphasises social justice and its empirical evaluations tend to focus on poverty which is a dysfunction of social cohesion in terms of the deprivation of access to resources and opportunities, and a major barrier to economic and social progress (Berger-Schmitt, 2000, 2002; Sirgy, 2011b; Sztaudynger, 2018). Poverty reduction has always been the centre of human ideal and empirical evidence suggests poverty is significantly associated with various social issues, such as poor health and hygiene, suicide, deprivation of education and freedom, social isolation and social exclusion (Smith and Kawachi, 2014; Mood and Jonsson, 2016; Amir-ud-Din, Abbas and Javed, 2018; Eckhard, 2018; Goubin, 2018).

Regarding the evaluation of poverty, there are generally two different methods: the absolute and the relative approaches. Absolute poverty is typically measured by the threshold of the resources necessary to meet the basic need of an individual such as the international poverty line and a country-specific poverty line (Mood and Jonsson, 2016). However, with economic development, the effect of absolute poverty on societal QOL seems to decrease, and the societal inequality is increasingly determined by the income gaps among citizens, especially in developed countries (Kawachi and Kennedy, 1997; Abida and Sghaier, 2012). Today, income inequality is the dominant indicator for inequality evaluations in the literature, typically measured by indices such as the Gini coefficient, the Decile Dispersion Ratio, the Generalised Entropy Measures or Atkinson's Inequality Measures (Goudie and Ladd, 1999; Michálek and Výbošťok, 2019). However, empirical studies regarding the associations between income inequality and economic development have produced mixed results including positive,

negative, or weak correlations; the absence of sufficient and consistent evidence for the causality between wealth distribution and economic performance implies a contingent role of income inequality in social progress (Shin, 2012; Delbianco, Dabús and Caraballo, 2014; Fawaz, Rahnama and Valcarcel, 2014, 2015; Caraballo, Dabús and Delbianco, 2017; Sztaudynger, 2018).

Besides economic effects, income gaps are also closely associated with a variety of social issues. For example, excessive income inequality can lead to social stratification and hierarchy, loss of social cohesion, disinvestment in social capital, less happiness and satisfaction, poorer health and greater suicide rates and mortality rates (Hamilton and Kawachi, 2013; Smith and Kawachi, 2014; Oishi and Kesebir, 2015; Sztaudynger, 2018; Michálek and Výbošťok, 2019). Despite its vital role, overreliance on income inequality in the literature tend to overlook other social inequality issues, and the increasing acknowledgement of the multi-dimensionality of societal inequality suggests the necessity to assess inequality across society from multiple angles (Goubin, 2018; Kobus, Półchłopek and Yalonetzky, 2019)

Public safety is another important indicator to evaluate individual-society relationships which have profound effects on individual and business behaviours (Berman and Phillips, 2000; White and Wynne, 2014; OECD, 2019a). High correlations between public safety and QOL can be explained by the rationale that safety is one of the basic individual needs (Sirgy, 1986; Hagerty, 1999; Camfield and Skevington, 2008). Further, a safe habitat attracts talents and quality labour force which are critical for business activities, while insecurity toward public safety generates avoidance behaviours in both individuals and businesses which can cause a breakdown in social cohesion (Kitchen and Williams, 2010). Besides, unsafe environments are also closely associated with inequality and poverty (Roe and Siegel, 2011; Klein, 2013; Amir-ud-Din, Abbas and Javed, 2018). Literature suggests using different methods to assess the safety dimension at different levels including the perception of personal safety at

the individual level, crime rates at the local and regional levels, and political stability at the societal level (Roe and Siegel, 2011; Abbott and Wallace, 2012; Kim, Kim and Yang, 2012; White and Wynne, 2014).

3.3.6 Sustainability

Besides favourable current conditions, a quality society is also characterised by a substantial capacity to ensure its future development, thus evaluation of sustainable development is critical in the societal QOL assessment (Noll, 2004; Giovannini, 2008; OECD, 2011; Bleys, 2012; Marans, 2015; Pieper, Karvonen and Vaarama, 2019). Emphasising inter-generational equity, sustainability generally refers to the capacity to satisfy the needs of the current generation without undermining that of future generations (Giovannini, 2008; OECD, 2011; Sirgy, 2011b; Tso, Yau and Yang, 2011; Schiefer and van der Noll, 2017; UNDP, 2019). The literature suggests that sustainability at the societal level includes two equally important aspects: human development and environmental sustainability (Tso, Yau and Yang, 2011; Pieper, Karvonen and Vaarama, 2019).

In terms of prosperous human development, a quality and sustainable society is characterised by well-educated and healthy citizens which indicates that education and health are the most relevant indicators (Sirgy, 2011b; UNDP, 2019).

Being the primary channel of knowledge communication, education enhances the active participation of individuals in economic and social lives, the cultivation of a skilled labour force, the capacity of the labour force for internal migration to adjust to economic, social and technological transformations, and the technological and R&D reservoir of a society to a knowledge-based economy (Giovannini, 2008; Michalos, 2008; Mustunsir, 2015; UNDP, 2019). Furthermore, education is an institutional arrangement which significantly contributes to inter-generational equity, social justice, and societal progress (Estes and Sirgy, 2019; Kobus, Półchłopek and Yalonetzky, 2019).

A significant body of empirical studies based on various datasets confirms that different measures of education are positively associated with SWB, happiness and satisfaction, self-confidence, income level, employment opportunity, self-reported health, general human capital, economic growth and poverty reduction in both developed and developing countries (Abida and Sghaier, 2012; Cuñado and de Gracia, 2012; Hamilton and Kawachi, 2013; Delbianco, Dabús and Caraballo, 2014; Fawaz, Rahnama and Valcarcel, 2014, 2015; Caraballo, Dabús and Delbianco, 2017). Additionally, variations in education also significantly contribute to the income disparities within and across societies (Gilleskie and Hoffman, 2014). Michalos (2008) argued that the contribution of education to welfare depends on the way of defining education because education can be recognised on a narrow concept of formal education or a broad concept incorporating both formal and informal learning. In the literature, the former conceptualisation is generally preferred due to the convenience in operationalisation.

As a human ideal for all societies, a healthy life contributes to both current and future individual wellbeing. Various theoretical and empirical studies suggest that health predicts individual SWB, physical competency and life satisfaction, enhances human capital and social relations and sustains human development (Michalos, 2004; Camfield and Skevington, 2008; Lepage, 2009; Marans, 2015; Estes and Sirgy, 2019). Being an important source and construct of human capital, health is closely associated with lower discount rates of individuals' future utilities, and differences in health can lead to significant income gaps across a society (Schultz, 1961; Tetrick *et al.*, 2000; Hatak and Zhou, 2021). For example, Becker (2007) suggested that healthier individuals are more likely to invest in education. Through dynamic modelling, Gilleskie and Hoffman (2014) found that differences in health among individuals can generate significant variations in human capital and disparities in income. In terms of its measurements in the literature, the evaluation of health typically relies on self-reported surveys at the micro-level and

on indices such as life expectancy and mortality rates at the macro-level (EUROSTAT, 2019; OECD, 2019a; UNDP, 2019).

Due to the deteriorating environmental issues such as air pollution and climate change, an enjoyable habitat has been increasingly accepted by researchers, policy-makers and the general public as one of the most important characteristics of a quality society (Michalos, 2014; Estes and Sirgy, 2019; UNDP, 2020c; World Economic Forum, 2020). Environmental sustainability at the societal level not only refers to enjoyable habitat which is closely connected to people's physical and mental health but also denotes inter-generational equity to preserve natural resources at the disposal of future generations (Berger-Schmitt, 2000, 2002; Marans, 2015; Malkina-Pykh and Pykh, 2016). A sustainable environment provides affluent natural resources which are critical for the survival and prosperity of individuals and businesses, especially in factor-driven economies; further, an enjoyable living environment attracts talents and quality labour force, especially younger generations who have stronger environmental values (Hafeez *et al.*, 2011). As a multi-dimensional concept, environmental sustainability has been assessed from different angles in the literature such as fossil fuel usage, greenhouse gas emission, carbon footprint, natural resource exploitation or various indices like the Environmental Sustainability Index (ESI) and Environmental Performance Index (EPI), etc. (Bleys, 2012; Rowley *et al.*, 2012; Babcicky, 2013; Pissourios, 2013; Bjørn *et al.*, 2016).

3.4 Chapter Summary

This chapter is a critical assessment of the concept and key dimensions of societal QOL to support subsequent empirical analysis. Through a critical review of the literature, QOL at the societal level is defined as the multi-dimensional aggregate life quality which reflects the economic, social and environmental development of a society. The significant differences in QOL of micro- and macro-systems justify the reliance on objective indicators in this study. Through synthesising various QOL models, three broad and inter-related domains of

societal QOL are identified: the economic domain, social cohesion, and social sustainability. Further, the economic domain evaluates the material aspect of QOL which includes two main indicators: personal economic resources and unemployment. Social cohesion domain appraises the inter-personal and individual-society relations which consists of two major components: inequality and public safety. Societal sustainability is concerned with the developmental potential and inter-generational equity of a society which can be assessed from education, health and environmental sustainability.

4 Societal QOL and Entrepreneurship

4.1 Chapter Overview

A significant body of literature has examined the associations between QOL and entrepreneurship. However, empirical studies tend to be fragmented and unsystematic which reflects currently limited knowledge regarding their causal links. Although there are some theoretical discussions concerning the role of QOL in an EE, little comprehensive empirical evidence has been generated. To address this gap, this chapter critically reviews the extant literature on the associations between societal QOL factors and entrepreneurship to construct the conceptual frameworks and develop research hypotheses.

To this end, this chapter consists of two main parts. The first part is the discussion of the direct associations between societal QOL factors and entrepreneurship and the development of Hypothesis 1: Societal QOL has significant direct effects on entrepreneurship. The second part discusses the indirect associations between societal QOL and entrepreneurship mediated by EI. Thus, Hypothesis 2 is developed: EI mediate the effects of various QOL factors on entrepreneurship.

4.2 Direct Associations

In terms of the causal relationships between QOL and Entrepreneurship, there are two distinct perspectives in the literature: entrepreneurship as the explanatory variable and as the explained variable. From one perspective, various types of entrepreneurial activity make significant contributions to societal QOL through creating extraordinary economic and social values and enhancing the capacity for sustainable development which suggests entrepreneurship significantly affects societal QOL (Nataraajan and Angur, 2014; Morris, Neumeyer and Kuratko, 2015; Woodside, Bernal and Coduras, 2016). By contrast, various societal QOL factors, such as social and human capital, attractive living conditions, knowledge creation and spill-over, create entrepreneurial opportunities and motivate entrepreneurial activity (Hafeez *et al.*, 2011; Kim, Kim

and Yang, 2012; Qian, Acs and Stough, 2013; Lecuna, 2014; White and Wynne, 2014). The presence of double causations implies an indispensable role of societal QOL in an EE (Autio *et al.*, 2014; Kline *et al.*, 2014; Nicotra *et al.*, 2018).

4.2.1 The Economic Dimension of Societal QOL and Entrepreneurship

Due to the widely accepted significant role of entrepreneurship in economic growth and job creation, the correlations between entrepreneurial activity and the economic dimension of societal QOL have been widely discussed in the literature. The pivotal role of personal economic resources in the creation of entrepreneurial ventures is attributable to two reasons:

a) access to funding & finance is deemed by entrepreneurs to be one of the most important aspects of an EE (World Economic Forum, 2013, 2014);
b) a significant share of entrepreneurs are self-financed (Keister, 2005; Meh, 2005; Van Praag and Versloot, 2007; Prieger *et al.*, 2016).

A significant body of literature has empirically examined the effects of economic development, usually measured by indicators of personal economic resources such as per capita GDP, per capita GNI or per capita consumption, on entrepreneurship. Although the significance of the effects has been generally acknowledged, there are two distinct viewpoints on the patterns of the relationships: the U-shaped association and the negative correlation.

The U-shaped trajectory can be explained by the theory of economic development stages coined by Porter (1990) which suggests the involvement of a large share of the labour force in low-quality self-employment contributes to the high level of entrepreneurial activity in factor-driven economies, the dominance of incumbent large firms leads to low level of entrepreneurship in efficiency-driven economies, and a significant part of the working population in pursuit of entrepreneurial opportunities results in a rising level of entrepreneurial activity in innovation-driven economies (Thurik and Wennekers, 1999; Acs, 2006; Acs, Desai and Hessels, 2008; Pinillos and Reyes, 2011; Bosma and Sternberg, 2014; Liñán and Fernandez-Serrano, 2014). However, the U-shaped relationships are

generally concluded by cross-sectional analyses which suffer from the weakness of failing to address the issues of time dynamics and double causations. Further, these studies tend to treat economic development as a strictly exogenous regressor. However, as entrepreneurship is inherently an important part of economic activity and the presence of double causations, the assumption of strict exogeneity is problematic.

In contrast, the negative association is inferred from the observation that the highest level of business creation often takes place in the least developed economies while most of the richest countries have very low levels of entrepreneurial activity (Acs, 2006; Bosma and Kelley, 2018; GERA, 2018; Bosma *et al.*, 2020). The literature suggests that negative association implies the shift from quantity to quality in the preference toward entrepreneurship along the trajectory of economic development (Acs and Audretsch, 2010; Brown and Mason, 2017; Cervelló-Royo *et al.*, 2020). The negative correlation is corroborated by both cross-sectional and panel data analyses which not only conform to empirical observations but also generate more robust findings and provide more reasonable interpretations regarding the structural change in entrepreneurship with the economic development. Despite the mixed results, both perspectives share the view that the variations in personal economic resources significantly affect business creation, both quantitively and qualitatively.

Theoretically, the interactions between unemployment and entrepreneurship are straightforward. High unemployment rates tend to force individuals into self-employment due to the unavailability of waged vacancies. By contrast, growing entrepreneurial activity contributes to unemployment reduction by creating more jobs. However, the empirical studies have generated mixed results. Based on the dataset of 37 countries participating in GEM 2002, Cowling and Bygrave (2007) examined the influences of unemployment on necessity entrepreneurship and the results indicated a negative short-term and a positive long-term association. Lecuna (2014) also asserted that unemployment is a significant structural factor

of entrepreneurial activity based on the finding of consistent and negative correlations between the unemployment rate and entrepreneurship. However, by examining the effects of regional characteristics of major European urban areas on entrepreneurship, the study of Bosma and Sternberg (2014) indicated no statistically significant relationship between unemployment rates and entrepreneurship.

The mixed results imply the dynamic associations between unemployment and the heterogeneity of entrepreneurial activity. Entrepreneurship creates massive job opportunities due to a large number of new entries, while these jobs tend to be unstable due to the low survival rates of newly created firms (Van Praag and Versloot, 2007; Morris, Neumeyer and Kuratko, 2015; Brown and Mason, 2017). In addition, being a “push” factor, various types of entrepreneurial activity react to the variations in the unemployment rate rather differently (Shane, 2009; Tamvada, 2010; Autio *et al.*, 2014). It can be argued that necessity entrepreneurship which is driven by the absence of job opportunities is strongly correlated with unemployment, while the associations between unemployment and opportunity entrepreneurship which are motivated by the identification of entrepreneurial opportunities tend to be weak.

4.2.2 Social Cohesion and Entrepreneurship

The individual- and group-level social cohesion generally deals with individuals’ membership attitudes and behaviours and emphasises the effects of social structures and interpersonal ties (Friedkin, 2004). Its connections to entrepreneurship have been intensely discussed in the literature, especially in that adopting the network approach (Marvel and Lumpkin, 2007; Jack *et al.*, 2010; Zhang, Soh and Wong, 2010). However, the societal level studies are to a large extent limited to the discussions regarding the associations between income inequality and EB.

The empirical studies on the associations between entrepreneurship and income inequality, which is the dominant proxy for societal inequality in the literature,

produced mixed results. Some literature suggests an inverted U-shaped association based on Kuznet's curve hypothesis which assumes systematic links between income inequality and the development of the economy and industrialization (Ragoubi and El Harbi, 2018). However, empirical studies based on longitudinal data only found weak evidence regarding the effects of economic growth on income inequality to support Kuznet's hypothesis; while growing evidence has shown entrepreneurship is negatively associated with both absolute and relative poverty (Meh, 2005; Yanya, Abdul-Hakim and Abdul-Razak, 2013; White and Wynne, 2014; Bonito *et al.*, 2017; Naminse and Zhuang, 2018). For example, Halvarsson, Korpi and Wennberg (2018) examined the effects of entrepreneurship on income dispersion based on the microdata of Sweden from 2005 to 2013 and suggested different types of entrepreneurship make distinctive contributions to overall income equity: self-employment contributes to income dispersion at the bottom end of the income distribution, while incorporated self-employment increase income dispersion at the top end. These studies generally emphasise the contributions of increasingly even distribution of economic resources to entrepreneurial activity and the positive role of entrepreneurship in alleviating poverty.

In contrast, some scholars argue that income inequality is inherently a structural factor in entrepreneurship because the primary motivation of entrepreneurship is to generate and accumulate personal wealth, and increasing income gaps motivate innovation and the creation of entrepreneurial ventures (Lecuna, 2014). For example, Tamvada (2010) found that social welfare was unevenly distributed in the occupational structure of India. Entrepreneurs who recruit employees enjoy the highest welfare return in terms of consumption, while the welfare return of self-employed individuals is slightly lower than waged employees but significantly higher than casual labours. By examining the relationships between household income and start-up outcomes and performance based on a sample of 1214 nascent entrepreneurs in the USA, Frid, Wyman and Coffy (2016) found that

entrepreneurs from low- and medium-wealth families are more likely to give up their venture creation efforts during entrepreneurial gestation due to liquidity barriers. Based on the 2011 China Household Survey, DaCosta and Li (2017) found income is more evenly distributed among non-entrepreneurial households than entrepreneurial households which implies a negative association between entrepreneurship and social equity. The study of Atems and Shand (2018) based on US state-level data from 1989 to 2013 also provided strong evidence of the positive correlations between entrepreneurship and income inequality.

Despite the different perspectives, the significant role of inequality in entrepreneurship is generally accepted. Further, previous studies primarily focus on income inequality, while societal QOL adopts the multi-dimensional view of societal inequality. This gap suggests the necessity to employ a comprehensive index that can assess the uneven distribution of various resources and opportunities across a society.

Public safety is another important dimension reflecting the inter-personal relationships in society. However, empirical studies on the effects of public safety on entrepreneurship are scarce. In the various dimensions of public safety, two aspects emerged in the literature to have significant social and economic impacts which are relevant to entrepreneurship, political stability and violence. Theoretical and empirical arguments suggest political instability and violence can result in significant social and economic costs such as psychological and physical stress, economic recession and societal inequality (Greenbaum and Tita, 2004; Roe and Siegel, 2011; Gören, 2014; Karnane and Quinn, 2019). A politically stable and safe society provides rich soil for economic prosperity; however, such an environment favours all kinds of economic activities, not constrained to entrepreneurship.

Although political stability and absence of violence have been theorised to be important contributors to entrepreneurial activity (Lecuna, 2014; Nataraajan and Angur, 2014; White and Wynne, 2014), regional level studies have produced

mixed results (García, 2014; Matti and Ross, 2016). For example, Greenbaum and Tita (2004) and Parker (2015) both reported negative effects of violence on entrepreneurship in US cities. Cañares (2011) found that violent conflict dramatically undermined the investment and expansion decisions of entrepreneurs in the rural areas of the Philippines. However, Rosenthal and Ross (2010) found that entrepreneurial activity in the service sector is more active in areas with higher violent crime rates in five major US cities. Sloan, Caudill and Mixon (2016) corroborated the positive associations by examining the impacts of various violent crimes on newly opened restaurants in Memphis. The positive relationship implies that, although the presence of violence affects entrepreneurial decision-making, the agglomeration of business is also attractive to crimes (Matti and Ross, 2016; Sloan, Caudill and Mixon, 2016). The mixed results suggest the contingent role of public safety in entrepreneurship which indicates that its effects are subject to a variety of contextual and individual factors.

Some literature argues that violent issues are local phenomena and there is no evidence regarding their explanatory power in predicting nationwide business creation, while political stability is inherently a country-level consideration which is a more appropriate indicator for public safety at the societal level (Roe and Siegel, 2011; García, 2014; Matti and Ross, 2016; Karnane and Quinn, 2019; Okrah and Hajduk-Stelmachowicz, 2020). Despite the observation of entrepreneurial activity flourishing during the political and economic swings in recent years which implies weak associations between political stability and entrepreneurship (World Economic Forum, 2014), empirical studies generally confirm the positive role of political stability in promoting entrepreneurship and base their argument on the substantial barriers imposed by political instability on entrepreneurial ventures such as a variety of mental and physical issues, deprivation of education and training opportunities, access to necessary assets, financial resources, markets, labour force, government services and support

(Greenbaum and Tita, 2004; Cañares, 2011; Bullough, Renko and Myatt, 2014; Parker, 2015). For example, through a dynamic panel data estimation, Dutta, S. Sobel and Roy (2013) confirmed that higher levels of political stability in a country facilitate entry density and creation of wealth. Based on Eurostat data, García (2014) who adopted a country-aggregate perspective toward both entrepreneurship and crimes found countries with lower crime rates tend to have higher levels of entrepreneurial activity in Europe. Okrah and Hajduk-Stelmachowicz (2020) found a strong positive effect of political stability on patenting activity in African countries.

4.2.3 Societal Sustainability and Entrepreneurship

With the growing awareness of sustainable development, sustainability has become a central theme in entrepreneurship and EE studies and a key factor in shaping related practice and policymaking (Cohen, 2006). As discussed in the previous section, the sustainability of a society is reflected by its substantial capacity for human development and environmental sustainability (Tso, Yau and Yang, 2011; Pieper, Karvonen and Vaarama, 2019). In terms of human development, two dimensions emerge to be critical in its evaluation and closely associated with entrepreneurship: education and health (Sirgy, 2011b; Rietveld, Van Kippersluis and Thurik, 2015; Estrin, Mickiewicz and Stephan, 2016; Marvel, Davis and Sproul, 2016; Rietveld *et al.*, 2016; UNDP, 2019; Hatak and Zhou, 2021).

Various EE models unanimously theorise education as an important determinant of entrepreneurship due to its significant role in knowledge creation, knowledge transfer and talent cultivation (Isenberg, 2011; World Economic Forum, 2013, 2014; Stam, 2015; Jennen, Rigby and Allum, 2016) which is interpreted in the literature via two streams of theories: one originates from the extension of the human capital theory to entrepreneurship studies, the other is based on the knowledge spillover theory. Literature of knowledge spillover theory generally focuses on the supportive role of higher educational institutions in the regional

EE by examining the positive effects of universities on facilitating knowledge-based entrepreneurship through knowledge creation, knowledge transfer and innovation commercialisation (McKeon, 2013; Qian, Acs and Stough, 2013; Kline *et al.*, 2014; Wadee and Padayachee, 2017; Acs *et al.*, 2018; Qian, 2018; Yoon *et al.*, 2018).

The human capital theory assumes knowledge and skills promote productivity and efficiency which can be captured and improved through investments in health, training, formal education, adult education and internal migration (Schultz, 1961; Becker, 2007; Gilleskie and Hoffman, 2014). As a multi-dimensional concept, human capital consists of two broad categories, general human capital, referring to knowledge and skills that are easily transferable, and specific human capital, referring to less transferable and narrowly applicable knowledge and skills (Alvarez and Barney, 2007; Corbett, 2007; Ucbasaran, Westhead and Wright, 2008; Baptista, Karaöz and Mendonça, 2014). Within the entrepreneurial context, general human capital is typically created by education and work experiences, while specific human capital is generally sourced from entrepreneurial experiences and entrepreneurship education (Davidsson and Honig, 2003; Marvel and Lumpkin, 2007; Marvel, 2013; Marvel, Davis and Sproul, 2016). Besides, human capital also determines an individual's capacity to adapt and adjust to economic, social and technological changes which are extremely valuable to entrepreneurs and entrepreneurial ventures due to their constant exposure to uncertainties and dynamics (Schultz, 1961; Qian, Acs and Stough, 2013; Estrin, Mickiewicz and Stephan, 2016; Hatak and Zhou, 2021). Some recent studies explicitly suggest the pivotal role of human capital in EEs (Acs *et al.*, 2016; Backman and Karlsson, 2018; Park and Park, 2018).

As a human development consideration, education in this study should be reflective of the average educational level of a society which indicates that the human capital theory is more relevant. Further, to suit the research objective and allow cross-national comparison, the education dimension is generally measured

by formal education which is the primary source of general human capital. According to the human capital theory, education makes significant contributions to venture emergence, opportunity identification and venture performance (Marvel, Davis and Sproul, 2016; Hessels *et al.*, 2018; Park and Park, 2018). A substantial body of empirical studies has provided firm evidence regarding the significant positive effects of entrepreneurship education on EB (Guerrero *et al.*, 2014; Raible, 2016; Naminse and Zhuang, 2018; Olutuase *et al.*, 2018; Hechavarría and Ingram, 2019).

In contrast to the established role of entrepreneurship education, the associations between formal education and entrepreneurship are still under scrutiny. Some literature generated findings that, in the knowledge-based entrepreneurial context, formal education is only a weak or even negative predictor of entrepreneurship (Ucbasaran, Westhead and Wright, 2008; Marvel, 2013; Zhang, 2014; Zhang, Duysters and Cloodt, 2014). Although only a small body of literature has examined the associations between formal education and entrepreneurship, the empirical findings provide clues regarding the role of formal education in predicting variations in entrepreneurship at both regional and national levels.

In terms of business entries, the study of Qian, Acs and Stough (2013) indicated that formal education could predict the variations in the knowledge-based entrepreneurial activities among US metropolitan statistical areas. White and Wynne (2014) found significant correlations between public education, measured by high school or equivalent educational attainment rate, and entrepreneurship in the US metro areas. Estrin, Mickiewicz and Stephan (2016) analysed GEM 2009 data and found formal education is relatively more important to business entries of social entrepreneurship than those of commercial entrepreneurship.

In terms of entrepreneurial performance, Marvel and Lumpkin (2007) investigated a sample of 145 technology entrepreneurs in university incubators and found a significantly positive association between formal education and the innovativeness of ventures. Baptista, Karaöz and Mendonça (2014) concluded

that both formal education and entrepreneurship-specific human capital enhance ventures' early survival chances in Portugal; further, formal education plays an important role in the early success of opportunity-driven entrepreneurship but a less important role in that of necessity-driven entrepreneurship. Backman and Karlsson (2018) reported positive effects of the years of schooling on the likelihood of entrepreneurship in Sweden while the magnitude of the probability is subject to regional differences. And Hatak and Zhou's (2021) study based on German longitudinal data revealed significant positive effects of education on both monetary and non-monetary entrepreneurial successes.

Besides, some studies presented findings that formal education enhances individuals' social capital to facilitate entrepreneurial networking (Davidsson and Honig, 2003; Foley, 2010). These studies pave the way for this research to develop a reasonable hypothesis assuming formal education significantly facilitates venture creation at the societal level.

The effects of health on entrepreneurial activity can also be inferred from human capital theory; however, in contrast to education, health is only discussed in a small fraction of the literature (Becker, 2007; Hatak and Zhou, 2021). Recent years have witnessed growing research attention and meaningful results in empirical studies which make it reasonable to assume health to be valuable resources in entrepreneurship (Volery and Pullich, 2010; Kim, Kim and Yang, 2012; Stephan, 2018).

Assessment of the health differences between entrepreneurs and non-entrepreneurs based on multiple waves of surveys in both developed and developing countries indicated that physically and mentally healthier individuals are more likely to engage in entrepreneurial activities (Tetrick *et al.*, 2000; Bradley and Roberts, 2004; Nikolova, 2019). However, different interpretations regarding their causality have led to two distinctive strands in the literature: the contextual effect which assumes the health differences can be explained by individuals' occupational choices and the selection effect which assumes the health

differences predict the likelyhood of entrepreneurial entries (Rietveld, Van Kippersluis and Thurik, 2015; Rietveld *et al.*, 2016).

Some literature suggests that entrepreneurs benefit both physically and mentally from monetary and non-monetary factors in entrepreneurship but are prone to physical and mental issues due to excessive workloads and stress (Volery and Pullich, 2010; Zhang, 2014; Cardon and Patel, 2015; Hessels *et al.*, 2018; Levasseur, Tang and Karami, 2019; Nikolova, 2019; Cubbon *et al.*, 2020; Xia *et al.*, 2021). By contrast, more recent studies have provided strong evidence of the selection effect that individuals' EB is constrained by their health-related barriers and health positively affects individuals' cognitive factors which strongly predict their EB (Rietveld, Van Kippersluis and Thurik, 2015; Stephan, 2018; Hatak and Zhou, 2021). According to Rietveld *et al.* (2016), the selection effect is attributable to several mechanisms, e.g., external creditors may be more willing to finance healthier individuals, and healthier individuals are more capable to deal with both the physical and mental stress in entrepreneurial activities, healthier individuals are more energetic in searching and recognising entrepreneurial opportunities.

There is substantial empirical evidence regarding the correlations between health and the entrepreneurial processes. For example, the survey of Swedish entrepreneurs showed that the use of occupational health services positively affects entrepreneurial performance (Gunnarsson, Andersson and Josephson, 2011). The result is corroborated and furthered by the study of Hatak and Zhou (2021) using the German panel which showed that both entrepreneurial and spousal physical and mental health contributes to entrepreneurial successes. Zhang (2014) and Zhang and Acs (2018) disclosed that, as a human capital measure, health makes significant contributions to entrepreneurial propensity, especially in the knowledge-based context. The study of Rietveld *et al.* (2016) reported significant associations between health and entrepreneurial perceptions among Caribbean business owners and waged workers which suggest that better health can lead to less fear of failure, more self-belief and increased opportunity

recognition, and healthier entrepreneurs have higher growth expectations of their ventures. Stephan (2018) draws attention to the association between entrepreneurs' mental well-being and EB and pointed out that entrepreneurs' mental health profoundly affects their decision-making, motivation, and action. This viewpoint corresponds with that of Hessels *et al.* (2018) that entrepreneurial exit can be explained by depression suffered by entrepreneurs. Furthermore, the literature suggests that the associations between health and entrepreneurship are also subject to the diversity of entrepreneurial activities and the variations in a variety of contextual factors such as demographic changes and regional specific characteristics (Bönte, Falck and Heblich, 2009; Backman and Karlsson, 2018; Stephan, 2018; Zhang and Acs, 2018; Nikolova, 2019). However, few studies have generated direct evidence regarding the causal relations between health and venture creation. To address this gap, this study will use a direct model to examine to what extent health directly affects EB.

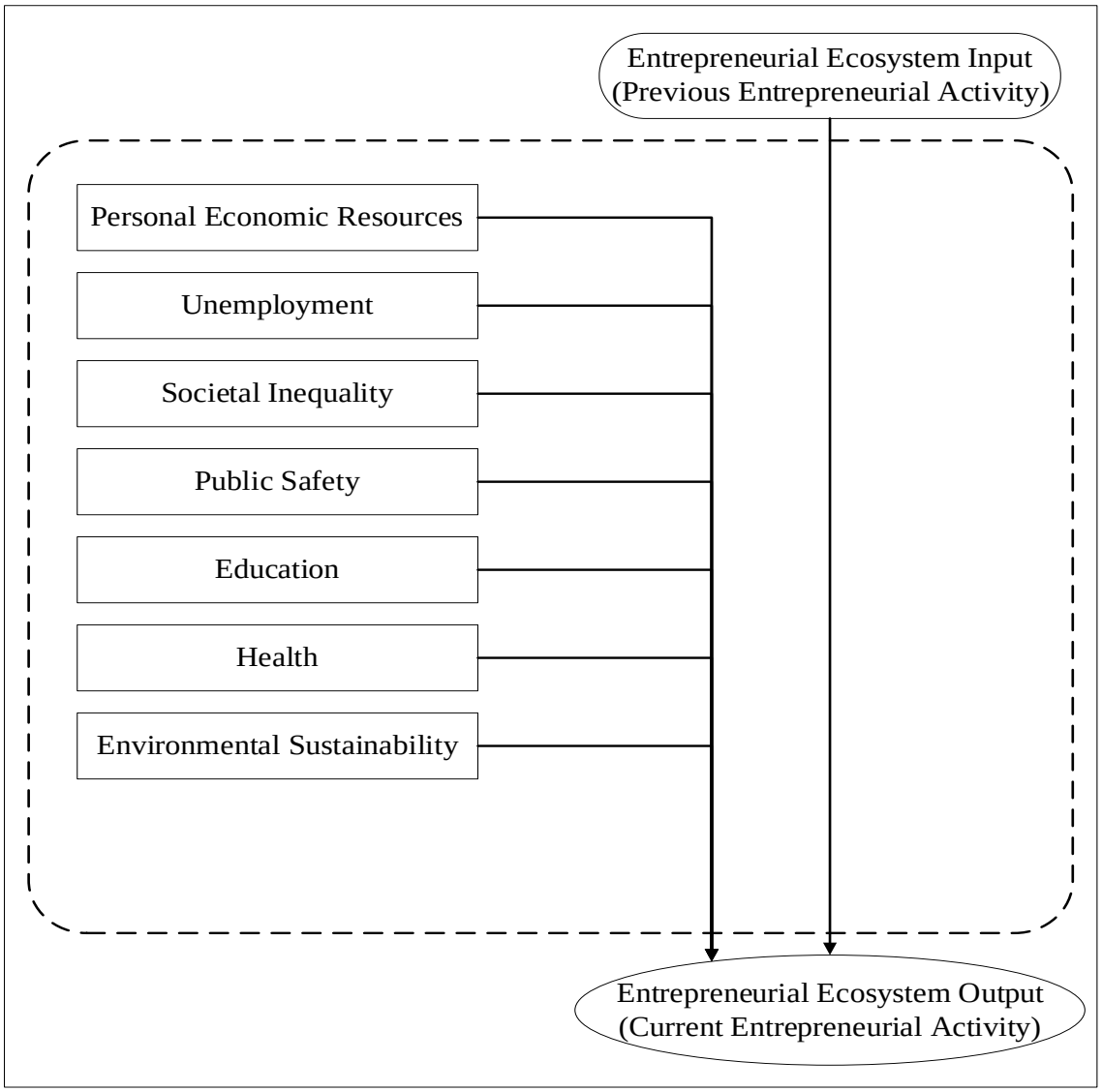
With regard to the associations between environmental well-being and entrepreneurship, various studies suggest double causalities (Morris and Lewis, 1991; Hafeez *et al.*, 2011). Since living environments exert substantial impacts on residents' health which is one of the basic needs of all human beings, it can be argued that an enjoyable habitat attracts both individuals and organisations which can be beneficial to the development of entrepreneurship (Berger-Schmitt, 2000, 2002; Marans, 2015; Malkina-Pykh and Pykh, 2016). However, excessive entrepreneurial activity can jeopardise the preservation of natural resources and impose environmental burdens, especially in developing countries. Mustunsir (2015) argued that the current sustainable development discourses can hinder economic growth and social progress because the economic activity in less-developed economies is to a large extent resource-based. According to RBV, the availability of natural resources is vital for entrepreneurial ventures, especially those in factor-driven economies due to their heavy reliance on the exploitation of natural resources (Alvarez and Busenitz, 2001; Acs and Audretsch, 2010).

Thus, it can be argued that environmental sustainability is more likely to be closely associated with high income levels and opportunity entrepreneurship. Besides, the growing awareness of environmental issues such as global warming and climate crisis creates strong environmental values which have significantly reshaped the entrepreneurial orientations (Mort and Hume, 2009; Schaltegger and Wagner, 2011; Haldar, 2019; Peng *et al.*, 2021).

4.2.4 Theoretical Framework

Based on the above arguments, a conceptual model (see Figure 4-1) and a hypothesis of the direct effects can be developed.

Figure 4-1 The direct effect model



(Source: developed by the author)

This is an update of the EE framework focusing on the associations between societal QOL and entrepreneurship. The societal QOL consists of the 7 indicators mentioned in Chapter 3. This model also highlights the effects of EB in the previous period on that in the current period. The study establishes this model to provide preliminary evidence regarding the associations between societal QOL and EB to inform subsequent analysis assuming the mediating effects of EI.

Hypothesis 1: Societal QOL has significant direct effects on entrepreneurship

4.3 Societal QOL and EI

EB is the materialisation of EI (Krueger and Carsrud, 1993; Kautonen, Van Gelderen and Tornikoski, 2013; Kautonen, van Gelderen and Fink, 2015; Looi, 2020). Serving as “the closest indicator of entrepreneurial potential in society” (Bosma and Kelley, 2018, p.47), EI is one of the most popular themes in entrepreneurship research which has drawn substantial attentions from both researchers and policymakers who share the belief that motivating EI is one of the most effective ways to nurture entrepreneurial activity. Since the decision-making of venture creation is a conscious and pre-meditated process, excluding the cognitive factors from EE studies not only ignores the proactive role of entrepreneurs but also generates situational biases (Ajzen, 1991; Davidsson, 1995; Lüthje and Franke, 2003; Hisrich, Langan-Fox and Grant, 2007; Ojiaku, Nkamnebe and Nwaizugbo, 2018).

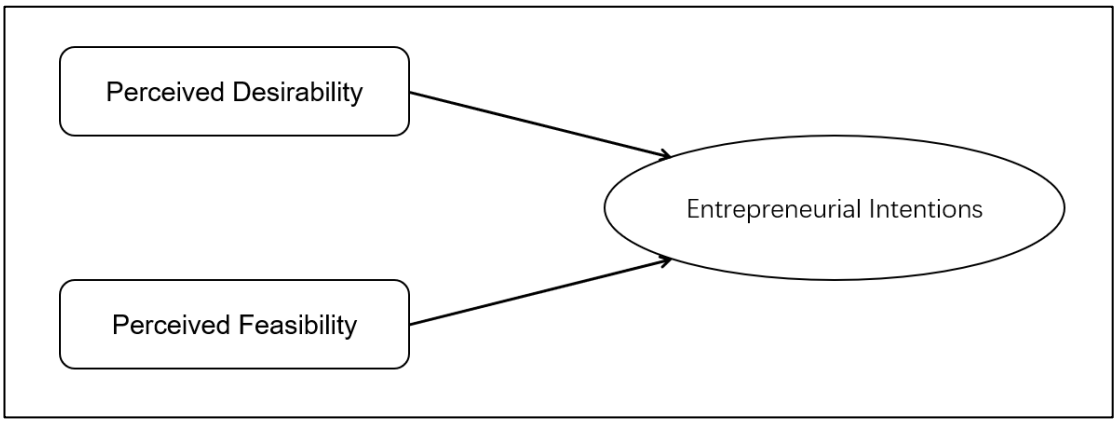
4.3.1 Concept and Theories of EI

In contrast to the vague conceptualisation of entrepreneurship in the literature, EI is clearly defined as the consciousness preceding business creation (Krueger and Carsrud, 1993; Moriano *et al.*, 2012; Zhang, Duysters and Cloodt, 2014; Ozaralli and Rivenburgh, 2016; Li and Zhang, 2020; Peng *et al.*, 2021). Adopting the GEM approach, EI in this study refers to “the extent to which people intend to start a business in the future” (Bosma and Kelley, 2018, p.47).

In terms of the theoretical underpinnings, a shift from individual-focused to context-focused perspective has also taken place in EI studies. Adopting the trait approach, early studies argue that variance in EI can be explained by individual differences in psychological characteristics and personality traits, such as proactivity, internal locus of control, innovativeness, tolerance of ambiguity, propensity to take risks and need for achievement (Lüthje and Franke, 2003; Segal, Borgia and Schoenfeld, 2005; Barbosa, Gerhardt and Kickul, 2007; Altinay *et al.*, 2012). By contrast, recent studies characterised by the application of robust cognitive approaches base the interpretation for the establishment of intentionality on the variances in human cognitive patterns, and two steams of theories have dominated EI literature: the Entrepreneurial Event Theory and TPB.

In the Entrepreneurial Event Theory, EI emerges when individuals perceive entrepreneurship to be more desirable and feasible than other occupational alternatives (Shapero and Sokol, 1982; Liñán and Santos, 2007; Li and Zhang, 2020). Thus, variations in EI can be explained by the differences in perceived desirability and perceived feasibility among individuals.

Figure 4-2 The Entrepreneurial Event model

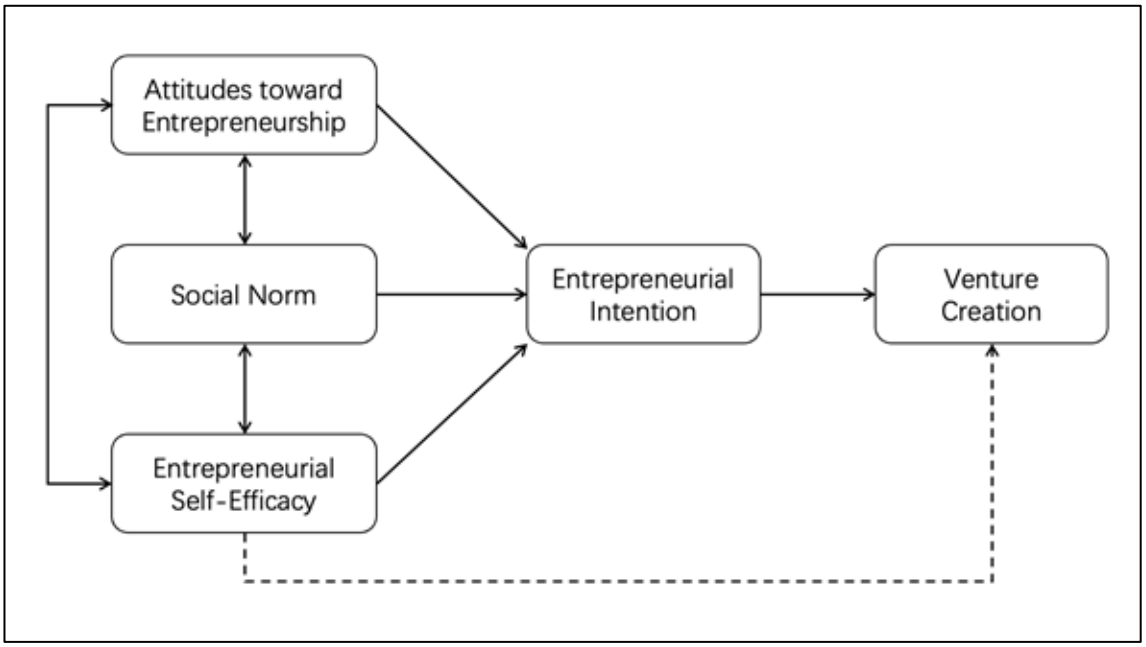


(Source: Shapero and Sokol (1982) and Liñán and Santos (2007))

TPB assumes intentions to be the immediate antecedent of behaviours, thus planned behaviours like entrepreneurship are best predicted by intentions toward business creation (Ajzen, 1991, 2002, 2020; Krueger and Carsrud, 1993; Bosnjak,

Ajzen and Schmidt, 2020). Intentionality emerges from the combination of three predetermined cognitive factors: attitude toward the behaviour which describes the perceived favourable or unfavourable attributes of the behaviour, subjective norms which depicts the perceived cultural pressure on the behaviour, and perceived behavioural control which refers to the perceived barriers of the behaviour (Ajzen, 2002). TPB has been modified to adapt to the entrepreneurial context (see Figure 4-3) and become the leading theory in entrepreneurial cognition literture.

Figure 4-3 TPB model for entrepreneurship



(Source: adapted from Ajzen (1991) and Bosnjak, Ajzen and Schmidt (2020))

With the increasing awareness of the social embeddedness of entrepreneurship, studies adopting TPB suggest that contextual factors exert indirect impacts on EB by affecting the development of EI through the formation of entrepreneurial mindsets (Krueger and Carsrud, 1993; Simon, Houghton and Aquino, 2000; Carr and Sequeira, 2007; Kautonen, Van Gelderen and Tornikoski, 2013). For example, some literature employing the view of cultural embeddedness indicates that the variances in EI can be explained by the variations in people's cognitive

patterns predetermined by cultural differences (Moriano *et al.*, 2012; Santos, Roomi and Liñán, 2016; Weiss, Anisimova and Shirokova, 2019).

More recent studies expand the contextual determinants of EI to a variety of demographic and socio-economic factors (Ojiaku, Nkamnebe and Nwaizugbo, 2018; Essel *et al.*, 2020; Looi, 2020; Peng *et al.*, 2021). For example, empirical studies based on samples of university students in different countries unveiled significant contributions of family business background, prior entrepreneurship exposure and entrepreneurship education to the formation of EI (Carr and Sequeira, 2007; Zhang, Duysters and Cloodt, 2014; Anjum *et al.*, 2018; Georgescu and Herman, 2020). Some literature generates empirical evidence for the positive effects of social capital, measured by family and friends' connection, participation in the local community, neighbourhood connection, and feeling of trust and safety, on EI (Kim and Aldrich, 2005; Liñán and Santos, 2007; Liñán, Urbano and Guerrero, 2011; Ali and Yousuf, 2019).

To sum up, the TPB literature validates the role of EI in bridging a wide range of socio-economic factors to EB. Hence, following TPB, this study uses EI as an indicator of the individual factors to examine the joint effects of both the societal QOL factors and the individual factors on entrepreneurship as well as the mediating effects of EI because of its robustness and directness in predicting EB.

4.3.2 QOL and EI

Although the associations between various socio-economic factors and EI have been widely discussed, empirical evaluations regarding the effects of QOL tend to be fragmented and unsystematic. For example, Iakovleva, Kolvereid and Stephan (2011) found that university students in developing countries have significantly higher levels of EI than their counterparts in developed countries which implies a negative association between EI and economic development. Empirical studies by Vancea and Utzet (2017) and Ojiaku, Nkamnebe and Nwaizugbo (2018) based on Spanish and Nigeria samples showed that the formation of EI is not sensitive to the dynamics of the unemployment rate.

Empirical analyses of datasets in different countries corroborate that social cohesion, measured by social capital indicators such as trust and associational activities, contributes to the regional formation of EI (Liñán and Santos, 2007; Ali and Yousuf, 2019; Weiss, Anisimova and Shirokova, 2019). Bullough, Renko and Myatt's (2014) observation of the formation of EI in the context of war indicates a weak association between EI and an unsafe environment which suggests the contingent role of public safety in EI development. In contrast to the significant positive role of entrepreneurship education, formal education is only found to be predictor (Canever, Barral and Ribeiro, 2017; Falck, Gold and Heblich, 2017; Vancea and Utzet, 2017), while there is some evidence for its effectiveness in predicting the differences in the gestation for nascent entrepreneurial activity between nascent entrepreneurs and non-entrepreneurs (Davidsson and Honig, 2003).

However, most of the extant literature is regional or local level research or constrained to specific groups such as university students which unavoidably leads to limited generalisation. Nonetheless, these studies have produced valuable evidence which paves the way for this study to assume the formation of EI is highly dependent on the QOL factors and their dynamics.

According to TPB, EI does not necessarily refer to the intentions to engage in all kinds of entrepreneurial activity; instead, the generation of EI is more closely associated with the identification and exploitation of entrepreneurial opportunities which implies a direct linkage between EI and opportunity-driven entrepreneurship (Vancea and Utzet, 2017; Ojiaku, Nkamnebe and Nwaizugbo, 2018). This argument leads to two important inferences on the causal links between societal QOL and EI.

Firstly, the demand-side of entrepreneurship and RBV suggest that entrepreneurial opportunities originate from market imperfection because the socio-economic dynamics contribute to the generation of entrepreneurial opportunities and motivate intentions to exploit them (Acs *et al.*, 2012; Diaconu

and Duţu, 2015; Essel *et al.*, 2020). Thus, the more dynamic the societal QOL of an economy is, the higher levels of EI should be observed.

Secondly, the formation of EI has highly differentiated sensitivity toward different socio-economic factors. Ojiaku, Nkamnebe and Nwaizugbo (2018) tested the Push-Pull-Mooring (PPM) model drawn from the migration literature in EI. The push factors refer to “expulsive factors at the origin that provides a reason to leave”, the pull factors are “attraction at the destination that pulls people towards them” and the mooring factors denote “personal, social factors or cultural variables that either facilitate or inhibit the decision to move” (Ojiaku, Nkamnebe and Nwaizugbo, 2018, p.4). Their findings suggest that pull and mooring factors such as financial resources and market opportunities significantly affect the formation of EI, while the impacts of push factors such as unemployment, dissatisfaction and poor educational performance tend to be weak and statistically insignificant.

To enhance the generalisation of the research findings, this study adopts the EI data of GEM based on much larger samples that are representative of the whole population in different economies and is expected to generate more robust and meaningful results to inform entrepreneurship research and policymaking.

4.3.3 The Mediating Role of EI

Linking a wide variety of societal factors to entrepreneurship means not only linking macro-level to individual-level but also linking exogenous factors to endogenous factors (Krueger and Carsrud, 1993; Thurik and Wennekers, 1999; Huggins and Thompson, 2014; Liñán and Fernandez-Serrano, 2014) which is reflected in this study by the attempt to examine the mediating effects of EI on the associations between QOL and entrepreneurship at the societal level. The theories of EE and EI provide solid theoretical foundations for this assumption.

First, the cognitive perspective suggests socio-economic environment assumes an important role in predicting individual behaviours by affecting their cognition

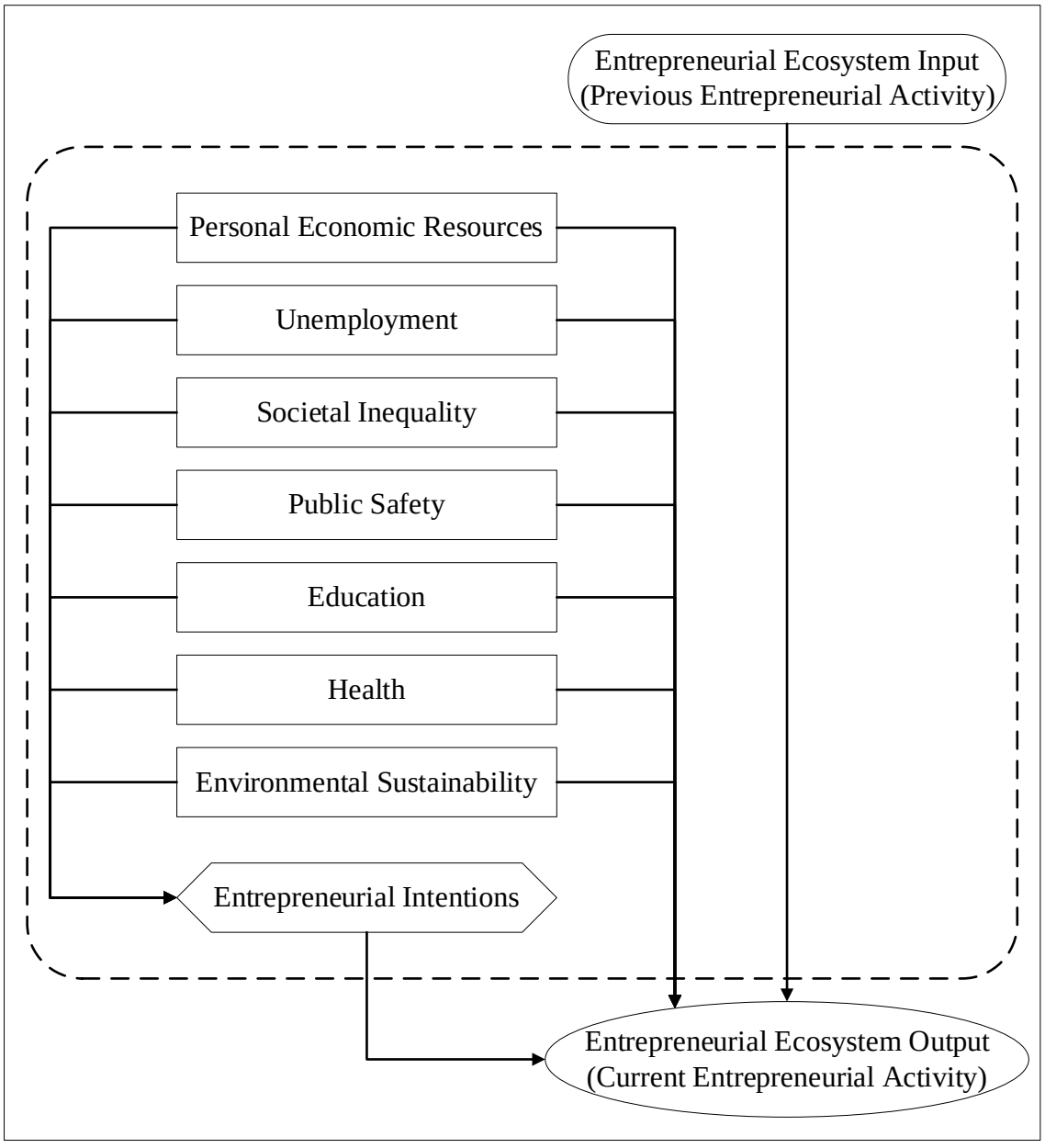
(Santos, Roomi and Liñán, 2016), and the EE perspective explicitly articulates that socio-economic factors and individual factors interactively affect entrepreneurship (Ács, Autio and Szerb, 2014; Mason and Brown, 2014; Acs *et al.*, 2016; Kreuzer *et al.*, 2018; Roundy, Bradshaw and Brockman, 2018; Essel *et al.*, 2020; Georgescu and Herman, 2020). Thus, it is reasonable to postulate that, besides potential direct effects, societal QOL factors also indirectly affect entrepreneurial activity through shaping individual cognitive patterns.

Second, the significant direct associations between individual cognitions and behaviours have been examined in a substantial body of literature which suggest the context embeddedness of an entrepreneurial mindset (Kreiser *et al.*, 2010; Liñán, Urbano and Guerrero, 2011; Pinillos and Reyes, 2011; Kautonen, Van Gelderen and Tornikoski, 2013; Mueller and Conway Dato-on, 2013; Zhang, Duysters and Cloodt, 2014; Kautonen, van Gelderen and Fink, 2015). Although some literature suggests multiple cognitive factors in explaining individual career choices including attitudes, perceptions and intentions, the EI is the most direct antecedent and the most robust predictor of EB (Krueger, 2003; Kelley, Bosma and Amoròs, 2011; Bosma, 2013; Ojiaku, Nkamnebe and Nwaizugbo, 2018; Bosma *et al.*, 2020; Georgescu and Herman, 2020). Altough not all intentions will be implemented, it can be argued that “those who have started were those who had previously planned, or at least considered, becoming an entrepreneur” (Bosma and Kelley, 2018, p.47).

The EE perspective explicitly suggests entrepreneurship is subjective to the effects of both contextual and individual factors (Ács, Autio and Szerb, 2014; Mason and Brown, 2014; Acs *et al.*, 2016; Kreuzer *et al.*, 2018; Roundy, Bradshaw and Brockman, 2018; Essel *et al.*, 2020; Georgescu and Herman, 2020). It can be argued that excluding contextual factors undermines the contextual dependence of entrepreneurship and may cause idiosyncratic biases while excluding EI ignores the proactive role of entrepreneurs in an EE and may generate situational biases. Thus, a conceptual model (see Figure 4-4) is

developed based on the above arguments to illustrate the interactive effects between societal QOL factors and EI on EB.

Figure 4-4 The indirect effect model



(Source: developed by the author)

This is an update of the direct effect model with assumptions regarding the mediating effects of individual factors on the associations between societal QOL and entrepreneurship. The individual factor of the EE is measured by EI because of its directness and robustness in predicting EB. Besides direct effects, the

model suggests various societal QOL factors indirectly affect entrepreneurship through reshaping the formation of EI. Based on the conceptual model, a hypothesis can be established:

Hypothesis 2: EI mediates the effects of various QOL factors on entrepreneurship.

4.4 Chapter Summary

This chapter is a critical review of the extant literature on the associations between societal QOL factors and entrepreneurship. Firstly, the direct effects of societal QOL on entrepreneurship are discussed. Although the empirical studies characterise the direct associations of dynamics and double causations and generate mixed results, they generally conclude that various societal QOL factors significantly affect entrepreneurial activity. Thus, the first main hypothesis is developed: societal QOL has significant direct effects on entrepreneurship.

Secondly, drawn from the EE perspective which explicitly suggests entrepreneurship is subject to the joint effects of both contextual and individual factors, EI, which refers to “the extent to which people intend to start a business in the future” (Bosma and Kelley, 2018, p.47), is introduced to be the mediator bridging the associations between societal QOL and entrepreneurship because it is the most direct antecedent and the most robust predictor of EB. Thus, the second main hypothesis is developed: EI mediates the effects of various QOL factors on entrepreneurship.

5 Methodology

5.1 Chapter Overview

Having identified the aims and objectives of the research, critically reviewed relative literature and developed hypotheses, this chapter will present the research method designed for this study. Underpinned by various well-established theories, this study adopts a positivist paradigm which is consistent with the research objective to examine the strength of the causal relationships between QOL factors and entrepreneurship at the societal level. Following the philosophical stance, a deductive strategy and a quantitative approach are employed in this study. This chapter will be organised as follows:

First of all, the research aim, objectives, contributions, and main hypotheses are reiterated. Then, the philosophical assumptions of this study, including ontology, epistemology, and axiology, are introduced. Then, the research strategy and research design are presented in detail. Then comes the procedures regarding the data collection and the data analysis. Data sources, samples and variables in the empirical models are also outlined. Further, the necessary diagnostic tests are performed, and the results are reported. At last, the validity, reliability and limitations of the research method are discussed.

5.2 Research Aims, Objectives and Contributions

According to Easterby-Smith, Thorpe and Jackson (2015, p.47), research methodology is “a combination of techniques used to inquire into a specific situation”. The methodological choice for a specific study depends on the objective of the study, the nature of the phenomenon, the research question, and practical considerations (Crossan, 2003). Consistency among research aims, research questions, research method and research philosophy is vital for the validity and reliability of an empirical study (Proctor, 1998).

To enrich the understanding of EE phenomena and inform entrepreneurship policymaking, the research aim is supported by three objectives:

a) to critically assess the concepts of entrepreneurship and EE, and consolidate prior strands of the EE literature to develop a theoretical framework of EE;
b) to critically review the concept of societal QOL and identify its key dimensions; and
c) to examine to what extent various societal QOL factors affect entrepreneurship; additionally, to evaluate the mediating effects of EI.

Entrepreneurship has been widely accepted as the engine of economic growth and job creation, especially in today's globalised and knowledge-based economy (Drucker, 2002; Morris, Neumeyer and Kuratko, 2015; Bosma *et al.*, 2020). Besides the positive effects on economic growth, entrepreneurship also contributes to social development through promoting social cohesion, facilitating cultural transformation and integration, and enhancing QOL (Tamvada, 2010; Nataraajan and Angur, 2014; Woodside, Bernal and Coduras, 2016). Thus, motivating entrepreneurial activities has become one of the major national policies around the world.

The literature suggests that entrepreneurship is not an isolated phenomenon but subject to complex interactions among various factors, both internal and external (Mason and Brown, 2014; Acs *et al.*, 2016; Mack and Mayer, 2016; Spigel, 2016, 2017; Brown and Mason, 2017; Stam and Spigel, 2017). The ecological perspective has become one of the most popular themes in the literature due to its capacity to provide a holistic view of entrepreneurship research and to offer effective ways to foster entrepreneurial activity (Isenberg, 2011; Spigel and Harrison, 2018). As discussed in previous sections, complexity, dynamics, diversity, and path-dependence have been widely accepted as the primary characteristic of an EE which leads to the following implications.

First, the path-dependent and context-dependent nature of EEs imply entrepreneurship is subject to a wide variety of economic, social and cultural influences (Peltoniemi and Vuori, 2004; Mason and Brown, 2014; Boulton, Allen and Bowman, 2015). Although the causal relationships between various

contextual factors and entrepreneurship have been intensely discussed in the literature, the identification of influencing factors of entrepreneurial activities is far from exhausted. Thus, one of the major tasks of EE research is to identify and piece together various economic, social, and cultural factors that significantly affect entrepreneurial activities to enrich the understanding of EE.

Second, the multi-level attributes of EE suggest that this phenomenon can be studied at different levels, and the characteristics of EEs at different levels vary significantly (Thornton and Flynn, 2003; Qian, Acs and Stough, 2013; Mason and Brown, 2014; Brown and Mason, 2017). At the local and regional levels, entrepreneurship primarily exhibits its social side which mainly emphasises the diversity of individual characteristics (Jennen, Rigby and Allum, 2016; Miller and Acs, 2017; Morris, Shirokova and Tsukanova, 2017; Roundy, 2017; Audretsch and Link, 2019; De Oliveira and Vitale Torkomian, 2019; Link and Sarala, 2019). While at the societal level, the manifestation of the economic side encourages academics to study the EEs phenomena based on economic theories and traditions (Acs *et al.*, 2014, 2016; Stam, 2014; Acs *et al.*, 2018; Ács, Autio and Szerb, 2014; Hechavarria and Ingram, 2014; Autio and Levie, 2015; Autio and Rannikko, 2016; Jha, 2018; Park and Park, 2018; Hechavarría and Ingram, 2019).

Third, the multi-faceted nature of the EE implies that this phenomenon can be investigated by different disciplines and different methods (Moore, 1993; Peltoniemi and Vuori, 2004; Mason and Brown, 2014; Stam, 2015; Acs *et al.*, 2017; Alvedalen and Boschma, 2017; Stam and Spigel, 2017; Brown and Mason, 2017; Spigel, 2017; Cavallo, Ghezzi and Balocco, 2018; Malecki, 2018).

Although some literature suggests QOL to be an important predictor of entrepreneurship and an indispensable construct of an EE (Kim, Kim and Yang, 2012; Autio *et al.*, 2014; Kline *et al.*, 2014; Nicotra *et al.*, 2018), empirical studies tend to be fragmented and unsystematic. To address this gap, this study intends to provide a comprehensive evaluation of the associations between various QOL

factors and entrepreneurship at the societal level following the econometric traditions which has substantial academic and practical values.

Academically, this study makes a threefold contribution to the entrepreneurship literature. First, this study is the first comprehensive and systematic empirical evaluation of the effects of QOL on entrepreneurship across countries based on the EE perspective that empirically validates QOL to be an indispensable component. Second, this study also provides empirical evidence corroborating the EE perspective, the Human Capital Theory, TPB, and PMM model in entrepreneurship. Third, this study extends the current understanding of the context-dependence of entrepreneurship and the proactive role of entrepreneurs in an EE by establishing an EE model which formalises the interactions and causal links between socio-economic factors and the individual-level factors in explaining EB.

Additionally, this study also generates practical implications. First, the study informs policymakers in both national and regional governmental organisations that entrepreneurship policies are contingent on distinctive socio-economic contexts and are subject to constant modifications. Second, the study informs various non-governmental organisations including business incubators, technology parks and business angels about their supportive role in motivating EI and facilitating high-quality business creations. Third, this study has practical implications to inform the orientational and geographic positioning of entrepreneurs and potential entrepreneurs regarding the QOL in today's fast-changing socio-economic contexts.

5.3 Theoretical Models and Hypotheses

Through critical evaluation of the literature, societal QOL is defined by the author as the aggregate life conditions reflecting the economic, relational and sustainable development of a society which involves three distinctive and interrelated domains: the economic dimension, social cohesion and societal

sustainability (Pennings, 1982; Berger-Schmitt, 2000, 2002; Giovannini, 2008; Bleys, 2012). The economic domain is mainly concerned with the capacity of a society in terms of value creation and job creation (Diener and Oishi, 2000; Bognar, 2005; Lambiri, Biagi and Royuela, 2007; Sirgy, 2011b), social cohesion depicts the connectedness and equity of a society which can be measured by the distribution of resources and public safety (Noll, 2004; Klein, 2013; Bottoni, 2018; Eckhard, 2018; Goubin, 2018), and societal sustainability emphasises the potential of a society for human development and ecological sustainability which can be assessed by conditions of education, health, and environment (Noll, 2004; Giovannini, 2008; OECD, 2011; Marans, 2015; Pieper, Karvonen and Vaarama, 2019; UNDP, 2019). Thus, Hypothesis 1 is developed to examine to what extent societal QOL factors directly affect entrepreneurship: societal QOL has significant direct effects on entrepreneurship.

The EE perspective explicitly indicates that entrepreneurship is subjected to the constant and complex interactions of various individual and contextual factors where individual factors generally refer to the attitudes, perceptions and intentions of individuals, and contextual factors the socio-economic, political and cultural influences (Ács, Autio and Szerb, 2014; Mason and Brown, 2014; Acs *et al.*, 2016; Kreuzer *et al.*, 2018; Roundy, Bradshaw and Brockman, 2018; Essel *et al.*, 2020; Georgescu and Herman, 2020). By assuming the significant effects of EI in bridging the impacts of societal QOL on entrepreneurship, Hypothesis 2 is developed: EI mediates the effects of various QOL factors on entrepreneurship.

5.4 Research Philosophy

Research methods are multi-level issues in which the philosophical assumptions form the most fundamental level involving intense reflexive work of the researcher (Clark, 1998; Proctor, 1998). Generally speaking, research philosophy refers to “a system of beliefs and assumptions about the development of knowledge” (Saunders, Lewis and Thornhill, 2016, p.124). These assumptions mainly denote the way a researcher perceives reality, human knowledge and the relationship

between his value and the research process which will profoundly affect and underpin the entire research process including the methodological choice, research strategy, data collection, data analysis and result interpretation (Easterby-Smith, Thorpe and Jackson, 2015; Saunders, Lewis and Thornhill, 2016).

In any academic study, the research philosophy assumes a critical role. Firstly, research philosophy determines a researcher's reflexive role in the study which dully determines the academic and practical contributions of the research (Clark, 1998; Easterby-Smith, Thorpe and Jackson, 2015). Secondly, philosophical knowledge facilitates researchers to have a more clear knowledge of various research methodologies, to evaluate different methodological options, to choose the appropriate research method and strategy for the study which are consistent with the philosophical assumptions, and to create the research designs which can adapt to the distinctive fields of research (Clark, 1998; Proctor, 1998; Easterby-Smith, Thorpe and Jackson, 2015).

Business and management draw their theoretical foundation from various disciplines in both natural sciences and social sciences which leads to the coexistence of multiple research philosophies, paradigms and methods (Saunders, Lewis and Thornhill, 2016). Literature suggests five major philosophical choices available for business and management studies, namely, positivism, critical realism, interpretivism, postmodernism and pragmatism, which differ from each other due to the fundamentally different research assumptions including ontology, epistemology and axiology (Easterby-Smith, Thorpe and Jackson, 2015; Saunders, Lewis and Thornhill, 2016). Ontology refers to the "philosophical assumptions about the nature of reality", and epistemology denotes "a general set of assumptions about ways of inquiring into the nature of the world" (Easterby-Smith, Thorpe and Jackson, 2015, p.47). Axiology is concerned with "the role of values and ethics within the research process" (Saunders, Lewis and Thornhill, 2016, p.128).

Table 5-1 Comparisons of five major research philosophies

Ontology	Epistemology	Axiology
	Positivism	
Real, external, independent One true reality Granular Ordered	Scientific method Observable and measurable facts Law-like generalisations Numbers Causal explanation and prediction as contribution	Value-free research Researcher is detached, neutral and independent of what is researched Researcher maintains objective stance
	Critical realism	
Stratified/layered External, independent Intransient Objective structures Causal mechanisms	Epistemological relativism Knowledge historically situated and transient Facts are social constructions Historical causal explanations as contribution	Value-laden research Researcher acknowledges bias by world views, culture experience and upbringing Research tries to minimise bias and errors Researcher is as objective as possible
	Interpretivism	
Complex, rich Socially constructed through culture and language Multiple meanings, interpretations, realities Flux of processes, experiences, practices	Theories and concepts too simplistic Focus on narratives, stories, perceptions and interpretations New understandings and worldviews as contribution	Value-bound research Researchers are part of what is researched Subjective Researcher interpretations key to contribution Researcher reflexive
	Postmodernism	
Nominal Complex, rich	What counts as ‘truth’ and ‘knowledge’ is decided by dominant ideologies	Value-constituted research

Socially constructed through power relations Some meanings, interpretations, realities are dominated and silenced by others Flux of processes, experiences, practices	Focus on absences, silences and oppressed/repressed meanings, interpretations and voices Exposure of power relations and challenge of dominant views as contribution	Researcher and research embedded in power relations Some research narratives are repressed and silenced at the expense of others Researcher radically reflexive
Pragmatism		
Complex, rich, external 'Reality' is the practical consequences of ideas Flux of processes, experiences and practices	Practical meaning of knowledge in specific contexts 'True' theories and knowledge are those that enable successful action Focus on problems, practices and relevance Problem solving and informed future practice as contribution	Value-driven research Research initiated and sustained by researcher's doubts and beliefs Researcher reflexive

(Source: Saunders, Lewis and Thornhill (2016, p.136-127))

Both positivism and critical realism take the objectivist stance by assuming that social reality is external and independent from social actors while they differ from each other in terms of the observability of reality. Positivism assumes that reality is observable, while critical realism believes that reality cannot be directly accessed through observations but need further interpretation through human reasoning. In contrast, both interpretivism and postmodernism embrace subjectivism by assuming that social reality is complex, rich and socially constructed. Interpretivism focuses on the interactions among participating social actors and aims to develop new understandings, while postmodernism emphasises power relations and aims to challenge dominant theories. And pragmatism takes a more practical point of view toward social reality by

recognising the existence of multiple realities and acknowledging the possibility of multiple methods to interpret realities.

Positivist philosophy is most appropriate when prior theories are present, the phenomena of interest can be well observed, conceptualised and operationalised, and the purpose of the study is to predict behaviours, corroborate theories, identify causal relationships or calibrate the strength of correlations (Crossan, 2003; Sobh and Perry, 2006; Chilisa and Kawulich, 2012). The reason for this thesis to adopt the positivist philosophy is two-fold. Firstly, apart from their social characteristics, entrepreneurship and EE are inherently economic phenomena, and economic and business studies following the positivist tradition have generated robust theories and fruitful findings to inform this study (Mason and Brown, 2014; Stam, 2015; Stam and Spigel, 2017; Malecki, 2018; Maroufkhani, Wagner and Wan Ismail, 2018). Secondly, the presence of a significant body of literature and reliable data sources enables both entrepreneurship and societal QOL indicators to be well conceptualised, operationalised, observed and measured.

Originated from natural sciences, positivism embraces the basic belief that the scientific methods of natural sciences offer the only way to inquire into the social world to establish the truth about the single, objective reality (Chilisa and Kawulich, 2012). Ontologically, positivism assumes the existence of a single, tangible, external reality (Sobh and Perry, 2006; Mertens, 2014; Easterby-Smith, Thorpe and Jackson, 2015; Palagolla, 2016). In terms of the relationship between people's beliefs and the truth about reality, positivist philosophy embraces a correspondence view in which truth is objective and independent of people's beliefs and interests (Clark, 1998; Crossan, 2003; Chilisa and Kawulich, 2012).

In this study, entrepreneurship, EE and societal QOL are acknowledged to be complex and diverse socio-economic phenomena that can be observed and evaluated from different angles at different levels (Mason and Brown, 2014; Brown and Mason, 2017). At the individual level, variances in these socio-

economic behaviours to a large extent are dependent on the variations in individuals' values and beliefs; by contrast, they can be well conceptualised at the aggregate level (Sirgy, 2011a; Morris, Neumeyer and Kuratko, 2015). In previous sections, entrepreneurship, EE and societal QOL are clearly defined based on the critical review of the literature. It can be argued that, once the conceptualisations are established, they can be well observable and quantifiable, and independent of the observers which enables the study to objectively measure these phenomena. Additionally, the literature suggests these phenomena are causally related that are regulated by underlying economic laws (White and Wynne, 2014). Thus, it is the researchers' job to observe, measure and reveal the patterns in terms of their causal links.

In terms of knowledge creation in positivist philosophy, "knowledge is statistically generalised to a population by statistical analysis of observations about an easily accessible reality" (Sobh and Perry, 2006, p.1195). The generalisation of the properties of reality is only meaningful when tested and corroborated based on scientific approaches (Chilisa and Kawulich, 2012; Mertens, 2014; Palagolla, 2016). The cumulation of various positivist inquiries deducted from observable and measurable phenomena jointly build the universal laws which govern the causal relationships and dynamics of the social reality which are free of dependence on social actors and researchers and can be used to explain and predict events and behaviours (Clark, 1998; Proctor, 1998).

The epistemology of this study is built on two premises. First, entrepreneurship, EE and QOL at the societal level are concrete socio-economic phenomena that can be well defined and objectively measured independent of the values and beliefs of the observers (Schalock, 2004; Gasper, 2010; Malecki, 2018; Cervelló-Royo *et al.*, 2020). Second, these phenomena are causally associated, and the patterns can be identified and deduced, irrespective of the observational units or the observers (Lecuna, 2014; White and Wynne, 2014). Thus, committed to creating meaningful generalisations, this study develops empirical models and

hypotheses based on a critical review of a large body of literature on the associations between entrepreneurship and societal QOL and tests the hypotheses through collecting objective data from reliable sources and analysing the data following rigorous econometric traditions. The outcomes manifest the generalised causality dictating the relationships between QOL and entrepreneurship at the societal level that can explain and predict EB in economies, not constrained to those in the sample.

Positivism also embraces an objective view of the role of the researcher in the research process (Clark, 1998; Proctor, 1998; Crossan, 2003; Mertens, 2014; Easterby-Smith, Thorpe and Jackson, 2015; Palagolla, 2016). Positivist philosophy suggests that the personal characteristics of the researcher, such as beliefs and values, can lead to biased results which undermine the validity and reliability of the study. Thus, it is critical for the researcher to maintain a role as a value-free and neutral observer during the inquiry process and to minimise any individual, cultural or social influences that may affect results (Chilisa and Kawulich, 2012). In this study, the author is committed to being objective by collecting reliable secondary data from credible sources, such as GEM and the World Bank, and analysing data based on an econometric approach to minimise the possibilities of subjectivity and the influences of personal values.

Besides the ontological, epistemological and axiological assumptions, the choice of a positivist philosophy also leads to the following implications. Firstly, a quantitative approach is typically related to positivist philosophy which involves statistical and mathematical processing of numerical data, while a qualitative approach is typically associated with interpretivism without processing numerical data in the research process (Avgousti, 2013; Mertens, 2014; Basias and Pollalis, 2018). Secondly, the study adopts a deductive logic and uses a hypothetico-deductive approach to identify causal relationships to interpret and predict socio-economic phenomena (Proctor, 1998; Kivunja and Kuyini, 2017). Thirdly, social facts must be observable and measurable to enable others to replicate and verify

the results; and fourthly, social phenomena can be generalised to the simplest possible forms (Crossan, 2003; Chilisa and Kawulich, 2012).

A research approach can be quantitative or qualitative. The choice of the research approach is contingent on the philosophical assumptions, the nature of the phenomenon of interest, the nature of the research question and practical considerations (Avgousti, 2013; Foster, Rzhetsky and Evans, 2015; Saunders, Lewis and Thornhill, 2016; Basias and Pollalis, 2018). A quantitative approach, in line with the philosophical foundations of this study, is adopted because the thesis aims to verify the causal relationship between QOL and entrepreneurship at the societal level and the availability of data enables the calibration of the strength of their associations.

5.5 Research Strategy

Research strategy is the critical link between the philosophical level and the design level of academic studies which is mainly concerned with the role of theories in the research (Easterby-Smith, Thorpe and Jackson, 2015; Foster, Rzhetsky and Evans, 2015; Strang, 2015; Saunders, Lewis and Thornhill, 2016; Baxendale, 2019). All academic studies involve the use of theories, and Saunders, Lewis and Thornhill (2016) identified three basic approaches to theory development, deduction, induction and abduction. In a deductive approach, a theory is usually developed through literature review and tested by data collection and analysis. In an inductive approach, the theory is usually created through the exploration of a phenomenon. And the abductive approach usually involves both theory creation through the exploration of a phenomenon and subsequent test of the theory.

Table 5-2 The approaches to theory development

	Deduction	**Induction**	**Abduction**
Logic	In a deductive inference, when the	In an inductive inference, known	In an abductive inference, known

	premises are true, the conclusion must also be true	premises are used to generate untested conclusion	premises are used to generate testable conclusions
Generalisability	Generalising from the general to the specific	Generalising from the specific to the general	Generalising from the interactions between the specific and the general
Use of data	Data collection is used to evaluate propositions or hypotheses related to an existing theory	Data collection is used to explore a phenomenon, identify themes and patterns and create a conceptual framework	Data collection is used to explore a phenomenon, identify themes and patterns, locate these in a conceptual framework and test this through subsequent data collection and so forth
Theory	Theory falsification or verification	Theory generation and building	Theory generation or modification; incorporating existing theory where appropriate, to build new theory or modify existing theory

(Source: Saunders, Lewis and Thornhill (2016, p.145))

Consistent with the positivist philosophy, a deductive approach is adopted by this thesis which involves rigorous tests of hypotheses developed based on the literature review to explain and predict socio-economic behaviours. Saunders, Lewis and Thornhill (2016) identified three main characteristics of the deductive approach:

a) hypothesis development and structured methodology

As mentioned in previous sections, two hypotheses subject to verifications by data analysis are developed from the reflexive work of the literature. And the research is designed based on rigorous statistical and mathematical approaches following the econometric traditions.

b) operationalisation and reduction

Following the reductionist paradigm, a series of empirical models in the form of mathematical equations are developed for estimation. And the variables involved in the conceptual and empirical models are identified, operationalised and measured.

c) generalisation

Based on the analysis, the coefficients of the variables measuring the QOL factors in the empirical model are estimated and tested. With the reliable estimation of the coefficients and the corroboration of the literature, the empirical model can be used to explain and predict the associations between QOL and entrepreneurship at the societal level in different economies.

5.6 Research Design

A research design denotes the plan and action of a researcher to answer his/her research question regarding the way data is collected and analysed (Saunders, Lewis and Thornhill, 2016). In practice, there are several alternatives available for business studies, including experiments, surveys, archival and documentary research, case study, grounded theory and so on (Saunders, Lewis and Thornhill, 2016).

The choice of a specific research design is subject to the nature of the research questions, the nature of the phenomena of interest, the research philosophy and strategy and practical considerations (Crossan, 2003; Chilisa and Kawulich, 2012; Avgousti, 2013; Foster, Rzhetsky and Evans, 2015; Basias and Pollalis, 2018). Following the positivist philosophy, a deductive approach and a quantitative

method, this study is implemented by retrieving secondary panel data from open databases of reliable international bodies and analysing the dataset via a panel data regression approach.

5.7 Data

5.7.1 Data Sources

In this study, data is primarily retrieved from the following sources: Global Entrepreneurship Monitor (GEM) of the Global Entrepreneurship Research Association (GERA), World Development Indicators (WDI) of the World Bank, Human Development Reports (HDR) of the United Nations Development Programme (UNDP), and Global Burden of Disease Study (GBD) of the Institute for Health Metrics and Evaluation (IHME).

a) GEM

To provide hard, robust and credible data to inform the decision-making of promoting sustainable entrepreneurial activities and EEs, the Global Entrepreneurship Monitor program was launched in 1997 as a joint effort of London Business School and Babson College. Covering only ten countries (Canada, France, Germany, Italy, Japan, United Kingdom, United States, Denmark, Finland and Israel) in its first report in 1999, GEM has expanded its research scope to 50 economies covering more than 150,000 individual participants in its latest 2019-2020 global report. The 22 years of longitudinal and multi-level data including over 200,000 interviews across 115 economies have qualified GEM to be one of the most informative data sources in entrepreneurship studies.

The last two decades have seen a growing body of literature relying on the unique methodological approaches and dataset of GEM to study entrepreneurship at the national level. To enable cross-national comparisons, GEM adopts a combination of both occupational and behavioural perspectives and defines entrepreneurship as "Any attempt at new business or new venture creation, such as self-

employment, a new business organization, or the expansion of an existing business, by an individual, a team of individuals, or an established business" (Reynolds, Hay and Camp, 1999, p.3). To measure entrepreneurship and its influencing factors, GEM developed two independent and complementary research tools: the Adult Population Survey (APS) which focuses on the role of individuals in the entrepreneurial process and the National Expert Survey (NES) which emphasises experts' evaluation regarding major factors that significantly affect entrepreneurship.

As a comprehensive tool that investigates a minimum sample of 2000 working-age adults in each participating economy, APS is a standard GEM questionnaire inquiring information regarding their entrepreneurial activities, attitudes, motivations and ambitions. In terms of the operationalisation of entrepreneurial activity, APS provides a widely used indicator in the literature, Total early-stage Entrepreneurial Activity (TEA), to measure "the proportion of the working-age adult population actively engaged in starting or running a new business"; to be more specific, TEA refers to "the sum of those actively starting a new business (but who have not yet paid salaries, or any other payments, including to the founder[s], for three months or more — the Nascent Entrepreneur), plus those already running a new business (who have paid wages, or other payments, including to the founder[s], for three months or more but for less than 42 months — the New Business Owner), minus any double- counting (those who fall into both categories)" (Bosma *et al.*, 2020, p.26). Further, acknowledging entrepreneurs' reliance on a wide variety of stakeholders, GEM also collects and reports data regarding people's attitudes, perceptions, affiliations and intentions toward entrepreneurship (Bosma and Kelley, 2018).

b) WDI

The World Bank, preceded by the International Bank for Reconstruction and Development founded in 1944, is the largest development institution in the world. Today, the World Bank has 189 member countries in close cooperation with the

primary goal of “fighting poverty, supporting economic growth, and ensuring sustainable gains in the quality of people’s lives in developing countries” (World Bank, 2020a). Besides implementing various development programs, coordinating economic policies of member countries and providing advisory and analytic services, the World Bank also serves as a knowledge-based institution by offering open data and open knowledge repository to facilitate knowledge creation and sharing, economic policymaking and academic studies (World Bank, 2020c).

World Development Indicators (WDI) is the primary open database of the World Bank which is one of the largest and most comprehensive panel data collection of development indicators drawn from various officially recognised sources such as the United Nations (UN), the World Health Organisation (WHO), the International Labour Organisation (ILO) and various national departments of statistics. Currently, the database captures 1431 indicators covering various properties of 264 countries such as economy, education, health and so on, around the world for the last 60 years. Due to the provision of the latest and accurate global, national and regional development data and reliable methodologies, WDI has one of the most commonly adopted data sources in the literature of various disciplines. Besides, WDI provides adjusted indicators, such as GDP per capita in constant 2010 U.S. dollars, to enable cross-national comparisons.

c) WGI

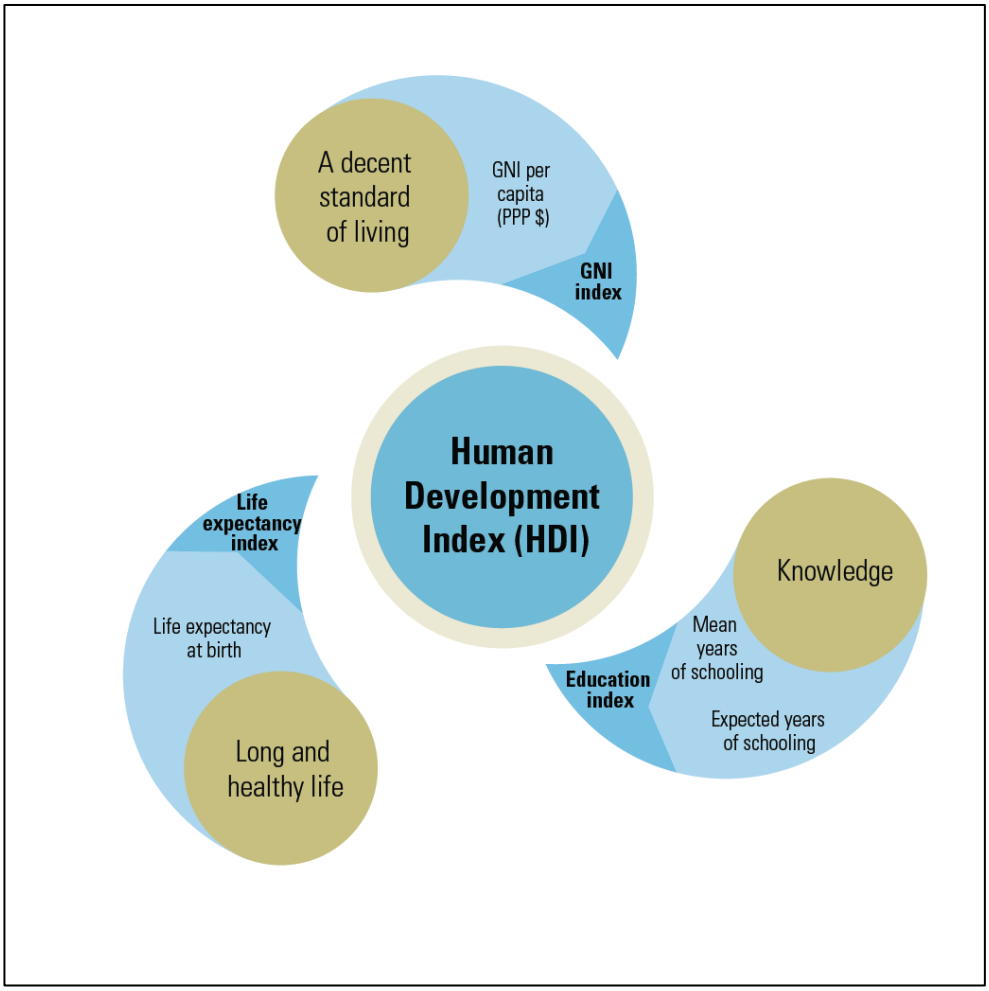
Worldwide Governance Indicators (WGI) was introduced in 1996 covering six broad dimensions of governance in terms of Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption on a wide variety of data sources including surveys, non-governmental organizations, commercial business information providers, and public sector organizations worldwide; and the data is combined into aggregate governance indicators using a distinctive

methodology developed by the World Bank to operationalise comparisons across countries and over time (Kaufmann, Kraay and Mastruzzi, 2010).

d) HDR

Human Development Report (HDR) was launched by UNDP in 1990 as the incentive of "a new approach for advancing human wellbeing" to produce a series of cross-national comparable indicators to evaluate the sustainability of human development (UNDP, 2020b). With the acknowledgement of the multi-dimensionality in human development, HDR has developed methodologies to capture the information covering three distinctive dimensions of human development, namely, living standard, health and education, and take the inequalities within those dimensions into account.

Figure 5-1 HDI framework



(Source: UNDP (2020b))

Apart from the key outcome – Human Development Index (HDI), other important indicators related to different aspects of human development are also generated by HDR and have been widely used in the literature such as the Human Inequality Index and the Educational Index.

e) GBD

Global Burden of Disease Study is an incentive launched by the Institute for Health Metrics and Evaluation (IHME), an independent global health research centre at the University of Washington, to produce yearly health data regarding various causes of death, diseases injuries, and risk factors in different countries and territories. GBD data, drawn from various sources and processed based on the distinctive methods of IHME, are publicly accessible to researchers and policymakers around the world, and one major source of the World Health Organisation (WHO) database.

5.7.2 Sample

This study intends to provide a cross-national evaluation of the causal relationships between entrepreneurship and societal QOL. The sample frame is drawn from economies participating in GEM during the period 2010-2019 which consists of 587 observations of 105 different economies. The dataset is then filtered based on the criterion that each economy should at least have two years' observations of all indicators. Based on the criterion, 29 economies are excluded from the original dataset which generates a sample of 444 observations of 76 different economies for the period of 2010-2018.

Such criterion is employed due to two main reasons. First, observations with missing data are excluded since those observations will be automatically omitted during the analysing process by STATA. For example, there are no observations concerning human inequality in Sandi Arabia; thus, the country is to be omitted during the estimation process simply because of the unavailability of information. Also, due to the lack of data on environmental sustainability in 2019, the dataset for actual analysis only covers the period 2010-2018. Second, if an economy has

only one year's observation in which data of every indicator is available, the individual effect of the economy will be estimated entirely based on information from a single observation which will lead to the issue of singleton, and "Maintaining singleton groups in linear regressions where fixed effects are nested within clusters can overstate statistical significance and lead to incorrect inference" (Correia, 2015, p.1).

5.7.3 Variables

Descriptions and data sources of the variables are presented in Table 5-3.

Table 5-3 Descriptions of the variables

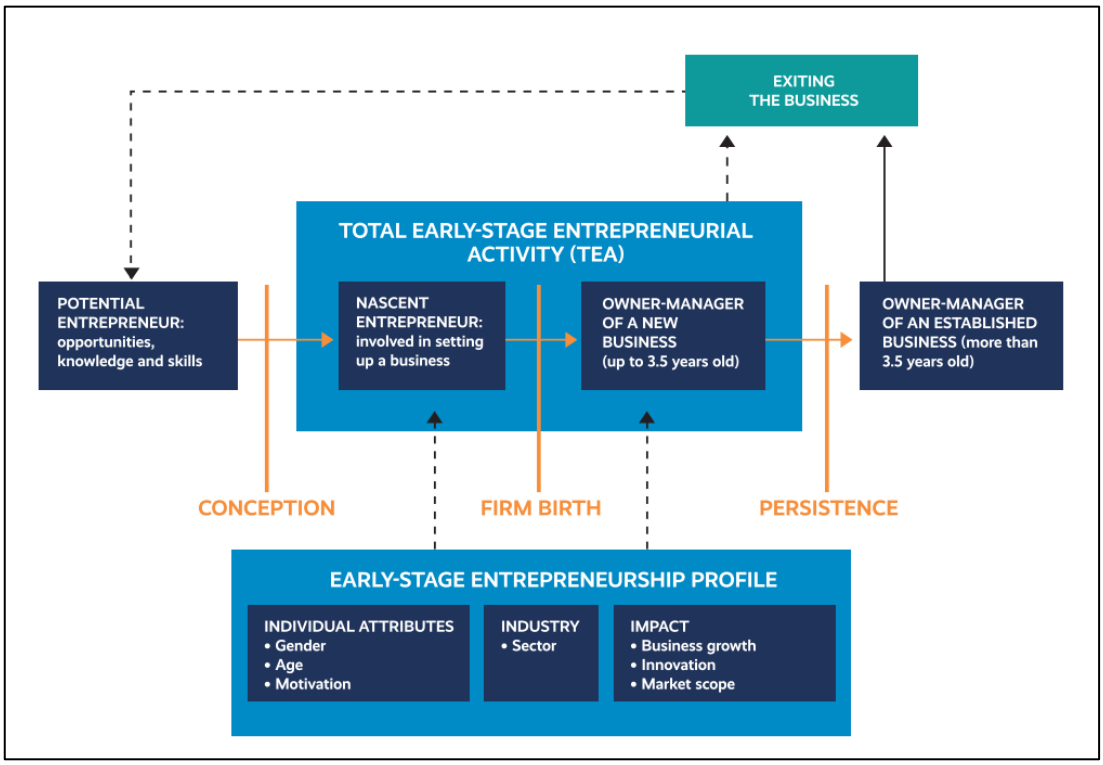
Indicator	Variable	Description	Source
Dependent Variable			
Entrepreneurship	TEA	Total early-stage Entrepreneurial Activity Rate	GEM
QOL Variable (Contextual Factors)			
Personal Economic Resources	CON	Households and NPISHs Final consumption expenditure per capita, PPP (Current International $)	WDI
Unemployment	UNE	Unemployment Rate (% of total labour force)	WDI
Societal Inequality	INE	Coefficient of Human Inequality	HDR
Public Safety	PV	Political Stability and Absence of Violence/Terrorism	WGI
Education	EDU	Education Index	HDR
Health	HALE	Healthy Life Expectancy	GBD
Environmental Sustainability	ENV	Natural Resources Depletion (% of GNI)	WDI
Individual Factor Variable			
Entrepreneurial Intention	EI	Entrepreneurial Intentions Rate	GEM

(Source: developed by the author)

TEA

The dependent variable adopted in this study is entrepreneurship which is defined as business creation and measured by the Total early-stage Entrepreneurial Activity (TEA) Rate retrieved from the GEM open database which refers to the "Percentage of the 18–64 population who are either a nascent entrepreneur or are owner-manager of a new business, i.e. the proportion of the adult population who are either starting or running a new business" (Bosma *et al.*, 2020, p.192).

Figure 5-2 GEM's framework for TEA



(Source: Bosma *et al.* (2020, p.26))

More specifically, TEA depicts EB of two groups of entrepreneurs: the nascent entrepreneurs who are "actively starting a new business" and "have not yet paid salaries, or any other payments, including to the founder[s], for three months or more", and the new business owners who are "already running a new business" and "have paid wages, or other payments, including to the founder[s], for three months or more but for less than 42 months". (Bosma *et al.*, 2020, p.25-26)

Entrepreneurial Intention Rate

Adopting the GEM approach, EI in this study refers to “the extent to which people intend to start a business in the future” and is measured by Entrepreneurial Intentions Rate which is “the percentage of working adults (ages 18-64) who state they intend to start a business in the next three years” (Bosma and Kelley, 2018, p.47).

Households and NPISHs Final consumption expenditure per capita, PPP (Current International $) refers to “the market value of all goods and services purchased by households within an economy, excluding purchases of dwellings but including imputed rent for owner-occupied dwellings, purchases of durable products, payments and fees to governments to obtain permits and licenses, and expenditures of nonprofit institutions serving households” in current international dollars modified by purchasing power parity (PPP) conversion factor (World Bank, 2021). The per capita statistics are computed by:

$$CON = \frac{Households\ and\ NPISHs\ Final\ consumption\ expenditure\ , PPP\ (Current\ International\ \$)}{Population}$$

Access to funding & finance is one of the top needs for entrepreneurs and a significant share of entrepreneurial ventures are self-financed, thus the economic resources at one’s disposal are vital to individual intention and behaviour toward business creation (Keister, 2005; Meh, 2005; Van Praag and Versloot, 2007; World Economic Forum, 2013, 2014; Prieger *et al.*, 2016). In the literature, various measures have been used as the economic indicator of social welfare which can be divided into three broad categories: GDP, income-based and consumption-based measurements (Fleurbaey, 2009; Tamvada, 2010; Chamberlin, 2011; Sirgy, 2011b; Bleys, 2012).

GDP, which refers to the value of goods and services produced within a given area over a given period, is the most widely used metric to gauge the material prosperity and economic development of an area, and the adoption of GDP as the economic indicator in societal QOL is built on the simple logic that the growth

of economy must result in the growth of welfare (Islam and Clarke, 2002). However, the overreliance on GDP in measuring the citizens' standard of living and welfare is flawed and misleading due to a series of limitations involved in its calculation: firstly, GDP includes capital payable to non-residents; secondly, GDP excludes the income of residents generated in other countries and wealth created by informal economic activities; thirdly, GDP does not illustrate how wealth is distributed across the society; fourthly, GDP fails to consider the social and environmental costs of economic activity; fifthly, GDP does not capture a range of non-money attributes of individuals and society (Islam and Clarke, 2002; Fleurbaey, 2009; OECD, 2011; Diener, Tay and Oishi, 2013). Thus, GDP serves as a better indicator of the general economic conditions of a society than a reflection of the material living status of residents.

Income-based measurements provide information about the current and future capability of residents in purchasing goods and services which also reflect the material QOL (Chamberlin, 2011; Diener, Tay and Oishi, 2013; OECD, 2019b). However, income-based measurements suffer from the major limitation of overlooking the differences in the cost of living in different societies.

In this study, per-capita consumption expenditure is adopted to measure personal economic resources because it is the most direct measurement of economic well-being and welfare (Tamvada, 2010). In consideration of the country differences, the Purchasing Power Parity is adopted to enable meaningful cross-national comparisons (Diener, Tay and Oishi, 2013; Fawaz, Rahnama and Valcarcel, 2014, 2015; OECD, 2019b).

However, it should be noted that consumption-based measurements of QOL are characterised by high constraints and uncertainty. First of all, expenditure is systematically constrained by the income level of individuals. Also, the patterns of expenditure behaviours are subject to cultural influences and individual differences in society. For example, citizens in some countries prefer savings to

consumption for extra income, while some people prefer consumption for current needs satisfaction.

Unemployment Rate data in WDI is sourced from the ILOSTAT database of the International Labour Organization which is modelled to facilitate comparability across countries and over time (ILO, 2019; World Bank, 2021). According to ILO (2019, p.6), “Persons in employment are defined as all those of working age who, during a short reference period, were engaged in any activity to produce goods or provide services for pay or profit”, “Persons in unemployment are defined as all those of working age who were not in employment, carried out activities to seek employment during a specified recent period and were currently available to take up employment given a job opportunity”, and the labour force is “The current supply of labour for the production of goods and services in exchange for pay or profit, computed as the sum of persons in employment and unemployment”; thus, the unemployment rate can be defined as:

$$Unemployment\ Rate = \frac{Unemployment}{Labour\ force} \times 100\% = \frac{Unemployment}{Employment + Unemployment} \times 100\%$$

The Coefficient of Human Inequality, retrieved from HDR, is the unweighted average of inequalities in three dimensions: health, education and income of an economy (UNDP, 2020a).

$$Coefficient\ of\ human\ inequality = \frac{A_{Health} + A_{Education} + A_{Income}}{3}$$

According to UNDP (2020a, p.5), the inequality of each dimension is estimated based on the following equations:

$$A = 1 - {}^{g}/_{\mu}$$

$$A_x = 1 - \frac{\sqrt[n]{X_1 \dots X_n}}{\bar{X}}$$

where g and μ are the geometric mean and the arithmetic mean of the distribution respectively. In contrast to other frequently used indicators in the literature, such as the Gini coefficient or poverty headcount ratio, the Coefficient of Human Inequality offers a multi-dimensional measure for cross-national comparison over time.

Political Stability and Absence of Violence/Terrorism refers to the "perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism" (Kaufmann, Kraay and Mastruzzi, 2010, p.4), and the data is retrieved from the Worldwide Governance Indicators (WGI) which is a research project to develop a series of comprehensive and cross-national indicators to evaluate governance launched by the World Bank. The value of the indicator is a standardised one that ranges from approximately -2.5 to 2.5 calculated based on the aggregate score of a country. The higher an economy scores, the more politically stable it is.

Education Index in HDR is the arithmetic mean of two educational indices, the expected years of schooling index and the mean years of schooling index, each of which is calculated based on the equation (UNDP, 2020a, p.2):

$$\frac{actual\ value - minimum\ value}{maximum\ value - minimum\ value}$$

and the value of the Education Index is always between 0 and 1. This index captures information regarding the disperses of formal education within an economy for cross-national comparisons.

Healthy Life Expectancy at Birth (Years), or Health-adjusted life expectancy (HALE), is defined as "The number of years that a person at a given age can expect to live in good health, if the rates of all-cause mortality and all-cause disability in a specified year of interest would remain constant into the future" (IHME, 2020, p.10), and the data is generated by the incentive of Global Burden of Disease Study (GBD) and is retrieved from the online database of Global

Health Data Exchange (GHDx) built by The Institute for Health Metrics and Evaluation (IHME).

The use of various indicators to measure the health conditions of a society in the literature such as the infant mortality rate, life expectancy at birth or healthcare insurance coverage are subject to the serious limitation of failing to capture the multi-dimensionality of health (Murray and Evans, 2003). In contrast, defined as the “Average number of years that a person can expect to live in ‘full health’ by taking into account years lived in less than full health due to disease and/or injury”, HALE captures “both fatal and non-fatal health outcomes in a summary measure of average levels of population health” which is “sensitive to changes over time or differences between countries in the severity distribution of health states” (WHO, 2020), and provides a more accurate multi-dimensional measurement to allow cross-national and comparisons over time (Murray and Evans, 2003).

Natural Resource Depletion (% of GNI) refers to “the sum of net forest depletion, energy depletion, and mineral depletion” (World Bank, 2021). According to World Bank (2011, p.153-154), Net forest depletion (NFD) is defined as “unit resource rents times the excess of roundwood harvest over natural growth”, Energy depletion (ED) is the “ratio of present value of rents, discounted at 4%, to exhaustion time of the resource” which covers coal, crude oil, and natural gas, and Mineral depletion (MD) is the “Ratio of present value of rents, discounted at 4%, to exhaustion time of the resource” which covers tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite, and phosphate. Thus, the higher the value of Natural resource depletion is, the less environmentally sustainable society will be.

Constructing aggregate indicators to measure environmental sustainability accurately and reliably has been a great challenge confronting academics and policymakers because of the complexity involved in conceptualising and operationalising the phenomenon. In the process of selecting the appropriate indicator for environmental sustainability in this study, the author has reviewed a number of measurements developed by different organisations and scholars,

such as carbon footprint, greenhouse gas emissions, renewable energy consumption from the WDI, Environmental Sustainability Index (ESI) and Environmental Performance Index (EPI) by Yale and Columbia University, the ecological footprint from the Global Footprint Network, Sustainable Development Goals (SDG) indicators from the UN. Unfortunately, the data availability significantly constrains their application.

Acknowledging natural sustainability being a complex and multi-dimensional concept that can be measured by a wide variety of indicators, World Bank (2011) argued constructing wealth accounts based on the adjusted savings approach of natural capital can not only inform policy-makers of the effectiveness of regulations on environmental sustainability but also generate practical tools for comparisons across countries and over time. Natural Resources Depletion is eventually elected to measure the natural sustainability of different economies which mainly captures the information regarding the exploitation of natural resources across countries and over time.

5.8 Panel Data Approach

The main objective of the research is to examine the influences of societal QOL factors on entrepreneurial activities at the country level. The panel data regression approach is adopted in this thesis.

Panel data generally refers to the dataset which consists of repeated observations on many cross-sectional units, which can be individuals, firms, regions or nations, over two or more periods (Wooldridge, 2010; Pesaran, 2015). The last several decades have witnessed mounting availability of panel datasets. Examples of national statistics include the Panel Study of Income Dynamics (PSID) conducted by the Survey Research Centre of the University of Michigan, the National Longitudinal Survey (NLS) sponsored by the U.S. Department of Labour, the China Family Panel Studies (CFPS) carried out by the Institute of Social Science Survey of Peking University, the British Household Panel Survey

(BHPS) launched by the Institute for Social and Economic Research of the University of Essex. Examples of international data collection include statistics published by various international organisations such as the World Bank, the Organisation for Economic Co-operation and Development (OECD) and the World Trade Organisation (WTO).

5.8.1 Advantages of Panel Data Approach

The econometric interest in panel data is motivated by several advantages over traditional cross-sectional or time-series data methods which are extremely valuable to inform EE studies for the following reasons.

Firstly, the complexity of EE implies that it is almost impossible to model all the influencing factors in a single study while overlooking some parameters which significantly affect entrepreneurship can cause biased results and undermine the effectiveness of the econometric models (Bruns *et al.*, 2017; Stam and Spigel, 2017; Kreuzer *et al.*, 2018; Spigel and Harrison, 2018; Hechavarría and Ingram, 2019). The panel data approach is advantageous to probe into real-life socio-economic phenomena than pure cross-sectional and time-series methods due to its capacity to control the effects of omitted variables and unobserved heterogeneity (Wooldridge, 2010; Baltagi, 2013).

Secondly, the complexity of EE also implies that the various factors and actors that significantly affect entrepreneurship are often interwoven which may cause significant multicollinearity issues, while the panel data approach helps to reduce multicollinearity among explanatory variables, offer more degrees of freedom and improve the efficiency of the estimators (Matyas and Sevestre, 2008; Pesaran, 2015).

Thirdly, the wide presence of institutional, technological and geographical inertia suggests that economic behaviours such as entrepreneurship are characterised by significant inertia and dynamics (Desyllas and Hughes, 2010; Kim, Kim and Yang, 2012; Ács, Autio and Szerb, 2014; Zhang, Duysters and Cloodt, 2014). In

contrast to pure cross-sectional or time-series data, panel data includes both the cross-sectional dimension and the time dimension which enables researchers to capture the dynamics within the socio-economic phenomena (Arellano, 2004; Hsiao, 2014).

Fourthly, panel data also benefit empirical studies in entrepreneurship due to its growing availability (Tsionas, 2019). With more and more publicly accessible micro and macro panel data published by reliable sources, such as GEM, WDI, HDR and GBD which are widely referenced in the literature by both researchers and policymakers and adopted in this study, the application of panel data has become commonplace in entrepreneurship studies (Baltagi, 2013).

Fifthly, involving both cross-sectional and time dimensions, the procedures of data processing and estimation involved in panel data regression are usually more complicated. However, the emergence of specialised software packages, such as STATA 16 which is employed in this thesis, significantly reduced the complexity and boomed the application of the panel data approach.

Panel data can be divided into three broad categories depending on the number of cross-sectional units (N) and time periods (T), 'small N, large T' panels, 'small T, large N' panels and 'large T, large N' panels, and each category of panels calls for distinctive data processing and analysing methods (Wooldridge, 2010; Pesaran, 2015). The dataset in this thesis consists of 444 observations of 76 countries (N=74) during a 9-year period (T=9) which implies the adoption of a 'small T, large N' panel, or a short panel, approach. Based on the assumptions of strictly or weakly exogenous regressors, a linear panel data model can be either static or dynamic.

5.8.2 Static Model

A linear panel data regression model of strictly exogenous regressors can be established as:

$$y_{it} = \alpha + \beta x_{it} + \mu_i + v_{it}$$

(5-1)

and

$$u_{it} = \mu_i + v_{it}$$

where y_{it} is the observation of the dependent variable of cross-sectional unit i at time t for i=1, 2, …, N; t=1, 2, …, T,

x_{it} is a $K \times 1$ vector of regressors of the cross-sectional unit i at time t,

β is a $1 \times K$ vector of slope coefficients,

and u_{it} is a composite error term that consists of μ_i which denotes the unobservable effects that vary across cross-sectional units and v_{it} which depicts the remaining stochastic disturbance.

One estimating strategy in panel data is to treat a panel as a pool of cross-sectional observations without any individual specific effects by assuming that both the intercepts and the slopes of all the observational units are homogenous and the disturbance is independent of x_{it} ($\mu_i = 0$); thus, model (5-1) can be rewritten as

$$y_{it} = \alpha + \beta x_{it} + v_{it}$$

(5-2)

the coefficient of each independent variable can be directly estimated by Ordinary Least Squares (OLS)

$$\hat{\beta}_{OLS} = \left[\sum_{i=1}^{N}\sum_{t=1}^{T}(x_{it} - \bar{x})(x_{it} - \bar{x})'\right]^{-1}\left[\sum_{i=1}^{N}\sum_{t=1}^{T}(x_{it} - \bar{x})(y_{it} - \bar{y})\right]$$

given

$$\bar{x} = (NT)^{-1}\sum_{i=1}^{N}\sum_{t=1}^{T}x_{it}$$

and

$$\bar{y} = (NT)^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} y_{it}$$

However, the Pooled OLS estimator is prone to biases when being used to probe into complex socio-economic phenomena such as entrepreneurship and EEs due to issues of omitted variables and unobserved individual effects (Wooldridge, 2010; Baltagi, 2013; Hsiao, 2014; Pesaran, 2015; Greene, 2018; Tsionas, 2019)

By assuming the presence of unobserved individual effects ($\mu_i \neq 0$), the model can further refer to a Fixed Effect (FE) model, where μ_i is correlated with x_{it}, or a Random Effects (RE) model, where μ_i is independent of x_{it} (Wooldridge, 2010; Greene, 2018).

In an FE model, μ_i is assumed to be a free parameter which varies across individuals but remains time-invariant, two methods are available to estimate FE regressors.

The Least Squares Dummy Variable (LSDV) estimator introduces N-1 dummies into the regression to capture individual heterogeneity which allows different cross-sectional units have different intercepts but homogeneous slopes. And the model (5-1) can be rewritten as:

$$y_{it} = (\alpha + \mu_i) + \beta x_{it} + v_{it} \quad (5\text{-}3)$$

Consequently, time-invariant variables cannot be estimated by FE specification since their effects are assumed to be captured by individual dummies (Hausman and Taylor, 1981; Baltagi, 2013).

Another way to estimate the FE model is within estimator where the unobserved individual effect μ_i can be neutralised through within-group transformation:

$$\bar{y}_{i.} = \alpha + \beta \bar{x}_{i.} + \mu_i + \bar{v}_{i.}$$

$$y_{it} - \bar{y}_{i.} = \beta (x_{it} - \bar{x}_{i.}) + (v_{it} - \bar{v}_{i.})$$

The parameters can then be estimated by applying OLS to the transformed model:

$$\hat{\beta}_{FE} = \left[\sum_{t=1}^{T}\sum_{i=1}^{N}(x_{it} - \bar{x}_i)'(x_{it} - \bar{x}_i)\right]^{-1} \sum_{t=1}^{T}\sum_{i=1}^{N}(x_{it} - \bar{x}_i)'(y_{it} - \bar{y}_i)$$

in which the composite slops $\alpha + \mu_i$ are assumed to be free parameters. It can be proved that the LSDV estimator is the same as the within estimator (Pesaran, 2015).

Compared with other FE estimators, the LSDV estimator is advantageous because it is the best linear unbiased estimator (BLUE) provided that v_{it} is a normal-distributed stochastic disturbance, and can produce the right R^2 and adjusted R^2 for researchers to evaluate the model's goodness-of-fit (Park, 2011; Baltagi, 2013). However, LSDV can suffer a significant loss of degrees of freedom due to the involvement of an extra of $N-1$ parameters, thus LSDV can sometimes be computationally inefficient or even infeasible in panels with a large number of cross-sectional units; further, the LSDV approach is only valid provided under the assumptions of homoscedasticity and no serial correlation which indicates the needs for special care and revision in empirical studies (Wooldridge, 2010; Baltagi, 2013; Pesaran, 2015).

The presence of fixed effects can be evaluated through an F-test for the joint significance of individual dummies (Park, 2011; Greene, 2018):

for H_0: $\mu_1 = \mu_2 = \mu_3 = \cdots = \mu_{N-1} = 0$

$$F_{N-1,N(T-1)-K} = \frac{(SSE_{Pooled\ OLS} - SSE_{LSDV})/\ (N-1)}{SSE_{LSDV}/(NT-N-K)} = \frac{(R^2_{LSDV} - R^2_{Pooled\ OLS})/\ (N-1)}{(1-R^2_{LSDV})/(NT-N-K)}$$

The F statistic contrasts the error sum of square (SSE) of the LSDV model with that of the Pooled OLS model which can also be considered as an evaluation of the changes in goodness-of-fit (Wooldridge, 2010; Park, 2011; Baltagi, 2013; Pesaran, 2015). The rejection of the null hypothesis, which indicates the

statistical significance of individual-specific effect in at least one cross-sectional unit and a significant increase in goodness-of-fit, implies the preference for the fixed effect model over Pooled OLS specification.

In an RE model, μ_i is assumed an independent stochastic parameter with restriction $E(\mu_i) = 0$ for all i and all t (Wooldridge, 2010; Greene, 2018). Thus, in the unobserved individual effect model (5-1), the covariance of the error terms between individual i at time t and individual j at time s is

$$cov\left(\mu_i + v_{it}, \mu_j + v_{js}\right) = \begin{cases} \sigma_\mu^2 + \sigma_v^2, & for\ i = j\ and\ t = s \\ \sigma_\mu^2, & for\ i = j\ and\ t \neq s \\ 0, & for\ i \neq j \end{cases}$$

and the correlation coefficient between the individual specific effects and the remaining disturbance is

$$\rho = \begin{cases} 1, & for\ i = j\ and\ t = s \\ \dfrac{\sigma_\mu^2}{\sigma_\mu^2 + \sigma_v^2}, & for\ i = j\ and\ t \neq s \\ 0, & for\ i \neq j \end{cases}$$

where $u_i \sim IID(0, \sigma_\mu^2), and\ v_{it} \sim IID(0, \sigma_v^2)$ (Fuller and Battese, 1973; Wooldridge, 2010; Baltagi, 2013). The ρ value indicates “the ratio of individual specific error variance to the composite (entire) error variance” which “may be interpreted as a goodness-of-fit of random effect model” (Park, 2011, p.37)

The OLS estimator is still the uniform estimate but no longer BLUE since the composite error terms of the same observational unit over time is serially correlated. The variance-covariance matrix of the error terms of the panel is an equi-correlated block diagonal matrix. Since the covariance structure of the composite disturbance is usually unknown in empirical studies, the random effect model can be estimated by Feasible Generalised Least Square (FGLS) estimators (Park, 2011).

For

$$\theta \equiv 1 - \sqrt{\frac{\sigma_v^2}{T\sigma_\mu^2 + \sigma_v^2}}$$

(5-4)

σ_μ^2 can be estimated by between estimators, and σ_v^2 can be estimated by within estimators, through quasi-demeaned transformation,

$$y_{it} - \hat{\theta}\bar{y}_i = (1 - \hat{\theta})\alpha + \beta(x_{it} - \hat{\theta}\bar{x}_i) + (1 - \hat{\theta})\mu_i + (v_{it} - \hat{\theta}\bar{v}_i)$$

(5-5)

the error terms are no longer serially correlated, and the model can be estimated through OLS.

Proposed by Breusch and Pagan (1980), Lagrange Multiplier (LM) test can be applied to examine error components of the random effect model with the null hypothesis H_0: $\sigma_\mu^2 = 0$. The Breusch and Pagan LM statistic

$$LM = \frac{NT}{2(T-1)}\left[\frac{T^2\bar{e}'\bar{e}}{RSS_{Pooled\ OLS}} - 1\right] \sim \chi^2(1)$$

is constructed based on the Pooled OLS residues, where $\bar{e}$ denotes the $n \times 1$ vector of the group means of pooled OLS residuals, and follows the one degree of freedom chi-squared distribution (Breusch and Pagan, 1980; Wooldridge, 2010; Park, 2011). Rejection of the null hypothesis indicates statistically significant individual-specific variance components which favour the random effect specification over Pooled OLS estimator (Baltagi, 2013).

To test whether the FE model or the RE model is more relevant in estimating a panel, the Hausman specification test can be applied by examining if there are statistically significant correlations between the individual-specific effects and the independent regressors within the model (Hausman, 1978; Hausman and Taylor, 1981). However, the Hausman test is only informative under the strict assumption

of homoscedasticity and the absence of auto-correlation (Wooldridge, 2010; Park, 2011). To address these issues, an artificial regression

$$y_{it} - \hat{\theta}\bar{y}_i = (1-\hat{\theta})\alpha + \beta(x_{it} - \hat{\theta}\bar{x}_i) + \gamma(x_{it} - \bar{x}_i) + (1-\hat{\theta})\mu_i + (v_{it} - \hat{\theta}\bar{v}_i)$$

of overidentifying restrictions can be built to examine whether the FE or the RE estimator is more effective (Arellano, 1993; Wooldridge, 2010). By applying clustered robust standard errors, the test reports a Wald test of the significance of the augmented deviations-from-mean regressor γ under the null hypothesis $H_0: \gamma = 0$.

When the null hypothesis is accepted, $p \lim_{n\to\infty} \hat{\gamma} = \gamma = 0$, the artificial regression equation is equivalent to equation 5-5 which indicates that the RE model is more relevant; otherwise, the FE model. Apart from heteroscedasticity and auto-correlation, this test is also applicable to unbalanced panels.

5.8.3 Dynamic Model

Path-dependence of socio-economic behaviours implies the presence of significant institutional, structural, organisational, relational, psychological, technological and geographical inertia (Stam, 2014; Sullivan and Ford, 2014; Stacey, 2016; Stacey and Mowles, 2016; Muldoon, Bauman and Lucy, 2018; Park and Park, 2018; Qian, 2018), it is necessary to assess the extent to which the trajectories of socio-economic phenomena are determined by prior conditions. Additionally, the interactive associations between entrepreneurship and QOL factors suggest the presence of two-way causality and dynamic relationships, and the dynamic model helps to treat “the problems of simultaneity bias, reverse causality, and omitted variables” (Feki and Mnif, 2016, p.995). Panel data is advantageous in allowing researchers to examine the dynamics within socio-economic behaviours by including the lag of the dependent variable in the econometric model (Kennedy, 2008; Matyas and Sevestre, 2008; Hsiao, 2014; Greene, 2018).

When the first-order lag of the dependent variable is modelled, the model (5-1) can be rewritten as

$$y_{it} = \alpha + \lambda y_{i,t-1} + \beta x_{it} + u_{it} \tag{5-6}$$

where

$$u_{it} = \mu_i + v_{it}$$

The individual-specific effects can be eliminated through the first differencing transformation of model (5-6)

$$y_{it} - y_{i,t-1} = \lambda\left(y_{i,t-1} - y_{i,t-2}\right) + \beta\left(x_{it} - x_{i,t-1}\right) + \left(v_{it} - v_{i,t-1}\right)$$

or

$$\Delta y_{it} = \lambda \Delta y_{i,t-1} + \beta \Delta x_{it} + \Delta v_{it} \tag{5-7}$$

Since $y_{i,t-1}$ are added into the equation as an explanatory variable, the estimations of various specifications in the static model are no longer consistent due to the violation of the strict exogeneity assumption (Wooldridge, 2010; Pesaran, 2015). To address the issue, Anderson and Hsiao (1981) proposed to use either $y_{i,t-2}$ or $\Delta y_{i,t-2}$ instruments for $\Delta y_{i,t-1}$, which are assumed to be correlated with $\Delta y_{i,t-1}$ but not with Δv_{it}, to estimate the dynamic model. Arellano and Bond (1991, p.278) suggested a more efficient procedure by arguing “values of y lagged two periods or more are valid instruments in the equations in first difference” in absence of serial correlation in the disturbance.

Both Anderson and Hsiao (1981) and Arellano and Bond (1991) estimators use instruments in levels to estimate equations in first differences, while Arellano and Bover (1995) argue that the difference GMM procedures might lead to substantial variation loss in the data. In contrast, they proposed a level GMM estimator by

using instruments in first differences to estimate dynamic panel data models in levels.

However, Blundell and Bond (1998) pointed out that the level GMM estimators suffer from weak instruments which can cause a large finite sample bias and a significant loss in precision. They further argued that “all the moment conditions available can be exploited by a linear GMM estimator in a system of first-differenced and levels equations” (Blundell and Bond, 1998, p.138) and constructed a system GMM estimator which showed dramatic efficiency gains with a much smaller bias and improved precision when being applied to both simulation and empirical data, especially in short panels (Kennedy, 2008; Wooldridge, 2010; Pesaran, 2015; Tsionas, 2019).

The dataset in this study is characterised by a relatively large “N” and a small “T”, to enhance the efficiency and precision of the estimation and minimise bias deriving from weak instruments, the system GMM estimator is adopted to assess the dynamic models concerning the effects of quality of life on entrepreneurial activity. It should be also noted that, in the system GMM estimator, the disturbance is assumed to be not serially correlated (Blundell and Bond, 1998) which can be tested by “the second-order residual serial correlation coefficient” constructed by Arellano and Bond (1991, p.278).

Besides, the validity of the GMM estimators is primarily dependent on the assumption of the exogeneity of the instruments (Wooldridge, 2010; Hsiao, 2014; Pesaran, 2015; Greene, 2018) which can be examined by the Sargan (1958) test and Hansen (1982) test of the over-identifying restrictions. Besides the overall validity of instruments, the Sargan/Hansen tests can also be applied to test the subsets of instruments (Roodman, 2009). However, the Sargan and Hansen’s *J* tests are not without weaknesses, the Sargan test is not robust but will not be weakened by too many instruments, while the Hansen’s *J* test is theoretically superior in robustness in the case of heteroscedasticity but subject to issues of weak instruments (Kennedy, 2008; Roodman, 2009).

5.8.4 Unbalanced Panel

Panel data can also be categorised depending on the availability of data. A dataset that contains observation for each cross-sectional unit at each period of time is a balanced panel, otherwise, an unbalanced panel (Wooldridge, 2010; Baltagi, 2013; Pesaran, 2015; Greene, 2018). The dataset in this study is a highly unbalanced panel that is subject to further sampling and modelling considerations.

There are no fundamental differences in the econometric methods for balanced and unbalanced panels; thus, various specifications can still be applied to an unbalanced panel with small adjustments which can be automatically processed in STATA (Wooldridge, 2010). Issues of unbalanced panels are more related to the sampling process than the modelling procedures due to the possibility of idiosyncratic errors introduced by sample selection provided that the pattern of missing data is systematic instead of random (Wooldridge, 2010; Pesaran, 2015). However, unbalanced panels are very common in real-life socio-economic contexts, and “the use of unbalanced panels may lessen the impact of self-selection” of samples (Arellano and Bond, 1991, p.281).

The sample of this study is drawn from the full dataset of GEM during the period 2010-2019 which is inherently an unbalanced panel. To avoid self-selection sampling, the data is filtered by the criterion that is developed entirely based on the availability of data. However, the dominance of wealthy countries in the sample may impose limits to the extent to which the generalisation of the study can be applied. The limitation can only be addressed by the joint efforts of both various international bodies and individual countries, especially poor countries, to improve the availability of relevant data.

5.9 Diagnosis Tests

The feasibility of panel data estimation is dependent on a series of econometric and statistical assumptions, and violations of these assumptions will significantly undermine the consistency of the panel data estimators and the robustness of

the regression statistics, and further weaken the validity and reliability of the study. Thus, various diagnosis tests are necessary to inform further adjustments to produce robust inference. For short panels, typical issues involved in the dataset are heteroscedasticity, multi-collinearity and auto-correlation (Kennedy, 2008; Matyas and Sevestre, 2008; Wooldridge, 2010, 2019; Hsiao, 2014; Greene, 2018).

5.9.1 Heteroscedasticity Test

Homoscedasticity is a basic assumption in panel data regression; however, heteroscedasticity is common in studies based on objective data and can generate biased results and misleading inferences due to the misestimation of the standard errors of the variable coefficients (Wooldridge, 2010). Due to the involvement of both cross-sectional and time dimensions in panel data, the traditional Breusch-Pagan and White tests are no longer effective; thus, a modified Wald statistic can be constructed to test the significance of groupwise heteroscedasticity in panel data under the null hypothesis a common variance of the disturbance among each individual i: $H_0: \sigma_i^2 = \sigma^2$, for all i, and the rejection of the null hypothesis indicates statistically significant heteroscedastic disturbance across individual groups within the panel (Greene, 2018).

Table 5-4 Statistics of the modified Wald tests for groupwise heteroscedasticity in panel data

	Direct effect model (Without lnEI)	Indirect effect model (With lnEI)
chi (2) statistics	31661.34***	54102.42**

According to Table 5-4, the chi (2) statistics, irrespective of whether EI is involved in the empirical models or not, indicate a strong rejection of the null hypothesis and the presence of significant heteroscedasticity across the dataset. Thus, robust standard errors should be applied in the estimation process.

5.9.2 Multi-Collinearity Test

The possibility of high correlations among societal QOL factors and entrepreneurship raises the issue of multi-collinearity which is a serious violation of the full rank assumption (Wooldridge, 2010; Hsiao, 2014). The presence of perfect multi-collinearity can be evaluated by constructing the diagnostic statistic of the Variance Inflation Factor (VIF) which is given by $1/(1-R_k^2)$, for R_k^2 is the R^2 derived from regressing each independent variable on all other independent variables (Kennedy, 2008; Greene, 2018).

Table 5-5 VIF statistics for the direct effect model

Variable	VIF	1/VIF
lnEDU	6.160	0.162
lnCON	5.490	0.182
lnINE	3.850	0.260
lnHALE	3.180	0.314
PV	2.210	0.453
ENV	1.590	0.628
UNE	1.080	0.928
Mean VIF	3.370	

Table 5-6 VIF statistics for the indirect effect model

Variable	VIF	1/VIF
lnEDU	6.160	0.162
lnCON	6.020	0.166
lnINE	4.550	0.220
lnHALE	3.300	0.303

lnEI	2.270	0.441
PV	2.250	0.444
ENV	1.610	0.621
UNE	1.080	0.926
Mean VIF	3.410	

According to Table 5-5 and Table 5-6, irrespective of whether EI is modelled, the VIF value of each variable is far below 10 with an average of around 3.40 which indicates the absence of strict multi-collinearity among independent variables.

5.9.3 Auto-Correlation Test

The presence of autocorrelation is another issue commonly involved in socio-economic short panels which is a serious violation of the independence assumption of panel data and can cause misleading results (Kennedy, 2008; Matyas and Sevestre, 2008; Hsiao, 2014; Greene, 2018). Wooldridge (2010) proposed a Wald test to examine the autocorrelation in panel data with the null hypothesis of a zero auto-covariance of individual i: H_0: $cov[v_{it}, v_{is}] = 0$, $t \neq s$ for all i, by conducting simple regression between the fixed effect residues of two different time periods t and $t-1$, and the rejection of the null hypothesis indicates a statistically significant first-order auto-correlation (Drukker, 2003).

Table 5-7 Statistics of the Wald tests for autocorrelation in panel data

	Direct effect model (Without lnEI)	Indirect effect model (With lnEI)
F statistics	7.267***	4.352**

According to Table 5-7, the F statistics indicate the presence of significant autocorrelation in the dataset irrespective of the involvement of EI in the models.

To address the issue, the clustered robust standard errors should be applied in the estimation process.

5.10 Quality of the Study

The quality evaluation of an academic inquiry into socio-economic phenomena varies significantly in different research traditions (Easterby-Smith, Thorpe and Jackson, 2015; Strang, 2015; Saunders, Lewis and Thornhill, 2016). Qualitative studies are typically advantageous in generating information-rich data to capture the complexity of the social phenomena and create in-depth inference; however, the small sample size and context-sensitivity significantly constrain their inference to other contexts. By contrast, quantitative studies often suffer from the weakness of oversimplification in quantifying complex social behaviours but have the strengths in rigidity, generalisability and replicability.

The quality of a quantitative study following the positivist paradigm is usually assessed via various criteria including measurement validity, internal validity, external validity, reliability and objectivity; thereinto, measurement validity refers to the appropriateness of the measurement, and internal validity is mainly concerned with the accuracy of the results and relationships, external validity denotes the generalisability of the research findings to other contexts, reliability mainly refers to the replication of the study, and objectivity requires the minimisation of the subjectivity and biases (Easterby-Smith, Thorpe and Jackson, 2015; Saunders, Lewis and Thornhill, 2016). To enhance the quality of this study, the following strategies have been employed.

5.10.1 Appropriate Measures

In a quantitative study in social science, various social behaviours and phenomena are measured by quantified indicators, thus “the appropriateness of the measures” is of pivotal importance (Saunders, Lewis and Thornhill, 2016, p.202). The assurance of the measurement validity of this study is based on the critical review of a substantial body of relative literature, and the measures

selected are those which have been widely used for the respective indicators. Their precise definitions, sources and the methods by which these measures are constructed and accessed have been articulated in detail in previous sections. Further, most of the indicators are the direct measurements of welfare to ensure accuracy. For example, consumption per capita is adopted because it is the direct determinant of economic welfare (Tamvada, 2010). The only indirect measure is Natural resource depletion (% of GNI) which is a wealth account for natural sustainability. However, the complexity of socio-economic phenomena imposes significant barriers for this study because of the incapacity of the numerical indicators in capturing the multi-dimensionality and diversity of social behaviours (Strang, 2015; Basias and Pollalis, 2018). To address such issues and minimise the limitations, some multi-dimensional indices, such as the Coefficient of Human Inequality and Education Index, are adopted to enhance measurement accuracy.

5.10.2 Firm Theoretical Underpinnings

According to Saunders, Lewis and Thornhill (2016), internal validity is dependent on the establishment of the causal relationship between variables. To enhance the internal validity, the study is built and underpinned on solid theoretical foundations of entrepreneurship, EE and QOL which are derived from several lineages of well-established theories. The conceptual model and its underlying causal relationships are constructed based on critical reviews of a large body of literature and relative established theories such as Human Capital Theory, TPB and so on, in which the dispensability of QOL within an EE has been theoretically evaluated and empirically examined. Among the hypotheses proposed in previous sections, Hypothesis 1 is developed to corroborate established theories, replicate previous studies and build a baseline model, while Hypothesis 2 expands the theories by exploring new relationships based on a close examination of the dataset. Further, the outcomes will also be critically evaluated by revisiting the literature.

5.10.3 Reliable Data Sources

Since the study adopts a quantitative approach based on data accessed from online panels, one major threat to its quality is the dependability of the data sources (Saunders, Lewis and Thornhill, 2016; Porter *et al.*, 2019). To address such an issue, the following methods have been adopted:

a) all data collected for this study are retrieved from databases of various specialised and dependable international bodies with rich experiences and professionalism in their respective areas, including GEM, the World Bank, UNDP, and IHME, which have been in popular use in the literature for their reliable data collection and estimation methods;
b) the data sources of this study are all open databases which allow free data retrieval for future replication by other researchers;
c) and, the original dataset is filtered completely based on the nature of the data itself to minimise the idiosyncratic bias which may be introduced by sampling.

5.10.4 Rigorous and Transparent Process

A quality quantitative study needs to be methodologically rigorous, and the transparency of the research process can greatly enhance its objectivity, generalisability, replicability and credibility (Saunders, Lewis and Thornhill, 2016; Anderson, Wennberg and McMullen, 2019; Wennberg and Anderson, 2020). In terms of this study, the entire analysis procedures are conducted by following rigorous econometric traditions. Meanwhile, various tests are implemented to ensure the robustness of the results for further interpretation, inferences and generalisation. Besides, the whole research processes, including data sourcing, data collection, data processing and data analysis procedures, are articulated in detail to maximise transparency, and enable close examination and future replications.

5.10.5 Robustness

In this study, different models, including the direct effect models and indirect effect models established based on different hypotheses, are assessed by

adopting different panel data specifications, such as FE, RE and system GMM estimators, to ensure the robustness of the results. Comparing the results of different models and different specifications and linking the findings to the literature significantly strengthen the generalisability, reliability and objectivity of the study.

Besides, to enhance the robustness of the findings, results of regressions including extra control variables are presented. The robustness checks can ensure that the results are not driven by the subjective choices of the key indicators and significantly increase the quality of the study.

5.11 Methodological Limitations

Despite the reasonable justification of the methodological decisions, the study has several limitations.

Firstly, based on well-established theories and a large body of literature, this study adopts a quantitative approach. Although the methodological choice has been reasonably justified, it still suffers from the common limitations involved in quantitative studies such as the incapacity to include information-rich data and generate in-depth understandings of the phenomenon in interest (Saunders, Lewis and Thornhill, 2016).

Secondly, the data collection strategies of the data sources generate a dataset of an unbalanced short panel consisting of 444 observations of 76 different economies for the period of 2010-2018. The sample is dominated by High and Upper-Middle-Income countries which may produce biased results and undermine the generalisation of the research findings.

Thirdly, the relatively small number of economies offers limited degrees of freedom which significantly constrain the number of parameters that can be estimated and the number of instruments that can be specified. For example, to address endogeneity issues, the regressions heavily rely on system GMM estimators. Due to the relatively small sample size, only CON is assumed to be

endogenous to avoid too many and weak instruments. This study also attempts to test the potential moderating effects, but the endogeneity issue results in too many instruments that can significantly undermine the robustness of the analysis.

Lastly, the multi-dimensionality and multi-facet of the socio-economic phenomena such as QOL indicate each of the QOL indicators can be measured from different angles. However, for most of the QOL factors, there are no universally accepted measures in the literature. Although the choice of each indicator is built on a review of the literature and can be reasonably justified, the incapacity of the numerical measures to capture the complexity in socio-economic behaviours may impose limitations on the validity of this study and produce measurement biases.

5.12 Chapter Summary

This chapter presents the research methodology of the study. Adopting the positivist philosophy, a deductive approach and a quantitative method are employed in this study. The analysis relies on secondary data retrieved from various open databases including the Global Entrepreneurship Monitor (GEM) of the Global Entrepreneurship Research Association (GERA), World Development Indicators (WDI) of the World Bank, Human Development Reports (HDR) of the United Nations Development Programme (UNDP), and Global Burden of Disease Study (GBD) of the Institute for Health Metrics and Evaluation (IHME).

The dataset subject to analysis is an unbalanced short panel consisting of 444 observations of 76 different economies for the period of 2010-2018 which is to be processed by STATA based on both static and dynamic panel data regression estimators. Various diagnosis tests are performed that report significant heteroscedasticity and auto-correlation within the dataset.

To enhance the quality of the study, strategies regarding the measurements, theoretical underpinnings, data sources, rigorous and transparent procedures, and robustness are employed in this study to ensure the measurement validity,

internal validity, external validity, reliability and objectivity. Although the methodological decisions have been reasonably justified, the research methods in this study have several limitations in terms of total reliance on a mono quantitative approach, an unevenly distributed sample, a relatively small sample size and measurement issues.

6 Analysis and Results

6.1 Chapter Overview

Based on the theoretical foundations laid in Chapter 2, 3 and 4, and the research methods introduced in Chapter 5, this chapter outlines the detailed analysis procedures and reports the regression results. To examine the extent to which societal QOL factors affect entrepreneurship, the dataset is analysed via different panel data specifications to test the hypotheses.

To this end, this chapter is divided into three parts. The first part is a descriptive analysis of the dataset which presents an overview of the sample. In the second part, two empirical models are developed to test the direct effect hypothesis via static and dynamic panel data models respectively and the results are reported. In the last part, based on the Simple Mediation Model approach, three empirical models are constructed to test the indirect effect hypothesis and the results are detailed. Drawn from the implications in the analysis process of the direct effect model, only the dynamic panel data regression estimator is adopted.

6.2 Descriptive Analysis

Due to the data collection strategy of GEM and data availability of societal QOL indicators, the dataset being analysed in this study consists of 444 observations of 76 economies spanning 9 years from 2010 to 2018. As observations for some economies are not available for some years, the study is left with a short and highly unbalanced panel.

According to the Country Income Groups established by World Bank (2016, 2020a, 2020b) based on the yearly Gross National Income (GNI) per capita, the panel is made up of 260 observations from 36 High-Income economies, 128 observations from 23 Upper-Middle-Income economies, 46 observations from 13 Lower-Middle-Income economies, and 10 observations from 4 Low-Income economies. The economies of different Country Income Groups in the dataset are presented in Table 6-1.

Table 6-1 Income groups of the countries in the sample

High Income	Upper-Middle Income	Lower-Middle Income	Low Income
Australia	Argentina	Angola	Burkina Faso
Austria	Belize	Bolivia	Madagascar
Belgium	Bosnia and Herzegovina	Cameroon	Malawi
Canada	Botswana	Egypt	Uganda
Chile	Brazil	El Salvador	
Croatia	Bulgaria	Ghana	
Cyprus	China	India	
Denmark	Colombia	Nigeria	
Estonia	Costa Rica	Pakistan	
Finland	Ecuador	Philippines	
France	Georgia	Tunisia	
Germany	Guatemala	Vietnam	
Greece	Indonesia	Zambia	
Hungary	Jamaica		
Ireland	Kazakhstan		
Israel	Mexico		
Italy	Namibia		
Japan	North Macedonia		
Korea	Peru		
Latvia	Russia		
Lithuania	South Africa		
Luxembourg	Thailand		
Netherlands	Turkey		
Norway			
Panama			
Poland			
Portugal			
Romania			
Slovakia			
Slovenia			
Spain			

Sweden
Switzerland
United Kingdom
United States
Uruguay

(Source: developed by the author based on the dataset)

According to the classification of the Stages of Development established by the World Economic Forum (2017), countries are divided into factor-driven (Stage 1), transition from Stage 1 to Stage 2, efficiency-driven (Stage 2), transition from Stage 2 to Stage 3, and innovation-driven (Stage 3) economies. As presented in Table 6-2, the dataset is made up of 185 observations from 26 Stage 3 economies, 91 observations from 13 economies in transition from Stage 2 to Stage 3, 116 observations from 21 Stage 2 economies, 24 observations from 7 economies in transition from Stage 1 to Stage 2, and 28 observations from 9 Stage 1 economies.

Table 6-2 Development groups of the sample

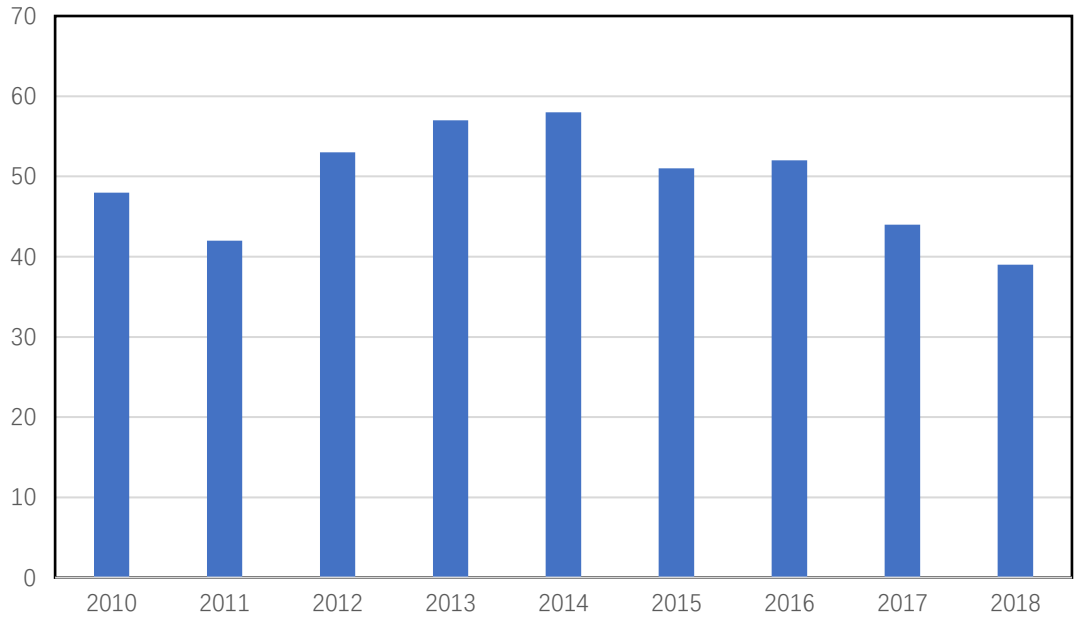
Stage 1	**Transition from stage 1 to stage 2**	**Stage 2**	**Transition from stage 2 to stage 3**	**Stage 3**
Burkina Faso	Angola	Belize	Argentina	Australia
Cameroon	Bolivia	Bosnia and Herzegovina	Chile	Austria
Ghana	Botswana	Brazil	Costa Rica	Belgium
India	Kazakhstan	Bulgaria	Croatia	Canada
Madagascar	Nigeria	China	Hungary	Cyprus
Malawi	Philippines	Colombia	Latvia	Denmark
Pakistan	Vietnam	Ecuador	Lithuania	Estonia
Uganda		Egypt	Panama	Finland
Zambia		El Salvador	Poland	France
		Georgia	Romania	Germany
		Guatemala	Slovakia	Greece
		Indonesia	Turkey	Ireland
		Jamaica	Uruguay	Israel

Mexico	Italy
Namibia	Japan
North Macedonia	Korea
Peru	Luxembourg
Russia	Netherlands
South Africa	Norway
Thailand	Portugal
Tunisia	Slovenia
	Spain
	Sweden
	Switzerland
	United Kingdom
	United States

(Source: developed by the author based on the dataset)

The uneven distribution of economies across both the Income Groups and the development stages indicates a similar pattern in terms of the dominance of wealthy and developed countries in the sample.

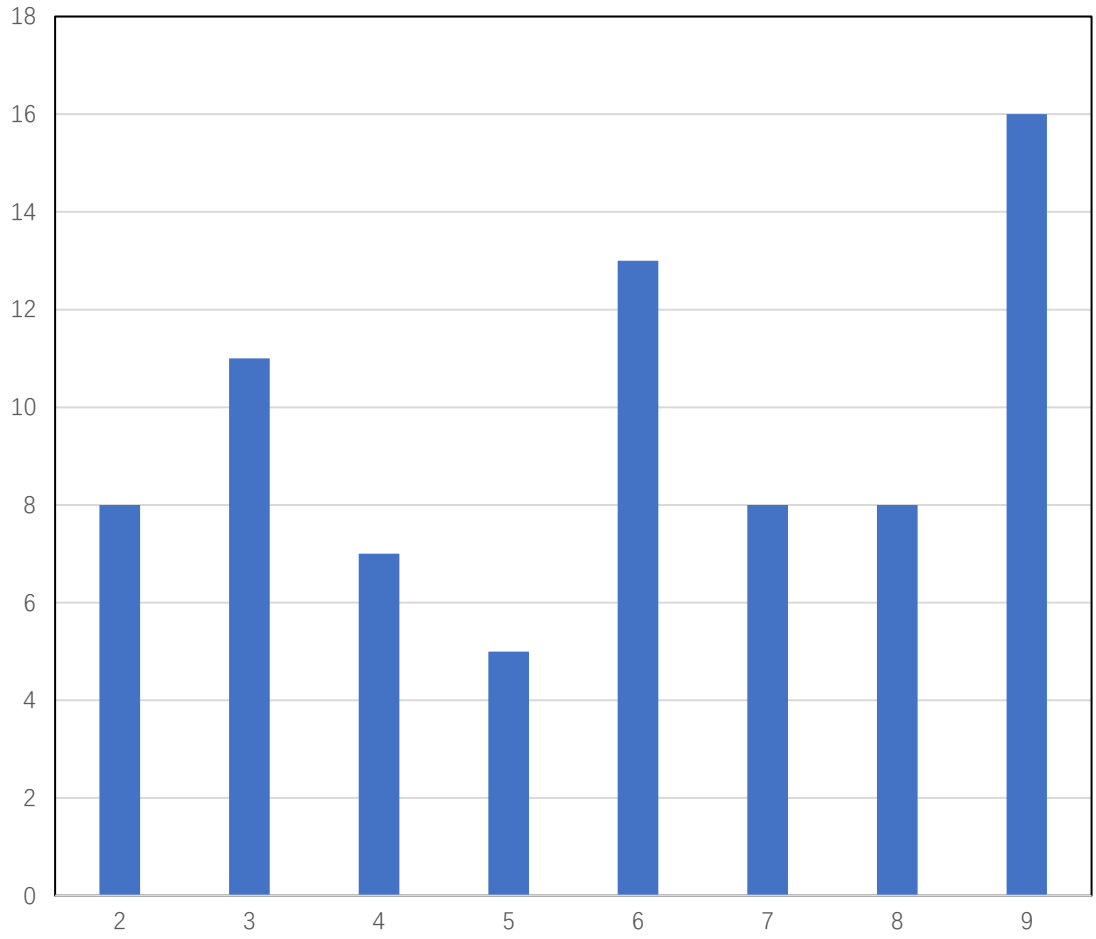
Figure 6-1 Yearly observations in the dataset



(Source: developed by the author based on the dataset)

According to Figure 6-1, the number of yearly observations varies significantly with a maximum of 58 in 2014 and a minimum of 39 in 2018. Figure 6-2 illustrates the uneven distribution in terms of the data availability of each observational unit, 44 economies have 6 observations or less, and full observational data are only available in 3 Upper-Middle-Income economies and 13 High-Income economies.

Figure 6-2 Country groups by numbers of observations



(Source: developed by the author based on the dataset)

The descriptive statistics of the variables are presented in Table 6-3. Across the 76 economies included in the sample, the average value of TEA is 12.88%, the minimum is 2.35% (Italy, 2010), and the maximum is 41.46% (Zambia, 2012). The individual factor, EI, fluctuates more significantly with an average of 21.89%, a minimum of 2.12% (Russia, 2016), and a maximum of 90.95% (Nigeria, 2011).

Table 6-3 Descriptive statistics of variables

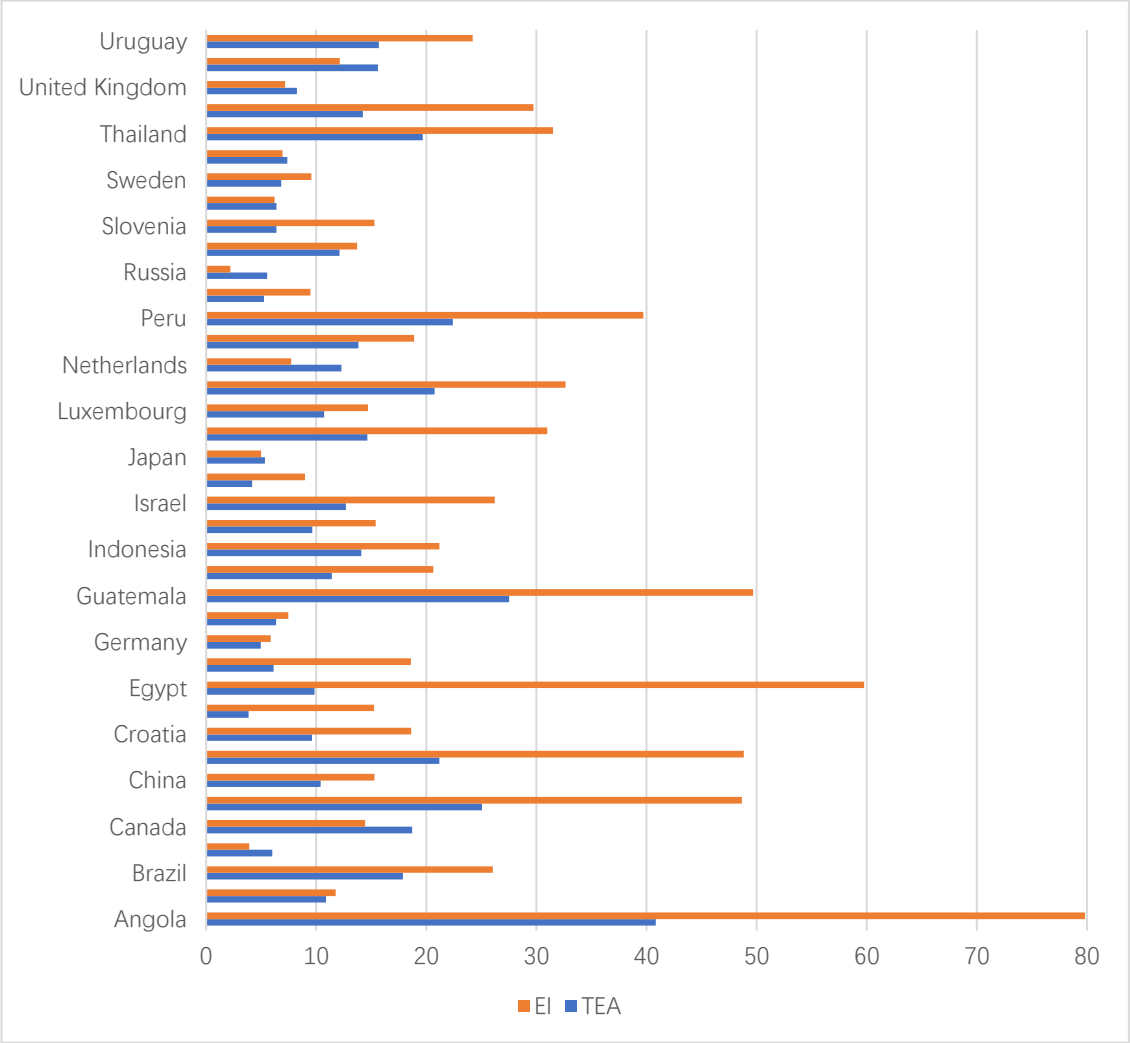
Variable	Observations	Mean	SD	Min	Max	Skewness	Kurtosis
TEA	444	12.88	8.170	2.350	41.46	1.343	4.315
lnTEA*	444	2.379	0.587	0.854	3.725	0.254	2.320
EI	444	21.89	16.18	2.120	90.95	1.322	4.405
lnEI*	444	2.828	0.731	0.751	4.510	-0.0317	2.451
CON	444	14008	7964	836.3	42834	0.646	3.212
lnCON*	444	9.343	0.714	6.729	10.67	-1.004	4.040
UNE*	444	8.452	5.872	0.210	32.02	1.682	5.887
INE	444	15.45	8.682	3.600	43.60	0.969	3.124
lnINE*	444	2.589	0.544	1.281	3.775	0.195	1.973
PV*	444	0.183	0.808	-2.810	1.439	-0.688	3.114
EDU	444	0.757	0.136	0.277	0.943	-0.856	3.209
lnEDU*	444	-0.298	0.205	-1.284	-0.0587	-1.469	5.733
HALE	444	66.51	4.978	49.35	73.74	-1.533	4.857
lnHALE*	444	4.194	0.0800	3.899	4.301	-1.715	5.471
ENV*	444	2.204	3.907	0	33.74	3.681	22.50

*The variables included in the regression models

(Source: developed by the author based on the dataset)

Figure 6-3 illustrates the data of TEA and EI in various economies in 2018 which shows significant variations across countries.

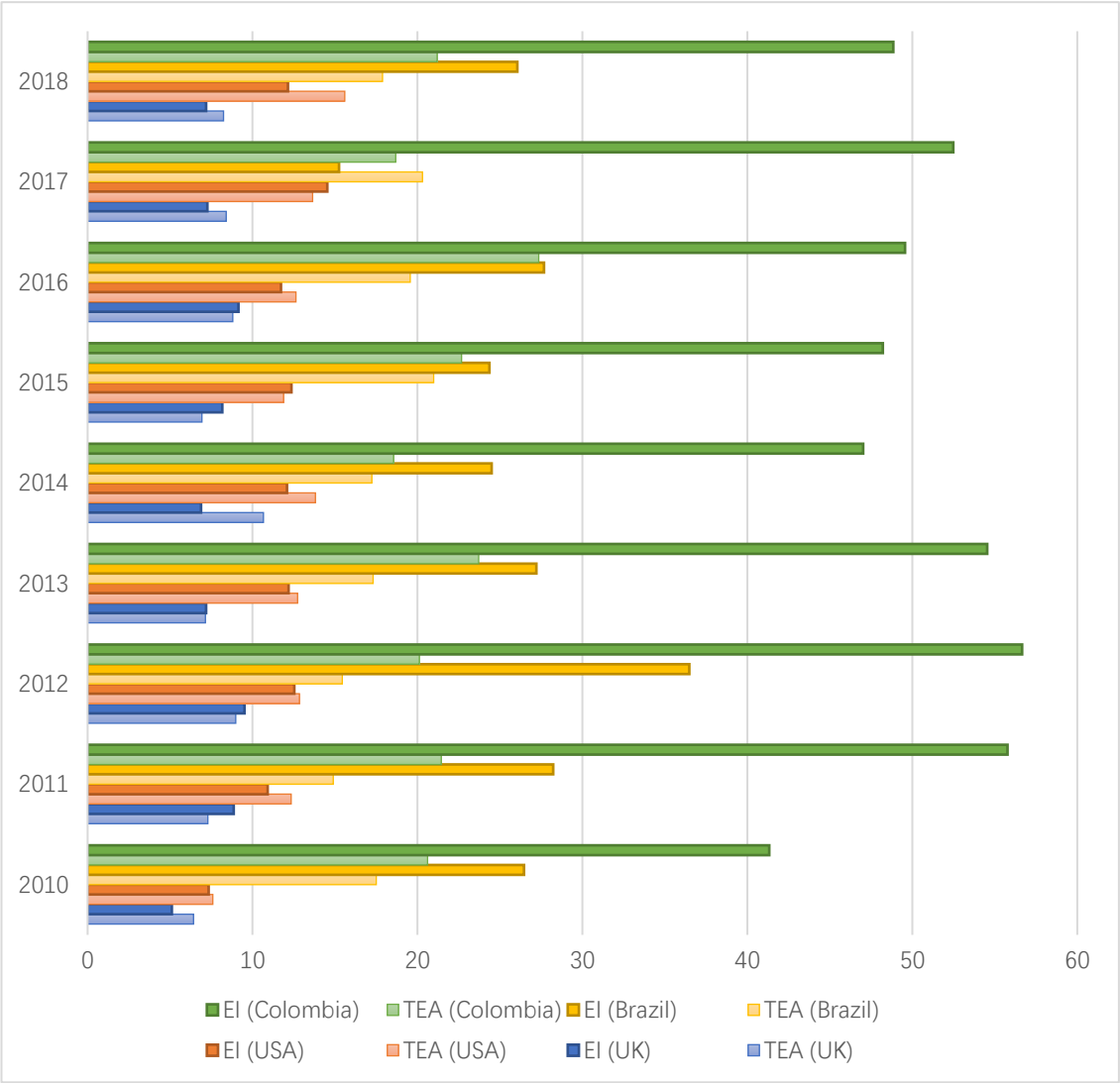
Figure 6-3 TEA and EI of individual countries in 2018



(Source: developed by the author based on the dataset)

According to Figure 6-4, the TEA and EI data in 2010-2018 of four selected economies including two High-Income Countries (UK and USA) and two Upper-Middle-Income Countries (Brazil and Colombia) suggest significant dynamics both across and within economies. The two Upper-Middle-Income countries have significantly higher levels of TEA and EI than the two High-Income countries. And entrepreneurial activity is much more active in Colombia and the USA than that in the other economy of their respective income groups.

Figure 6-4 The dynamics in TEA and EI of selected countries



(Source: developed by the author based on the dataset)

According to Table 6-3, the values of the societal QOL indicators also show dramatic disparities which indicate significant differences across countries. For example, the highest value of the unemployment rate is 32.03% (North Macedonia, 2010) which is more than 150 times larger than the lowest value, 0.21% (Thailand, 2013).

To sum up, the descriptive analysis suggests the dataset and relative variables are characterised by substantial disparities across countries and significant dynamics across time.

Table 6-4 Correlation matrix

Variables	lnTEA	lnEI	lnCON	UNE	lnINE	PV	lnEDU	lnHALE	ENV
lnTEA	1.000								
lnEI	0.813***	1.000							
lnCON	-0.612***	-0.672***	1.000						
UNE	-0.302***	-0.104**	0.069	1.000					
lnINE	0.665***	0.696***	-0.773***	-0.054	1.000				
PV	-0.367***	-0.459***	0.621***	0.055	-0.702***	1.000			
lnEDU	-0.569***	-0.640***	0.876***	0.111**	-0.829***	0.678***	1.000		
lnHALE	-0.512***	-0.505***	0.795***	-0.017	-0.687***	0.454***	0.752***	1.000	
ENV	0.507***	0.452***	-0.554***	-0.174***	0.490***	-0.320***	-0.532***	-0.551***	1.000

**** p<0.01, ** p<0.05, * p<0.1*

(Source: developed by the author based on the dataset)

According to Table 6-4, the pairwise correlation statistics suggest strong correlations between the dependent variable and each independent variable which provide preliminary evidence to further evaluate their causal relationships. In addition, besides their positively mutual correlations, the dependent variable (lnTEA) and the individual factor variable (lnEI) are only positively correlated with lnINE and ENV but negatively with other societal QOL variables. The values of the correlation coefficients indicate close associations between lnTEA and lnEI, lnCON and lnINE, lnCON and lnEDU, lnCON and lnHALE, lnINE and lnEDU, and lnEDU and lnHALE.

6.3 Direct Effects of Societal QOL

The first step of the analysis process is to examine the direct associations between QOL and entrepreneurship at the societal level by testing Hypothesis 1: societal QOL has significant direct effects on entrepreneurship. Besides testing the joint effects of various societal QOL factors on TEA, this step is also undertaken to assess the dynamics of the associations between individual QOL factors and TEA, and evaluate the effects of reverse causations, inertia and simultaneity biases. To this end, two empirical models, a simultaneity and a dynamic equation, are established.

Model 1

$$ln(TEA_{it}) = \beta_0 + \beta_1 * lnCON_{it} + \beta_2 * UNE_{it} + \beta_3 * UNE_{it}^2 + \beta_4 * lnINE_{it} + \beta_5 * PV_{it} + \beta_6 * PV_{it}^2 + \beta_7 * lnEDU_{it} + \beta_8 * (lnEDU_{it})^2 + \beta_9 * ln\ HALE_{it} + \beta_{10} * (lnHALE_{it})^2 + \beta_{11} * ENV_{it} + u_{it}$$

Model 2

$$ln(TEA_{it}) = \beta_0 + \beta_1 * lnTEA_{i,t-1} + \beta_2 * lnCON_{it} + \beta_3 * UNE_{it} + \beta_4 * lnINE_{it} + \beta_5 * PV_{it} + \beta_6 * lnEDU_{it} + \beta_7 * lnHALE_{it} + \beta_8 * ENV_{it} + u_{it}$$

Model *1* is a simultaneous equation based on strict exogeneity assumption and estimated via the specifications of the static panel data regression approach, namely, the Pooled OLS, two-way FE and RE specifications. The detailed statistics are presented in Appendix I. To address the issues of heteroscedasticity and auto-correlation, all estimations remain robust.

Table 6-5 Tests for model specifications

Effect Statistics	Hypothesis	Conclusion
F (75, 349)=13.82***	H_0: Pooled OLS H_1: FE (LSDV)	Rejection of H_0 in favour of the FE Model
Breusch and Pagan LM=311.22***	H_0: Pooled OLS H_1: RE (GLS)	Rejection of H_0 in favour of the RE Model
Sargan-Hansen Overidentification Restrictions=112.580***	H_0: RE (GLS) H_1: FE (LSDV)	Rejection of H_0 in favour of the FE Model

To decide the appropriate estimation method, three diagnosis statistical tests are performed: the F test for Pooled OLS vs FE model, the Breusch and Pagan test for Pooled OLS vs RE model, and the Sargan-Hansen test for FE model vs RE model (Arellano, 1993; Wooldridge, 2010). The detailed statistics shown in Table 6-5 suggest the FE specification is more relevant.

A significant body of literature suggests the presence of two-way causations between entrepreneurship and societal QOL factors (Acs, Desai and Hessels, 2008; Acs *et al.*, 2012; Sautet, 2013; Morris, Neumeyer and Kuratko, 2015; Prieger *et al.*, 2016; Cervelló-Royo *et al.*, 2020), especially the macroeconomic

determinant, and significant inertia in entrepreneurial activity which the simultaneous model is not able to capture (Autio and Levie, 2015; Schubert, 2015; Stacey, 2016; Stacey and Mowles, 2016; Muldoon, Bauman and Lucy, 2018; Park and Park, 2018; Qian, 2018; Colombo *et al.*, 2019). To treat "the problems of simultaneity bias, reverse causality, and omitted variables" (Feki and Mnif, 2016, p.995), the estimation of Model 2 adopts the system GMM estimators. In consideration of the limited availability of data, only linear terms of the QOL indicators are included in Model 2 to avoid issues of too many and weak instruments.

Before running the dynamic model estimation, it is vital to assess the exogeneity/endogeneity of the regressors in the empirical model (Wooldridge, 2010). Since entrepreneurship is inherently an economic phenomenon which implies the potential endogeneity issue of personal economic resources (Stam, 2015; Stam and Spigel, 2017; Malecki, 2018; Maroufkhani, Wagner and Wan Ismail, 2018; Roman, Bilan and Ciumaș, 2018), the Durbin-Wu-Hausman test is performed to evaluate whether OLS and IV estimators yield consistent results. By employing the lags as instruments of the regressor, the DWH statistics strongly reject the exogeneity null hypothesis and confirm the endogeneity of per capita consumption and suggest the necessity of instrumental variables techniques.

The detailed statistics of the FE specification of Model 1 and the system GMM specification of Model 2 are presented in Table 6-6. In terms of the FE specification, the large F statistic indicates a joint significant effect of societal QOL factors on TEA and strong acceptance of Hypothesis 1. The adjusted R^2 suggests

that 88.3% of the variance in TEA can be explained by Model 1 in which both individual and time effects are modelled.

Table 6-6 Detailed Statistics of the Model 1 and Model 2

VARIABLES	Model 1 lnTEA	Model 2 lnTEA
L.lnTEA		0.414***
		(0.106)
lnCON	-0.850***	-0.326*
	(0.272)	(0.196)
UNE	-0.0415**	-0.0129***
	(0.0181)	(0.00382)
UNE2	0.00125*	
	(0.000650)	
lnINE	0.171*	0.450***
	(0.102)	(0.129)
PV	0.0197	0.0704
	(0.0641)	(0.0538)
PV2	0.134***	
	(0.0348)	
lnEDU	-1.453	0.842*
	(1.204)	(0.459)
lnEDU2	-1.769**	
	(0.824)	
lnHALE	-143.8**	0.252
	(56.89)	(1.026)
lnHALE2	17.74**	
	(7.168)	
ENV	-0.00144	0.00392
	(0.0122)	(0.00811)
Constant	300.5***	2.602
	(112.9)	(3.220)
F or chi (2) statistics	3.382***	11500***

R^2	0.908	
Adjusted R^2	0.883	
SSE	13.99	
SEE	0.200	
AR (1)		-3.235***
AR (2)		-0.909
Sargan statistics		45.02
Hansen statistics		35.68
Observations	444	325
Economies	76	69

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

With regard to the dynamic model, the system GMM estimators are valid on two premises: the absence of high order autocorrelation and the proper specification of instruments (Wooldridge, 2010; Greene, 2018). According to Arellano and Bond (1991), the first differenced errors are auto-correlated by construction, while auto-correlation in the first differenced errors at higher orders suggests that the GMM moment conditions are not valid. The AR(2) statistic of the Arellano and Bond (1991) autoregressive test in Table 6-6 shows no evidence of second-order autocorrelation in the first differenced errors at conventional significance levels which suggests the validity of the GMM moment conditions. Both the Sargan (1958) and Hansen (1982) statistics of overidentification restrictions indicate that the null hypothesis of appropriate instruments specification cannot be rejected at conventional significance levels.

The chi (2) statistic of the system GMM estimators indicates that the effects of the combination of the societal QOL factors on TEA are statistically significant. Besides, positive and statistically significant associations between TEA and its one-year lag term are captured by the system GMM estimators which is

consistent with literature suggesting the presence of significant time inertia in entrepreneurship (Nijkamp, 2003; Cowling and Bygrave, 2007; Kim, Kim and Yang, 2012; Ács, Autio and Szerb, 2014). The positive coefficient of the lag regressor suggests, holding other parameters constant, that a 1% increase in the previous year's TEA can cause a 0.414% increase in the current year's TEA.

Table 6-7 Summarisation of the results of the direct models

Individual QOL variable	Results	
	LSDV	System GMM
CON	(–)	(–)
UNE	(~)	(–)
INE	(+)	(+)
PV	(~)	(n/a)
EDU	(~)	(+)
HALE	(~)	(n/a)
ENV	(n/a)	(n/a)

(+) statistically significant and positive associations
(–) statistically significant and negative associations
(~) statistically significant and non-linear associations
(n/a) no significant associations at conventional significance levels

Although the FE and system GMM specifications both confirm the joint significant effects of societal QOL indicators, their evaluations of the pattern of the

associations between individual QOL variables and TEA vary significantly. Both Model 1 and Model 2 produce statistically significant and negative effects of per capita consumption on TEA ($p<0.01$ for FE specification and $p<0.1$ for system GMM specification) which corroborate with literature suggesting negative associations between economic development and entrepreneurship (Acs, 2006; Bosma and Kelley, 2018; GERA, 2018; Bosma *et al.*, 2020). According to Table 6-6, the statistics of the FE estimator and the system GMM specification suggest a 1% increase in the per capita household consumption decreases TEA by 0.850% and by 0.326% respectively, holding other parameters constant.

In terms of the associations between the Unemployment Rate and TEA, the LSDV and system GMM estimators generate mixed results. The FE specification captures a statistically significant and positive effect of the quadric term of Unemployment Rate ($p<0.1$) on TEA which suggests a U-shaped relationship between unemployment and entrepreneurship. Holding other parameters constant, the lowest level of TEA emerges at the Unemployment Rate of 16.6%. Within the dataset, around 91% of the total observations (402 observations) are below such a threshold. By contrast, the system GMM estimator reports a significantly negative association ($p<0.01$) which is in line with literature suggesting unemployment negatively affects entrepreneurship (Cowling and Bygrave, 2007). The coefficient of the regressor indicates a 1% decrease in the Unemployment Rate increases TEA by 0.0129%, holding other parameters constant.

A statistically significant and positive association between Human Inequality Coefficient and TEA is captured in both FE ($p<0.1$) and system GMM ($p<0.01$) specifications. The LSDV estimator indicates that a 1% increase in the Human

Inequality Coefficient can lead to a 0.171% increase in TEA while the system GMM estimator 0.45%, holding other parameters constant. The statistics further confirm the literature that suggests inequality is a structural factor of entrepreneurship (Tamvada, 2010; Lecuna, 2014; Atems and Shand, 2018).

In terms of the direct associations between Political Stability and Absence of Violence/Terrorism and TEA, the FE specification indicates a U-shaped relationship by producing a statistically significant and positive coefficient for the quadric term of the regressor ($p<0.01$). Holding other parameters constant, the minimum level of TEA takes place at the Political Stability and Absence of Violence/Terrorism score of around -0.0735. In contrast, the system GMM estimator reports a positive coefficient of the regressor implying public safety promotes entrepreneurship. However, the effect is not statistically significant which is consistent with literature that entrepreneurship takes place in both safe and unsafe societies and there is little evidence regarding their direct causal links (Cañares, 2011; Kim, Kim and Yang, 2012; Bullough, Renko and Myatt, 2014; Lecuna, 2014; Nataraajan and Angur, 2014; White and Wynne, 2014).

According to Table 6-6, the effects of the Educational Index on TEA are statistically significant in both the FE and the system GMM specifications but vary in their respective trajectories. A statistically significant and negative coefficient of the quadric term ($p<0.05$) of the Educational Index is produced by the FE model estimator that implies an inverted U-shaped (bell-shaped) relationship. Holding other parameters constant, the highest level of TEA emerges at the value of the Educational Index of 0.663. However, the system GMM estimator produces a statistically significant and positive coefficient for the regressor ($p<0.1$) implying a linearly positive association between formal education and entrepreneurship

which has been both theoretically and empirically reiterated in the literature (Davidsson and Honig, 2003; Marvel and Lumpkin, 2007; Qian, Acs and Stough, 2013; Baptista, Karaöz and Mendonça, 2014; Estrin, Mickiewicz and Stephan, 2016; Backman and Karlsson, 2018; Hatak and Zhou, 2021). The results indicate that a 1% increase in the Educational Index increases TEA by 0.842%, holding other parameters constant.

Regarding the direct associations between HALE and TEA, Model 1 reports a U-shaped relationship between health and entrepreneurship by generating a statistically significant and positive coefficient for the quadric term of the regressor ($p<0.05$). Holding other parameters constant, the minimum level of TEA occurs when the healthy life expectancy is around 57.40 years. In comparison, a positive coefficient is produced by the dynamic model indicating a positive association which corroborates with literature arguing health promotes entrepreneurship (Kim, Kim and Yang, 2012; Nataraajan and Angur, 2014; Estes and Sirgy, 2019; Hatak and Zhou, 2021). However, the positive association is not statistically significant at conventional significance levels.

Concerning the direct associations between Natural Resource Depletion and TEA, Model 1 and Model 2 report contradicting results. The FE specification produces a negative coefficient for the regressor indicating the positive role of environmental sustainability in promoting entrepreneurship, while the dynamic model generates a positive coefficient suggesting a reverse association. Irrespective of variations in the trajectories of the impacts, the coefficients remain statistically insignificant at conventional significance levels in both estimators.

The results of both direct effect models offer empirical evidence for the important role of QOL in affecting entrepreneurship; however, there are substantial

variations in their statistics. The following issues may contribute to the inconsistency which shed light on the next step of the analysis process.

a) According to the statistics of Model 2, the effects of the previous TEA are not only statistically significant but also economically meaningful. The outcomes confirm the presence of substantial time inertia in EB.
b) There is mounting evidence in the literature that suggests double causations between QOL factors and entrepreneurship (Acs, 2006; Acs, Desai and Hessels, 2008; Acs *et al.*, 2012; Morris, Neumeyer and Kuratko, 2015) which may cause distortions in the static model by generating multiple non-linear relations.
c) In the dynamic modelling, the Durbin-Wu-Hausman statistics strongly reject the strict exogeneity assumption that suggests some QOL variables are not strictly exogenous.
d) The literature also suggests that QOL factors have both long-term and short-term impacts on entrepreneurship (Cowling and Bygrave, 2007) which may cause serious biases when adopting the static model.

The variations between the static and dynamic models indicate issues of significant dynamics and double causations involved in the associations between societal QOL and entrepreneurship, thus the system GMM estimator is theoretically superior because of its capacity to address issues of simultaneity bias, reverse causality, and omitted variables (Wooldridge, 2010; Rodrigues Brás and Soukiazis, 2015; Feki and Mnif, 2016; Roman, Bilan and Ciumaș, 2018; Sekrafi and Sghaier, 2018). Hence, the indirect effect model will be tested via the system GMM estimator.

6.4 Mediating Effects of EI

Linking a wide variety of societal factors to entrepreneurship means linking macro-level to individual-level (Krueger and Carsrud, 1993; Thurik and Wennekers, 1999; Huggins and Thompson, 2014; Liñán and Fernandez-Serrano, 2014). The attempt to examine the extent to which environmental factors and individual factors interactively affect entrepreneurship in this study is materialised by evaluating the mediating role of EI in the associations between societal QOL factors and EB. Thus, Hypothesis 2 is developed to examine the causal links between contextual factors and individual factors, as well as their joint effects on entrepreneurship: EI mediates the effects of various QOL factors on TEA. The articulation of the hypothesis is established based on a series of theoretical premises.

First, the EE perspective explicitly acknowledges both the central role of entrepreneurs and the context-dependence of entrepreneurship which highlight the necessity of including both contextual and individual factors in EE modelling (Ács, Autio and Szerb, 2014; Mason and Brown, 2014; Stam, 2015; Acs *et al.*, 2016, 2017; Spigel, 2016; Cavallo, Ghezzi and Balocco, 2018; Kreuzer *et al.*, 2018; Nicotra *et al.*, 2018; Roundy, Bradshaw and Brockman, 2018; Georgescu and Herman, 2020).

Second, the behavioural perspective such as the TPB suggests social embeddedness of entrepreneurial mindset which implies the indirect effects of a wide range of socio-economic factors on EB through shaping the individual factors (Kautonen, Van Gelderen and Tornikoski, 2013; Kautonen, van Gelderen and Fink, 2015; Ajzen, 2020; Bosnjak, Ajzen and Schmidt, 2020). Nonetheless,

the bridging effects of individual factors do not rule out the direct impacts of entrepreneurial contexts on EB.

Third, although the literature suggests the involvement of various individual factors in determining behaviours including attitudes, perceptions and intentions, EI is selected to be the mediator in this study because it is the most direct antecedent and the most robust predictor of EB (Bosma, 2013; Santos, Roomi and Liñán, 2016; Ojiaku, Nkamnebe and Nwaizugbo, 2018; Bosma *et al.*, 2020; Georgescu and Herman, 2020).

Adopting the Simple Mediation Model approach (Hayes, 2018), 3 empirical equations are developed to examine the mediating effects of EI. The analysis of the direct effect models suggests the estimation based on simultaneous equation suffers from serious biases caused by the issues of two-way causalities, time inertia and violation of the strict exogeneity assumption, thus only dynamic models are established.

Model 3

$$ln(TEA_{it}) = \beta_0 + \beta_1 * ln\,(TEA_{i,t-1}) + \beta_2 * ln\,(EI_{it}) + \beta_3 * ln\,(EI_{i,t-1}) + u_{it}$$

Model 4

$$\ln(EI_{it}) = \beta_0 + \beta_1 * \ln\, EI_{i,t-1} + \beta_2 * \ln\, CON_{it} + \beta_3 * UNE_{it} + \beta_4 * \ln\, INE_{it} + \beta_5 * PV_{it} + \beta_6 * \ln\, EDU_{it} + \beta_7 * \ln\, HALE_{it} + \beta_8 * ENV_{it} + u_{it}$$

Model 5

$$\ln(TEA_{it}) = \beta_0 + \beta_1 * \ln\, TEA_{i,t-1} + +\beta_2 * \ln\, EI_{it} + \beta_3 * \ln\, CON_{it} + \beta_4 * UNE_{it} + \beta_5 * \ln\, INE_{it} + \beta_6 * PV_{it} + \beta_7 * \ln\, EDU_{it} + \beta_8 * \ln\, HALE_{it} + \beta_9 * ENV_{it} + u_{it}$$

Model 3 focuses on the direct associations between EI and TEA, Model 4 assesses to what extent societal QOL indicators affect EI, and Model 5 evaluates the joint effects of EI and societal QOL on TEA. All the models are processed employing the system GMM specifications, all estimations remain robust; in line with the direct effect model, per capita consumption is assumed to be not a strictly exogenous variable. The detailed statistics of the indirect models are presented in Table 6-8.

Table 6-8 Detailed statistics of Model 3, Model 4 and Model 5

VARIABLES	Model 3 lnTEA	Model 4 lnEI	Model 5 lnTEA
L.lnTEA	0.376*		0.288*
	(0.199)		(0.170)
lnEI	0.567***		0.368***
	(0.134)		(0.0986)
L.lnEI	-0.185	0.441***	-0.0374
	(0.161)	(0.120)	(0.202)
lnCON		-0.376*	-0.209
		(0.205)	(0.142)
UNE		-0.00341	-0.0122***
		(0.00546)	(0.00284)
lnINE		0.355**	0.309***
		(0.156)	(0.0782)
PV		0.0417	0.0907**
		(0.0747)	(0.0398)
lnEDU		0.134	0.664**
		(0.617)	(0.316)
lnHALE		2.071*	-0.00455
		(1.118)	(0.708)
ENV		0.00906	0.000456
		(0.0128)	(0.00529)
Constant	0.424***	-4.445	2.245

	(0.160)	(4.329)	(2.171)
Chi (2) statistics	8452***	8154***	21113***
AR (1)	-2.607***	-2.749***	-2.490**
AR (2)	0.447	0.622	-0.174
Sargan statistics	21.09	52.17*	35.08
Hansen statistics	18.17	39.01	31.22
Observations	325	325	325
Economies	69	69	69

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

According to the Arellano and Bond (1991) statistics of the AR(2) tests of the three models, the null hypothesis of no statistically significant second order correlations in first differences cannot be rejected which indicates the validity of the GMM moment conditions across models. Both the Sargan (1958) and Hansen (1982) statistics of overidentification restrictions for Model 3 and Model 5 indicate acceptance of the null hypothesis which suggests no evidence of instrument miss-specification. In terms of Model 4, the results of the diagnostic tests indicate acceptance of the null hypothesis in the Hansen (1982) test but rejection of the null hypothesis in the Sargan (1958) test at a 10% significance level. Being a robust estimation, the Hansen (1982) test is theoretically superior in the presence of significant heteroscedasticity (Kennedy, 2008; Roodman, 2009); thus, the specification of the instruments in Model 4 is generally considered consistent.

According to Table 6-8, the coefficients for the one-year lag term of the dependent variables in each model are both statistically significant and economically meaningful which indicates the significant time inertia in both EI and EB. Holding other parameters constant, a 1% increase in the previous year's TEA increases

this year's TEA by 0.367% and 0.288% in Model 3 and Model 5 respectively, and a 1% increase in the previous year's EI increases the current year's EI by 0.441%.

The statistics of Model 3 and Model 5 present strong and persistent linear associations between EI and TEA which corroborate with the argument that, although there are a variety of psychological and cognitive factors involved in entrepreneurship, EI is the most direct, consistent and robust predictor for EB (Kautonen, Van Gelderen and Tornikoski, 2013; Kautonen, van Gelderen and Fink, 2015; Roundy, Bradshaw and Brockman, 2018). According to Table 6-8, a 1% increase in EI causes an 0.567% and an 0.368% increase in TEA in Model 3 and Model 5 respectively, holding other parameters constant. The results empirically validate the choice of EI as the mediator to link the societal level factors to EB.

The chi(2) statistics of Model 4 indicate the joint significant effects of QOL factors on EI which aligns with literature which suggests EI is subject to various contextual or environmental factors (Liñán, Urbano and Guerrero, 2011; Olutuase *et al.*, 2018; Essel *et al.*, 2020; Georgescu and Herman, 2020). The chi (2) statistics of Model 5 suggest the joint significance of both EI and QOL factors in predicting TEA. Further, despite the persistent significance of EI, the value of its coefficient in Model 5 (0.368) where both EI and QOL factors are modelled is significantly lower than that in Model 3 (0.567) where only EI is modelled. The combination of the above results implies that EI partially mediates the effects of societal QOL factors on entrepreneurship.

The direct and indirect associations between individual societal QOL variables and TEA are summarised in Table 6-9.

Table 6-9 Summarisation of the results of the indirect models

Individual QOL variable	Results	
	Direct Effects	Indirect Effects
CON	(n/a)	(–)
UNE	(–)	(n/a)
INE	(+)	(+)
PV	(+)	(n/a)
EDU	(+)	(n/a)
HALE	(n/a)	(+)
ENV	(n/a)	(n/a)

(+) statistically significant and positive associations

(–) statistically significant and negative associations

(~) statistically significant and non-linear associations

(n/a) no significant associations at conventional significance levels

According to Table 6-8, both Model 4 and Model 5 produce negative coefficients for per capita consumption which indicate negative effects of personal economic resources on both EI and EB. However, only the association with EI is statistically significant which implies significant indirect but weak direct associations between personal economic resources and entrepreneurship. Holding other parameters constant, a 1% increase in the per capita consumption decreases EI by 0.376%.

In terms of the unemployment rate, Model 4 and Model 5 both generate negative coefficients for the regressor, but only that on TEA is statistically significant ($p<0.01$) indicating significantly negative direct associations between unemployment and entrepreneurship but weak mediating effects from EI. A 1-point percentage increase in the unemployment rate directly decreases TEA by 0.0122%, holding other parameters constant. Additionally, the value of the coefficient in Model 5 (-0.0122) is rather similar to that in Model 2 (-0.0129) which further confirms the arguments suggesting the role of a direct determinant of unemployment in entrepreneurship (Kautonen, Down and Minniti, 2014; Kautonen, Kibler and Minniti, 2017; Vancea and Utzet, 2017; Ojiaku, Nkamnebe and Nwaizugbo, 2018).

Table 6-8 presents statistically significant and positive effects of the Human Inequality Index on both EI and TEA. Also, the coefficient value of the regressor in Model 5 (0.309) is significantly lower than that in Model 2 (0.450) which confirms the presence of both direct and indirect associations between societal inequality and entrepreneurship and provides further evidence for the role of inequality as a structural factor of entrepreneurship (Lecuna, 2014). Holding other parameters constant, a 1% increase in Human Inequality Index increases EI by 0.355% and TEA by 0.309%.

Regarding the Political Stability and Absence of Violence/Terrorism, both Model 4 and Model 5 report a positive coefficient which implies public safety facilitates both the development of EI and the creation of entrepreneurial ventures. However, the coefficient is only statistically significant in Model 5 which implies public safety significantly affects EB but weakly EI. According to Table 6-8, a 1-point increase in the Political Stability and Absence of Violence/Terrorism score increases TEA

by 0.0907%. Provided the value of the variable in the dataset is 1.439 at the maximum and -2.810 at the minimum, the economic meaning of the results is limited.

The statistics of Model 4 and Model 5 both report positive coefficients for the Educational Index which suggests formal education positively affects the development of EI and business creation. However, the effects of the regressor are only statistically significant on TEA but weakly on EI which suggest a 1% increase in the Educational Index increases TEA by 0.664%, holding other parameters constant. When compared to the statistics of Model 2, the value of the coefficient drops from 0.842 to 0.664 when the effect of EI is controlled which implies, despite the mediating effects is not statistically significant, the associations between formal education and EI should not be ruled out.

Regarding the associations among health, EI and TEA, Model 4 and Model 5 generate unexpected results. According to Table 6-8, HALE positively associates with EI but negatively with TEA, and only the positive effects are statistically significant which implies significant mediating effects of EI between health and EB. The statistics of Model 4 suggest a 1% increase in the Healthy Life Expectancy increases EI by 2.071%, holding other parameters constant.

Both Model 4 and Model 5 produce positive coefficients for the Adjusted Natural Resource Depletion which suggest exploitation of natural resources positively affects EI and EB. However, those effects remain statistically insignificant at conventional significance levels.

6.5 Robustness Check

Since the significant effects of the societal QOL factors on EI and EB can have impacts on entrepreneurship policymaking, it is necessary to evaluate the robustness of the empirical models. To ensure that the results are not driven by country-specific characteristics, different control variables are included to test if the statistics pertaining to the variables in interest are consistent across models.

The robustness checks of this study have two steps. The first step controls two demographic factors of an economy, namely, total population and urbanisation. These two demographic variables are included because they are not only the key characteristics of an economy but also are closely associated with both QOL and entrepreneurship (Smallbone, Dabic and Kalantaridis, 2017; Hans and Koster, 2018; Bellido-Jiménez, Martín-Martín and Romero, 2021; Aldén *et al.*, 2022). Second, a dummy variable regarding the EU membership (1 for EU countries and 0 for non-EU countries) is added to control the effects of economic integration. The descriptions and data sources of the control variables are presented in Table 6-10.

Table 6-10 Control variables for the robustness check

Indicator	Variable	Description	Source
First Step			
Population	POP	Total population	WDI
Regional Migration	UrbanP	Urban population (% of total population)	WDI
Second Step			
Economic Integration	EU	Membership in the European Union	EU

(Source: developed by the author)

The statistics of the robustness checks regarding Model 4 and Model 5 are presented in Table 6-11 and Table 6-12 respectively.

Table 6-11 Robustness check for Model 4

	Model 4	Step 1	Step 2
VARIABLES	lnEI	lnEI	lnEI
L.lnEI	0.441***	0.416***	0.405***
	(0.120)	(0.120)	(0.108)
lnCON	-0.376*	-0.511***	-0.515***
	(0.205)	(0.196)	(0.163)
UNE	-0.00341	-0.00633	-0.00478
	(0.00546)	(0.00555)	(0.00412)
lnINE	0.355**	0.399**	0.298**
	(0.156)	(0.171)	(0.152)
PV	0.0417	-0.0106	-0.00914
	(0.0747)	(0.0767)	(0.0621)
lnEDU	0.134	0.376	0.389
	(0.617)	(0.483)	(0.484)
lnHALE	2.071*	2.390**	2.363**
	(1.118)	(1.139)	(1.076)
ENV	0.00906	0.00848	0.00853
	(0.0128)	(0.0138)	(0.0143)
lnPOP		-0.0664**	-0.0582**
		(0.0332)	(0.0291)
UrbanP		0.00182	0.00175
		(0.00250)	(0.00236)
EU			-0.175**
			(0.0832)
Constant	-4.445	-3.462	-3.083
	(4.329)	(4.535)	(4.445)
Chi (2) statistics	8154***	9652***	11991***
AR (1)	-2.749***	-2.731***	-2.800***
AR (2)	0.622	0.580	0.628

Sargan statistics	52.17*	51.79*	51.77*
Hansen statistics	39.01	40.04	37.25
Observations	325	325	325
Economies	69	69	69

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

As shown in Table 6-11, the patterns regarding the associations between societal QOL and EI are proved by the robustness checks that suggest the empirical model and the estimation are consistent. The coefficients for lnEI in Model *4* and its robustness checks are 0.411, 0.416 and 0.405, respectively, at a 1% statistical level. The coefficients for lnCON drop significantly in the robustness checks with better statistical significance. The coefficients for lnINE in Model 4 and its robustness checks are 0.355, 0.399 and 0.298, respectively, at a 5% statistical level. The coefficients for lnHALE increase in the robustness checks with better statistical significance. Statistics of the control variables indicate population and being an EU member negatively affect the formation of EI.

Table 6-12 Robustness check for Model 5

VARIABLES	Model 5 lnTEA	Step 1 lnTEA	Step 2 lnTEA
L.lnTEA	0.288*	0.405*	0.363*
	(0.170)	(0.211)	(0.213)
lnEI	0.368***	0.373***	0.388***
	(0.0986)	(0.0958)	(0.0804)
L.lnEI	-0.0374	-0.146	-0.137
	(0.202)	(0.205)	(0.199)
lnCON	-0.209	-0.281*	-0.210
	(0.142)	(0.164)	(0.189)
UNE	-0.0122***	-0.0110***	-0.0100**

	(0.00284)	(0.00356)	(0.00424)
lnINE	0.309***	0.263***	0.230**
	(0.0782)	(0.0991)	(0.0897)
PV	0.0907**	0.0686	0.0823*
	(0.0398)	(0.0422)	(0.0432)
lnEDU	0.664**	0.556*	0.501*
	(0.316)	(0.298)	(0.302)
lnHALE	-0.00455	-0.00983	-0.256
	(0.708)	(0.624)	(0.692)
ENV	0.000456	-0.00508	-0.00648
	(0.00529)	(0.00650)	(0.00626)
lnPOP		-0.0165	-0.0129
		(0.0199)	(0.0146)
UrbanP		0.00375	0.00264
		(0.00275)	(0.00282)
EU			-0.121*
			(0.0664)
Constant	2.245	3.076	3.607*
	(2.171)	(1.893)	(1.980)
Chi (2) statistics	21113***	30849***	25158***
AR (1)	-2.490**	-2.471**	-2.335**
AR (2)	-0.174	0.0264	0.0536
Sargan statistics	35.08	32.46	31.70
Hansen statistics	31.22	34.72	33.81
Observations	325	325	325
Economies	69	69	69

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

According to Table 6-12, the joint effects of EI and societal QOL on TEA are generally proved. The coefficients for the lag term of the explained variable are 0.288, 0.405, and 0.363, respectively, at a 10% significance level. The values of the coefficients for lnEI and UNE increase when population, urbanisation and EU

membership are controlled, while those for PV and lnEDU decrease. Moreover, although step 1 fails to present a statistically significant coefficient for PV, its p vale (0.104) is very close to the 10% significance level. Further, the coefficient of lnCON in step 1 is statistically significant at a 10% level which suggests the attempts to increase control variables have material effects on some of the contextual variables. This is because of the relatively small number of economies (69) but large number of instruments (50 in step 1).

6.6 Chapter Summary

This chapter presents the detailed statistics of the analysis results. The descriptive analysis shows that the dataset is a highly unbalanced short panel that is dominated by observations of wealthy countries.

To assess the direct effects of societal QOL on entrepreneurship, a simultaneity and a dynamic equation are constructed and analysed via two-way FE and system GMM specifications respectively. The results indicate the presence of significant time inertia and double causations which suggests the dynamic model is more appropriate and relevant.

Then, three empirical models are developed based on the Simple Mediation Model Approach and estimated via system GMM specification to examine the extent to which EI mediates the effects of societal QOL on EB. Apart from generating strong evidence confirming that EI strongly predicts TEA, the results further indicate EI mediates the effects of per capita Consumption, the coefficient of Human Inequality and HALE on TEA. Besides the indirect effects, the coefficient of Human Inequality also has significant direct influences on TEA. The unemployment rate, public safety and formal education are significantly

associated with TEA but weakly with EI. No statistically significant effects of ENV are found on either TEA or EI.

Robustness checks are performed to control the effects of demographic characteristics of economies, and economic integration. The results further confirm the outcomes of the indirect effect models.

7 Discussion

7.1 Chapter Overview

The statistics of both the direct and the indirect models indicate strong acceptance of the two main hypotheses regarding the significant effects of QOL on entrepreneurship at the societal level. Further, by acknowledging the presence of substantial time inertia and double causality, the results highlight the significant dynamics in the associations between societal QOL factors and entrepreneurship, and the mediating role of EI. Table 7-1 presents the statistics of the system GMM estimators of the empirical models.

Table 7-1 Statistics of both the direct and the indirect models

	Model 2	Model 3	Model 4	Model 5
VARIABLES	lnTEA	lnTEA	lnEI	lnTEA
L.lnTEA	0.414***	0.376*		0.288*
	(0.106)	(0.199)		(0.170)
lnEI		0.567***		0.368***
		(0.134)		(0.0986)
L.lnEI		-0.185	0.441***	-0.0374
		(0.161)	(0.120)	(0.202)
lnCON	-0.326*		-0.376*	-0.209
	(0.196)		(0.205)	(0.142)
UNE	-0.0129***		-0.00341	-0.0122***
	(0.00382)		(0.00546)	(0.00284)
lnINE	0.450***		0.355**	0.309***
	(0.129)		(0.156)	(0.0782)
PV	0.0704		0.0417	0.0907**
	(0.0538)		(0.0747)	(0.0398)
lnEDU	0.842*		0.134	0.664**
	(0.459)		(0.617)	(0.316)
lnHALE	0.252		2.071*	-0.00455
	(1.026)		(1.118)	(0.708)

ENV	0.00392		0.00906	0.000456
	(0.00811)		(0.0128)	(0.00529)
Constant	2.602	0.424***	-4.445	2.245
	(3.220)	(0.160)	(4.329)	(2.171)
Chi (2) statistics	11500***	8452***	8154***	21113***
AR (1)	-3.235***	-2.607***	-2.749***	-2.490**
AR (2)	-0.909	0.447	0.622	-0.174
Sargan statistics	45.02	21.09	52.17*	35.08
Hansen statistics	35.68	18.17	39.01	31.22
Observations	325	325	325	325
Economies	69	69	69	69

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

By linking the literature which has been critically reviewed in previous sections to the results generated from the data analysis, this chapter is the discussion and interpretation of the research findings. The first 7 sections are the discussions regarding the role of individual societal QOL factors in entrepreneurship. In each section, the associations between the research findings and the relative literature are discussed, then interpretations based on relevant theories are presented, and academic and managerial implications are provided respectively.

By synthesising the research findings on the associations between individual QOL factors and entrepreneurship, the role of QOL in EE will be discussed and the EE conceptual model will be updated. And several academic and managerial propositions will be introduced in the end.

7.2 Personal Economic Resources

Both the direct and the indirect models report a negative association between personal economic resources and entrepreneurship across societies that can be

explained by the diversity of entrepreneurial motivations which assumes that entrepreneurship can be driven by various motives and the stages of economic development theory which assumes that the socio-economic behaviours are subject to the economic development stage of a society (Leibenstein, 1968; Porter, 1990a, 1990b; Thurik and Wennekers, 1999; Acs, Desai and Hessels, 2008; Morris, Neumeyer and Kuratko, 2015). In a factor-driven economy, individuals tend to be pushed by their limited access to economic resources into low-quality entrepreneurial activity. Despite its massive quantity, entrepreneurship in factor-driven economies is dominated by necessity-driven entrepreneurial activities which are characterised by a significant share of the labour force engaging in self-employment to serve well-established markets to sustain their families and themselves (Acs *et al.*, 2005; Acs, 2006). In contrast, in an innovation-driven economy, the extensive technological reservoir and affluent financial capacity motivate business entries that are opportunity-driven and growth-oriented and reshape the structure of entrepreneurship from quantity- to quality-focused (Acs and Audretsch, 2010; Brown and Mason, 2017; Cervelló-Royo *et al.*, 2020).

The argument is further corroborated by the observation from the dataset that although the economies with the highest levels of TEA are dominated by low-income countries such as Zambia, Angola and Nigeria and those with the lowest levels of TEA by high-income economies such as Italy, Belgium, Japan and Denmark, a reverse direction emerges in terms of the Motivational Index, an indicator developed by GEM as the “percentage of those involved in Total early-stage Entrepreneurial Activity that is improvement-driven and opportunity motivated, divided by the percentage of TEA that is necessity-motivated” (Bosma

et al., 2020, p.117), which implies domination of opportunity entrepreneurship in high-income economies while necessity entrepreneurship in low-income economies. The observation is further confirmed by the statistics of the group mean two-sample T-tests which indicate statistically significant lower levels of TEA (see Appendix II) but higher levels of the Motivational Index (see Appendix III) in High-Income countries than those in Low- and Middle-Income countries.

The literature further suggested two-way causation between personal economic resources and entrepreneurship. Socio-economic behaviours like entrepreneurial activities are subject to the economic environments of society (Acs *et al.*, 2012; Sautet, 2013; Morris, Neumeyer and Kuratko, 2015; Prieger *et al.*, 2016; Cervelló-Royo *et al.*, 2020). By contrast, entrepreneurship is considered to be an increasingly important contributor to economic growth, especially those entrepreneurial ventures that are knowledge-based, innovation-motivated and growth-oriented (Brown and Mason, 2017). Such interactive relationships are corroborated by the dynamic models based on the assumption that personal economic resources are not a strictly exogenous variable in this study. Although some cross-sectional studies suggested a U-shaped relationship (Audretsch and Thurik, 2001; Acs, 2006; Acs, Desai and Hessels, 2008; Pinillos and Reyes, 2011; Bosma and Sternberg, 2014; Liñán and Fernandez-Serrano, 2014), it can be argued to be caused by “the negative influence of rising per capita income and a positive one of the rising share of the service sector” (Thurik and Wennekers, 1999, p.49) and the two-way causations between economic growth and entrepreneurship which further validate the development of the dynamic models in this study.

The results of the indirect model further suggest the negative association is attributable to the significant negative effects of personal economic resources on EI. The economic theory on the demand side of entrepreneurship and the RBV suggests that entrepreneurial opportunities arise from market imperfection and entrepreneurship serves as the critical role of the resource allocator in the process of economic development (Leibenstein, 1968; Acs *et al.*, 2012; Diaconu and Duţu, 2015). Thus, the dynamics of the socio-economic environment generate entrepreneurial opportunities which motivate intentions for exploitation (Essel *et al.*, 2020). Since the socio-economic environments in developing economies are much more dynamic than those in developed countries, individuals in developing countries have significantly higher levels of EI than those in developed countries due to the perception of more entrepreneurial opportunities (Iakovleva, Kolvereid and Stephan, 2011).

It should be noted that the negative associations should not be interpreted as a manifestation that economic development inhibits EI or EB but as an indication of the structural change in entrepreneurship along the trajectory of economic development. Such an interpretation may lead to two important implications to inform entrepreneurship policymaking.

First, the variations in personal financial resources, which can also be an indicator of the economic development, impose significant effects on both the quantity and the quality of entrepreneurship. With the development of the economy, the increasing personal financial resources provoke structural changes in entrepreneurship materialised as a decrease in the quantity but an increase in the quality of EB.

Second, the policymaking needs to be strategically positioned according to the distinctive economic environment with a clear knowledge of mediating role of EI and the diversity of EB. Although some literature argues that opportunity-driven entrepreneurial activity is more closely associated with innovation and fast economic growth, necessity-driven entrepreneurship makes distinctive and complementary contributions to economic and social welfare (Morris, Neumeyer and Kuratko, 2015; Brown and Mason, 2017). The success of the Silicon Valley has motivated a massive wave of imitation by policy-makers around the world in hope of establishing similar EEs to nurture innovation, facilitate technological development and stimulate economic growth; however, strategies of simple replication without acknowledging the significant effects of the trajectory of economic development on the structure of domestic entrepreneurial activities can lead to profoundly negative impacts on both entrepreneurship and economy (Isenberg, 2010, 2011, 2016).

The implications inform policymakers in various business administrative agencies that differentiated entrepreneurship policies are vital for societies in different stages of economic development. In developing countries, the dynamic socio-economic environments provide fertile soil for the formation of individual EI, while the limited economic resources generate a high ratio of necessity entrepreneurship, the objective of entrepreneurship policy should concentrate on the intention-behaviour transformation such as lowering the barriers and improving the feasibility of venture creation as well as enhancing the survival rates of entrepreneurial ventures. In contrast, in developed economies that are characterised by a lower level of EI but a higher ratio of opportunity entrepreneurship, the goals of entrepreneurship policy should focus on nurturing

the development of EI to motivate more exploitations of entrepreneurial opportunities. These implications are particularly valuable for economies in transition stages, such as Argentina, Chile, Croatia, etc., due to the ongoing transformation in their entrepreneurial structures.

7.3 Unemployment

The statistics of the direct and the indirect dynamic models indicate unemployment strongly correlates to EB but is weakly associated with EI. Although the simultaneity equation reports a U-shaped relationship, it can be argued the non-linear association is caused by simultaneity bias because unemployment inhibits entrepreneurship in the short run but promote entrepreneurship in the long run and the reverse causation because various types of entrepreneurial ventures make distinctive contributions to job creation (Audretsch and Thurik, 2001; Audretsch, Carree and Thurik, 2001; Cowling and Bygrave, 2007; Morris, Neumeyer and Kuratko, 2015). And these issues can be treated by the dynamic model (Feki and Mnif, 2016).

The results further confirm the “push” effect of unemployment and its associations with the heterogeneity of entrepreneurship and entrepreneurial motivations (Ojiaku, Nkamnebe and Nwaizugbo, 2018). The significant role of unemployment in EEs is reflected by pushing individuals into entrepreneurship due to a lack of employment opportunities which indicates the close links between unemployment and necessity-motivated and survival-oriented self-employment. Empirical studies suggest unemployment imposes a substantial impact on necessity entrepreneurship while there is little evidence to confirm any significant effects on opportunity entrepreneurship (Cowling and Bygrave, 2007; Morris, Neumeyer and Kuratko, 2015). Thus, the significantly direct relationship between

unemployment and entrepreneurship can be explained by the high sensitivity of necessity-motivated entrepreneurship to the variations in the unemployment rate. By contrast, empirical studies indicate that most transfers from employment to entrepreneurship are motivated by utility maximisation such as opportunity exploitation and self-realisation instead of necessity which suggests that the formation of EI is not sensitive to “push” factors such as unemployment (Kautonen, Down and Minniti, 2014; Kautonen, Kibler and Minniti, 2017; Vancea and Utzet, 2017; Ojiaku, Nkamnebe and Nwaizugbo, 2018).

With the acknowledgement that different entrepreneurial motivations differ in their sensitivity to the dynamics of unemployment, the results show more meaningful implications for policymakers. Firstly, the negative association indicates a virtuous circle between unemployment and entrepreneurship. A low unemployment rate tends to motivate business creations in the pursuit of entrepreneurial niches (Cowling and Bygrave, 2007; Lecuna, 2014). In contrast, growing entrepreneurial activity creates more employment opportunities which leads to further unemployment reduction (Baptista, Karaöz and Mendonça, 2014; Morris, Neumeyer and Kuratko, 2015). Secondly, the microeconomic theory of labour supply suggests necessity entrepreneurship is highly sensitive to the variations in the unemployment rate while opportunity entrepreneurship is not (Cowling and Bygrave, 2007). Hence, unemployment reduction not only enhances the overall quantity of entrepreneurship in society but also increases the share of opportunity-driven entrepreneurship in the total entrepreneurial activity. It is of paramount importance for policymakers to acknowledge that entrepreneurial activities of different motivations react distinctively to the

dynamics of unemployment and effective unemployment reduction can significantly enhance both the quantity and the quality of entrepreneurship.

In economies with a significant share of the labour force involved in unemployment, effective policies of nurturing necessity entrepreneurship contribute to social and economic welfare through job creation and unemployment reduction to establish the virtuous circle for further decrease in unemployment and increase in entrepreneurial activity (Morris, Neumeyer and Kuratko, 2015). In contrast, policies in countries with low unemployment rates should be developed to motivate the creation of innovation- and growth-oriented businesses which can lead to not only a further reduction in unemployment but also innovation and economic prosperity due to the close relationships among opportunity-driven entrepreneurship, and innovation and fast economic growth (Autio *et al.*, 2014; Morris, Neumeyer and Kuratko, 2015; Brown and Mason, 2017).

7.4 Inequality

According to Table 7-1, the Coefficient of Human Inequality is the only societal QOL indicator whose effects are consistently significant across all models which provides strong empirical evidence for its role as a structural factor of inequality in entrepreneurship (Lecuna, 2014).

In terms of the direct associations, the role of inequality as a structural factor in entrepreneurship implies a mutually reinforcing process. Entrepreneurship enhances the concentration of wealth and the uneven distribution of welfare across society through generating higher income and superior welfare returns; and the increasing gaps in welfare further motivate venture creations (Meh, 2005; Tamvada, 2010; Yanya, Abdul-Hakim and Abdul-Razak, 2013; DaCosta and Li,

2017; Ragoubi and El Harbi, 2018). By contrast, the business clusters theory and RBV suggest the phenomena of business agglomerations strengthen the regional concentration of resources which promotes business creation, and the leadership effects of unicorn and gazelles ventures create “spiky” areas that are much more economically active which further enhance the uneven distributions of resources in an economy (Klepper, 2010; Acs *et al.*, 2017; Brown and Mason, 2017; Colombo *et al.*, 2019). Silicon Valley in the US and the Hangzhou e-commerce cluster in China are typical examples.

In terms of the indirect associations, empirical literature proposes several possible explanations. The economic theory suggests individuals make career choices for utility maximisation (Kautonen, Down and Minniti, 2014; Kautonen, Kibler and Minniti, 2017), thus the higher economic and welfare returns of entrepreneurial activity motivate the development of EI. High levels of inequality cause socio-economic dynamics which create entrepreneurial opportunities and motivate intentions to exploit these opportunities (Essel *et al.*, 2020). Some literature regarding the social embeddedness of entrepreneurship reports that individuals from wealthy families, with entrepreneurial family background or with early exposure to entrepreneurship are more likely to develop EI (Carr and Sequeira, 2007; Georgescu and Herman, 2020) which imply the uneven distribution of family wealth across the society facilitate the formation of intentions to engage in entrepreneurial activity.

According to World Economic Forum (2014a, p.74), “A few people can play a central role” in an EE. The positive contribution of inequality to EI can also be explained by the role mode effects which suggest stories of successful entrepreneurs significantly contribute to various antecedents of EI, including

shaping more favourable attitudes toward entrepreneurship, helping to build an entrepreneurial culture across the society, promoting potential entrepreneurs' self-efficacy, and enhancing the perceived feasibility and perceived desirability of venture creation (Austin and Nauta, 2016; Brunel, Laviolette and Radu-Lefebvre, 2017; Fellnhofer and Mueller, 2018; Nowiński and Haddoud, 2019; Abbasianchavari and Moritz, 2021). Moreover, in most societies, the successes of entrepreneurs are generally manifested as individuals amassing unproportionally massive resources through their EB (Lecuna, 2014; Roundy, 2017), Elon Musk of Tesla and Jack Ma of Alibaba are typical examples. Based on observations from several emerging economies such as Argentina, Jordan and Turkey, World Economic Forum (2014a) suggests that high-impact entrepreneurial ventures are important for the development of EE.

It is necessary to note that relative literature tends to be one-sided by focusing on income inequality which is usually measured by the Gini coefficient or poverty headcount ratio (Meh, 2005; Yanya, Abdul-Hakim and Abdul-Razak, 2013; Lecuna, 2014; Bonito *et al.*, 2017; Halvarsson, Korpi and Wennberg, 2018; Ragoubi and El Harbi, 2018), while a more holistic view is employed in this study by adopting the Coefficient of Human Inequality which captures the uneven distribution of income, education and health across a society (Goubin, 2018; Kobus, Półchłopek and Yalonetzky, 2019; UNDP, 2020a). Although increasingly even distributions of educational and healthcare resources are generally accepted to be vital for societal development, there is little evidence to confirm the strong and systematic associations between income inequality and the development of human societies (Deininger and Squire, 1997, 1998; Goudie and Ladd, 1999; Noll, 2004; Shin, 2012; Delbianco, Dabús and Caraballo, 2014;

Fawaz, Rahnama and Valcarcel, 2014, 2015; Caraballo, Dabús and Delbianco, 2017; Sztaudynger, 2018).

The panel data regression results and the above arguments have valuable implications for both entrepreneurship research and policymaking. First of all, the results provide empirical evidence for the important role of multidimensional inequality in entrepreneurship at the country level and confirm societal inequality to be a structural factor in an EE. Inequality not only directly associates with EB but also indirectly affects business creation through shaping the formation of EI.

Then, despite the adoption of a multi-dimensional measure of inequality, the results highly corroborate with literature focusing on income inequality. It can be argued that social stratification, hierarchy, and other social inequality issues in health and education are mainly driven by the uneven distribution of economic resources (Wilkinson, 1997; Noll, 2004; Huisman and Oldehinkel, 2009; Smith and Kawachi, 2014; Mood and Jonsson, 2016; Amir-ud-Din, Abbas and Javed, 2018; Eckhard, 2018; Goubin, 2018), thus this study provides some empirical evidence for income inequality to be a satisfactory proxy for societal inequality in entrepreneurship studies.

The result provides further evidence for the presence of a mutually reinforcing process that implies the role of inequality as a double-edged sword in entrepreneurship. In terms of social justice and sustainable development, social equity promotes the development of human capital and enhances overall life satisfaction across the society which contributes to entrepreneurship (Schultz, 1961; The WHOQOL Group, 1995; Sirgy *et al.*, 2006; Michalos, 2008; OECD, 2011, 2019a; Sirgy, 2011b, 2011a). By contrast, the role model effects of successful entrepreneurs, the leadership of unicorn ventures, and regional

clusters of entrepreneurial businesses significantly promote business creation which implies that excessively even distribution of economic resources can hinder entrepreneurial motivations and the sustainability of business entries (Austin and Nauta, 2016; Brunel, Laviolette and Radu-Lefebvre, 2017; Fellnhofer and Mueller, 2018; Nowiński and Haddoud, 2019; Abbasianchavari and Moritz, 2021). However, the results only corroborate the positive associations between inequality and the quantity of entrepreneurial activity, the patterns regarding the links between inequality and the quality of entrepreneurship need further exploration in future studies.

Further, the close associations between inequality and entrepreneurship indicate that, without jeopardising social justice, an important objective of the entrepreneurship policy should be the creation of a reasonably free economic environment that motivates pursuits of entrepreneurial opportunities and business creation. Drawn from the cultural embeddedness in both EI and EB, entrepreneurship policymaking should also be culturally dependent. For societies with an individualistic and entrepreneurial culture with a high tolerance of inequality, such as the US, the high levels of the uneven distribution of resources can both promote individual EI and overall entrepreneurial activity across the society. However, for economies that lack such cultures, excessive inequality may cause serious social instability which may damage both the entire economic system and individual entrepreneurial activities. In countries dominated by collectivistic culture, policies nurturing the creation of social entrepreneurial ventures whose business orientations are not driven by wealth creation can be a practical alternative that facilitates economic, social and technological

development without aggravating the uneven distribution of resources across the society.

7.5 Public safety

Safety is one of people's basic needs. It has been argued that an unsafe environment can cause significant barriers to entrepreneurial activity such as a variety of mental and physical issues and deprivation of education and training opportunities, access to necessary assets, financial resources, markets, labour force, government services and support (Greenbaum and Tita, 2004; Cañares, 2011; Dutta, S. Sobel and Roy, 2013; Bullough, Renko and Myatt, 2014; García, 2014; Parker, 2015). According to World Economic Forum (2013a, 2014a), access to markets, human capital and access to finance are the top three elements in an EE that are vital for entrepreneurs, thus it is reasonable to postulate public safety to be a positive predictor of entrepreneurship. However, the statistics in Table 7-1 only partially corroborate the assumption. Although the indirect models report positive effects of the index of Political Stability and Absence of Violence/Terrorism on both EI and TEA, only those on TEA are statistically significant. Further, the small values of the coefficients imply the limited explaining power of public safety in predicting entrepreneurship. The inconsistency reflects the current limited understanding of the causal relationships between public safety and entrepreneurship.

The theory of Maslow's hierarchy of needs suggests satisfaction of basic needs such as safety is a prerequisite for the satisfaction of high-level needs such as entrepreneurship (Sirgy, 1986; Hagerty, 1999; Hafeez *et al.*, 2011) which can explain the statistically significant and positive coefficients of the index of Political Stability and Absence of Violence/Terrorism Model 5. However, the benefit of

safe environments is constrained to entrepreneurial activity but for the overall business sector which may explain the small value of the coefficient.

The statistically insignificant effects in Model 4 corroborate with the small fraction of literature focusing on the associations between safety issues and EI which suggests EI is formed in both safe and unsafe societies, while there is little evidence to confirm significantly causal links (Cañares, 2011; Kim, Kim and Yang, 2012; Bullough, Renko and Myatt, 2014; Lecuna, 2014; Nataraajan and Angur, 2014; White and Wynne, 2014). In contrast, mounting evidence for the significant associations between public safety and entrepreneurship has been generated from regional and local studies. Literature suggests regional differences in public safety are more significant than variations in safety variables across countries and ventures are much more mobile within countries which imply significant causal relationships between public safety and business creation are regional phenomena (Kitchen and Williams, 2010; White and Wynne, 2014; Matti and Ross, 2016).

Literature suggests public safety is a multi-faceted and multi-level concept which can be assessed both objectively and subjectively; the macro-level generally focuses on political stability while the micro-level generally focuses on personal security; and a variety of indicators have been used in the literature including political stability, crime rate, prisoned population, homicide rate or perceived safety (Berman and Phillips, 2000; Kitchen and Williams, 2010; Kim, Kim and Yang, 2012). Due to issues involved in data availability and cross-national comparison, societal safety is measured by the index of Political Stability and Absence of Violence/Terrorism retrieved from WGI in this study focusing on “political-motivated violence and terrorism” (Kaufmann, Kraay and Mastruzzi,

2010, p.4). Although it can be argued that the index of Political Stability and Absence of Violence/Terrorism is qualified to be a reasonable indicator of public safety at the societal level, it only captures the political aspect of public safety. Although only weak effects of public safety on EI and entrepreneurial behaviours are revealed by the dynamic panel data modelling in this study, there are still valuable implications that are informative to entrepreneurship research and policymaking.

The results and arguments show that the current understanding of the associations between public safety and entrepreneurship is rather limited. The limited understanding is reflected not only by the small number of empirical studies focusing on this issue but also by the lack of a widely accepted theoretical framework underpinning the empirical arguments. Further, the significant differences in various measures of the public safety variable bring great challenges for empirical assessments. Thus, two themes are proposed for future studies: first, the establishment of theories to motivate empirical studies in examining the correlations between public safety and entrepreneurship; second, the development of practical and appropriate public safety variables through evaluating various safety issues at different levels.

The weak associations between public safety and entrepreneurship at the societal level generated by this study and the growing regional evidence of the significant effect of safety variables on entrepreneurship suggest the role of public safety as a determinant in explaining the regional variations in entrepreneurial activity. For policymakers in regional and local level governments, enhancing public safety is a “kill two birds with one stone” strategy that can effectively improve the QOL of residents and facilitate regional business creation.

7.6 Education

In terms of the effects of formal education on EI and entrepreneurial behaviours, the results perfectly corroborate the findings in the literature based on human capital theory and TPB.

According to the theory of human capital, general human capital, which is mainly communicated by formal education, and entrepreneurship-specific human capital, which is generally transferred through entrepreneurship education, make distinctive contributions to entrepreneurial processes (Alvarez and Barney, 2007; Corbett, 2007; Marvel and Lumpkin, 2007; Ucbasaran, Westhead and Wright, 2008; Marvel, 2013; Baptista, Karaöz and Mendonça, 2014; Marvel, Davis and Sproul, 2016). General human capital contributes to entrepreneurship by enhancing entrepreneurs' general capabilities and cultivating a more knowledgeable and skilled labour force (Kim, Kim and Yang, 2012; McKeon, 2013; Qian, Acs and Stough, 2013; Estrin, Mickiewicz and Stephan, 2016). By contrast, both human capital and knowledge-spillover literature suggest that exposure to tacit and entrepreneurship-specific knowledge not only facilitates business creation but also significantly shapes individuals' attitudes, perceptions and intentions toward entrepreneurship which implies the important role of entrepreneurship education in the formation of EI (Guerrero *et al.*, 2014; Zhang, Duysters and Cloodt, 2014; Anjum *et al.*, 2018; Olutuase *et al.*, 2018; Georgescu and Herman, 2020). Moreover, the growing importance of knowledge creation and commercialisation in the knowledge-based entrepreneurial processes implies the increasingly vital role of entrepreneurship education and higher education in the context of the knowledge-based economy (Baptista, Karaöz and Mendonça, 2014; Raible, 2016).

Being measured by the Educational Index retrieved from HDR which is the arithmetic mean of the expected years of schooling index and the mean years of schooling index, the education variable in this study captures the conditions of formal education depicting the general human capital of a society (UNDP, 2020a). The significant positive effects of the Educational Index on TEA in Model 5 corroborate with the Human Capital Theory which suggests formal education directly contributes to entrepreneurial activity by enhancing the general human capital of a society (Schultz, 1961; Davidsson and Honig, 2003; Qian, Acs and Stough, 2013; Estrin, Mickiewicz and Stephan, 2016) and with various EE models that suggests human capital is one of the most important constructs (Qian, Acs and Stough, 2013; World Economic Forum, 2013, 2014).

According to Table 6-4, the correlation matrix showcases the Educational Index is highly correlated to per capita household consumption which implies strong associations between formal education and economic growth within countries. Further, the statistics in Table 7-2 indicate the values of the Educational Index in Middle- and Low-income economies are significantly lower than those in High-income economies, but the variations in the education variable are significantly more dynamic. These statistics suggest that the effects of formal education on entrepreneurship are much stronger in factor-driven and efficiency-driven economies than those in innovation-driven economies. Thus, it can be argued that, along the trajectory to a more knowledge-based economy, entrepreneurship-specific education becomes increasingly important in promoting entrepreneurship while the effects of formal education deteriorate which can explain that the positive coefficient of the Educational Index in Model

5 is only statistically significant at the 10% significance level in the system GMM estimators.

Table 7-2 Distribution of the Educational Index across the Income Groups

Country Group	Observations	Mean	SD	Min	Max
High-Income economies	260	0.844	0.062	0.622	0.943
Upper-Middle-Income economies	128	0.680	0.082	0.437	0.842
Lower-Middle-Income economies	46	0.542	0.0843	0.345	0.665
Low-Income economies	10	0.439	0.0855	0.277	0.495

(Source: developed by the author based on the dataset)

In terms of the effects of formal education on EI, although there is some literature which argues formal education affects the psychological and behavioural factors of entrepreneurs (Ucbasaran, Westhead and Wright, 2008; Marvel, 2013; Qian, Acs and Stough, 2013; Baptista, Karaöz and Mendonça, 2014), empirical studies fail to produce significant correlations (Kline *et al.*, 2014; Canever, Barral and Ribeiro, 2017; Falck, Gold and Heblich, 2017; Vancea and Utzet, 2017). The weak effects of formal education on the formation of EI are empirically confirmed by the statistics in Model 4 that the positive coefficient for the education is not statistically significant at conventional significance levels.

The empirical findings validate the positive role of formal education in EE which has valuable implications for various organisations. The statistics of Model 5 confirm the significant positive effects of formal education on entrepreneurship

across countries which indicate policies of enhancing public education can effectively promote business creation in society. However, different country-specific educational conditions imply variations in the effectiveness of such policies in different economies. According to Table 7-2, the relatively low levels of formal education in Low- and Middle-Income countries indicate that not only massive potential regarding improvements in formal education but also improvement in public education makes substantial contributions to entrepreneurship. In contrast, the high level of formal education in High-Income countries indicates low potential for further improvements. Further efforts in enhancing public education are economically costly and the positive effects on entrepreneurship are limited. The weak associations between formal education and EI increase the understanding of the significant role of entrepreneurial education and higher education in regional entrepreneurship. Entrepreneurial education facilitates the formation of EI and enhances the performance of entrepreneurial ventures, and higher education strengthens knowledge creation and commercialisation that are essential in the knowledge-based entrepreneurial processes (Marvel, 2013; Qian, Acs and Stough, 2013; Baptista, Karaöz and Mendonça, 2014; Raible, 2016; Miller and Acs, 2017; Olutuase *et al.*, 2018; De Oliveira and Vitale Torkomian, 2019; Nowiński and Haddoud, 2019; Reichert, 2019; Li and Zhang, 2020). In the literature, universities are often theorised to be an important pillar of an EE (Isenberg, 2011, 2016; World Economic Forum, 2013, 2014; Stam, 2015). Practically, many regional EEs are centred by or in the vicinity of higher educational institutions, typical examples are Silicon Valley and Stanford University, the Cambridge Science Park and Cambridge University, and the Alibaba headquarters and Zhejiang University.

Thus, for policymakers in the national administrations, investment in higher education is an effective strategy to promote nationwide knowledge-intensive entrepreneurship. For those in the regional and local governments, exploiting the advantages of the leadership effects of local universities plays an important part in regional entrepreneurship policies. For various higher educational institutions, launching entrepreneurship education programs to enhance the communication of entrepreneurship-specific knowledge and establishing campus-based incubators are effective strategies for promoting knowledge creation, knowledge commercialisation and innovation. For decision-makers in various business incubators and business angels, geographic positioning in the vicinity of higher educational institutions and consultancy services aiming at dispersing entrepreneurship-specific knowledge can effectively increase the creation of entrepreneurial ventures and improve their subsequent performances.

7.7 Health

There is substantial empirical evidence regarding the significant variations in health between entrepreneurs and non-entrepreneurs which give rise to two competing inferences: the selection effect which assumes healthier individuals are more likely to engage in entrepreneurial activity, and the contextual effect which assumes that entrepreneurship contributes to individuals' health (Tetrick *et al.*, 2000; Bradley and Roberts, 2004; Nikolova, 2019). The statistics of Model *4* corroborate with the growing evidence in the literature which suggests significantly positive effects of health on individual factors in entrepreneurship such as attitudes, perceptions and intentions (Zhang, 2014; Rietveld *et al.*, 2016; Zhang and Acs, 2018). In addition, statistics of Model *5* indicate non-significant associations between HALE and TEA which implies health indirectly affects

entrepreneurship through facilitating the formation of EI. The significant mediating effects of EI between HALE and TEA provide strong evidence for the “selection effect” that individual EB is constrained by their health-related barriers and health positively affects individuals’ cognitive factors which strongly predict entrepreneurship (Rietveld, Van Kippersluis and Thurik, 2015; Stephan, 2018; Hatak and Zhou, 2021).

The positive associations between health and EI can be explained by Human Capital Theory which suggests health is an important component of human capital and TPB literature which indicates health-related human capital promotes the antecedents of EI (Kim, Kim and Yang, 2012; World Economic Forum, 2013, 2014; Zivin and Neidell, 2013; Gilleskie and Hoffman, 2014; Nataraajan and Angur, 2014; Marans, 2015; Estes and Sirgy, 2019; Hatak and Zhou, 2021). Health is associated with a lower discount rate of human utility which suggests healthy individuals are more advantageous in the active search and recognition of entrepreneurial opportunities; further, healthy individuals tend to have higher income and invest more in their education which significantly improves their EI through enhancing entrepreneurial self-efficacy and personal economic resources (Schultz, 1961; Tetrick *et al.*, 2000; Becker, 2007; Gilleskie and Hoffman, 2014; Hatak and Zhou, 2021).

Model *5* produces a negative coefficient for the health variable which indicates a negative relationship between health and entrepreneurship. Although the small value and statistical insignificance of the coefficient indicate rather limited power of health in explaining variations in entrepreneurial activities across countries, the unexpected direction of the effects is still worth further deliberation.

It can be argued that the negative association may be attributable to the variations in the effects of health on heterogeneous entrepreneurial activities. For example, some studies suggest close links between health and entrepreneurial opportunities recognition which imply close associations between health and opportunity-driven entrepreneurship, some studies suggest the availability of healthcare insurance increase favours entrepreneurs who are self-financed and married (Zhang, 2014; Rietveld *et al.*, 2016; Zhang and Acs, 2018).

Another possible explanation is that the health improvement is to a large extent attributable to the implementation of the healthcare system which can lower job mobility and cause financial barriers such as insurance premiums for both entrepreneurial ventures and individuals seeking self-employment (Fairlie, Kapur and Gates, 2011; Gumus and Regan, 2015; Fossen and König, 2017; Liu and Zhang, 2018; Kuo and Lin, 2020). In a word, the negative coefficient is an indication of changes in the patterns of EB along with the improvement of health conditions in a society. Besides, there are also arguments that health and income are strongly associated within societies but only weakly between societies which suggest that the causal links between health and entrepreneurship are regional phenomena (Kim, Kim and Yang, 2012; Bosma and Sternberg, 2014; White and Wynne, 2014; Marans, 2015).

The results have valuable implications for both entrepreneurship research and policymaking. Generally speaking, the findings suggest health has significant effects on EI but weak effects on EB which contribute to the understanding of the relevance of health in entrepreneurship by providing empirical confirmation for the “selection effect” perspective which assumes health affects entrepreneurship

through shaping individuals' cognitive factors (Rietveld, Van Kippersluis and Thurik, 2015; Stephan, 2018; Hatak and Zhou, 2021).

Though being a more accurate multi-dimensional measurement of health which captures "both fatal and non-fatal health outcomes" (WHO, 2020), HALE evaluates the physical dimension of health. There has been growing evidence in the literature for the close associations between entrepreneurship and mental health issues which invites future efforts to examine the impacts of both physical and mental health conditions on business creation (Cardon and Patel, 2015; Hessels *et al.*, 2018; Levasseur, Tang and Karami, 2019; Nikolova, 2019; Cubbon *et al.*, 2020; Xia *et al.*, 2021). In addition, the weak direct associations between health and entrepreneurship and the high correlations between health and personal economic resources imply the potential direct effects of health on entrepreneurship at the regional level which invites future regional investigations (Kim, Kim and Yang, 2012; Bosma and Sternberg, 2014; White and Wynne, 2014; Marans, 2015).

Studies in both developed and developing countries have articulated the dramatic demographic changes in terms of an ageing population and labour force due to decades of low birth rates and prolonged life expectancy which have caused deep social and cultural changes and reshaped individual EB (Bönte, Falck and Heblich, 2009; Bailey, Ruddy and Shchukina, 2012; Mather, Jacobsen and Pollard, 2015; Government Office of Science, 2016; Yang *et al.*, 2020). As the overall health conditions improve, individuals tend to participate in start-up activities at a later stage of their lives and individuals in more senior age cohorts are increasingly motivated to engage in entrepreneurial activity (Kautonen, Down and Minniti, 2014; Kautonen *et al.*, 2015; Backman and Karlsson, 2018; Zhang

and Acs, 2018). Apart from being the outcome of the inevitable demographic and social changes, old age entrepreneurship makes distinctive economic and social contributions. As EI decreases with age, individuals in the senior cohort generally have more personal financial resources, wider social networks and superior experiences which implies old age entrepreneurship is more active and more likely to be opportunity-driven (Hatak, Harms and Fink, 2015; Kautonen *et al.*, 2015; Sahut, Gharbi and Mili, 2015; Backman and Karlsson, 2018; Zhang and Acs, 2018).

However, a majority of current entrepreneurship strategies in different countries are developed to stimulate EI and entrepreneurial behaviours of individuals in young and prime age cohorts such as university students, while few are formulated to promote old age entrepreneurship to address the challenges brought by an ageing population. It can be argued that the growing issues of an ageing population in more and more developed and developing countries will lead to an increasing share of old age entrepreneurship in total entrepreneurial activity which showcases the important role of old age entrepreneurship to inform entrepreneurship policymaking in both national and regional governments and the decision-making in various stakeholders of entrepreneurial ventures such as business incubators and business angels.

7.8 Environmental sustainability

With the exacerbating global warming and climate crisis, recent years have witnessed growing public awareness of environmental issues, and environmental sustainability has become a popular theme in the entrepreneurship literature. Regional studies suggest environmental sustainability contributes to entrepreneurial ventures by attracting talents and a quality labour force (Pennings,

1982; Morris and Lewis, 1991; Hafeez *et al.*, 2011). Human Capital Theory indicates environmental sustainability promotes entrepreneurship through its positive effects on health-related human capital (Berger-Schmitt, 2000, 2002; Zivin and Neidell, 2013; Hatak and Zhou, 2021). According to RBV, businesses in environmentally sustainable countries have more necessary natural resources at their disposal (Alvarez and Busenitz, 2001; Acs and Audretsch, 2010). Moreover, the mounting concerns on environmental issues bring social and cultural changes which significantly reshape the individuals' cognitive factors that strongly predict EI in a society (Mort and Hume, 2009; Schaltegger and Wagner, 2011; Haldar, 2019; Voegel and Voegel, 2020; Peng *et al.*, 2021).

However, few studies have examined the causal links between environmental sustainability and entrepreneurship at the societal level and little empirical evidence has been generated to confirm any systematic variations in their relationships across countries (Berger-Schmitt, 2000, 2002; Mort and Hume, 2009; Marans, 2015; Malkina-Pykh and Pykh, 2016; Estes and Sirgy, 2019; Voegel and Voegel, 2020). To address this gap, this study examines the extent to which adjusted natural resource depletion affects EI and TEA. According to Table 7-1, the statistics of the system GMM estimators fail to reveal any statistically significant effects which suggest environmental sustainability is only weakly associated with EI and EB at the societal level.

The outcome of weak associations may be attributable to several issues which jointly reflect the current limited understanding of the role of environmental issues in entrepreneurship. Firstly, in contrast to the vague associations between environmental sustainability and entrepreneurship, there has been mounting evidence in the literature that variations in environmental conditions within

countries are even greater than those across countries and the positive effects of environmental sustainability on talent recruitment and health are regional phenomena (Pennings, 1982; Morris and Lewis, 1991; Berger-Schmitt, 2000, 2002; Hafeez *et al.*, 2011; Zivin and Neidell, 2013). This implication calls on future empirical studies to examine the causal relationship between environmental sustainability and entrepreneurship at the regional levels and informs regional and local policymakers of the significant role of enjoyable environments in promoting business creation.

Secondly, some literature suggests environmental sustainability is characterised by multi-dimensionality and complexity; thus, it is reasonable to assume that, due to their significant economic, political, social, and technological variations, the effects of different dimensions of ecological sustainability on business creations in different countries vary dramatically, and governments, individuals and businesses in different economies may prioritise different environmental concerns. Further, the diversity of entrepreneurship also implies the effects of environmental issues are subject to the heterogeneous motivations of business creation. For example, some literature has both theoretically and empirically argued that environmental values closely correlate to social and sustainability-driven entrepreneurship (Mort and Hume, 2009; Schaltegger and Wagner, 2011; Haldar, 2019; Peng *et al.*, 2021).

In consideration of the absence of a widely accepted measure capable of capturing the various facets of environmental sustainability, the measurement adopted in this study emphasises the exploitation of natural resources in an economy. Although there have been some attempts in developing comprehensive environmental indices, such as the ecological footprint by the

Global Footprint Network, the Environmental Sustainability Index (ESI) and the Environmental Performance Index (EPI) (Bleys, 2012; Babcicky, 2013; Pissourios, 2013; Global Footprint Network, 2021), the limited availability and delayed updates significantly undermine their current applications in empirical studies. However, with increasing attentions and efforts from both practitioners and scholars, the growing availability of data will benefit future studies.

Lastly and most importantly, the growing awareness of environmental issues and the mounting evidence for climate crises have created increasingly entrenched environmental values around the globe. The substantial social and cultural changes will inevitably reshape individuals' cognitions and behaviours, not constrained to those in entrepreneurship. For policymakers in business administrative agencies at both national and regional levels, the development of regulations to nurture the creation of sustainability-driven businesses not only enhance the public welfare and sustainable development of the society but also promote future economic prosperity. For decision-makers in business incubators and business angels, communication of environmental values and investments in sustainability-driven ventures both enhance the corporate social responsibilities and ensure the profitability and sustainability of their organisations. For entrepreneurial ventures, commitment to sustainable development and CSR practice will become increasingly important in talent recruitment.

7.9 An Updated Conceptual Model

This study is the first comprehensive and systematic empirical evaluation of the effects of QOL on entrepreneurship across countries based on the EE perspective. The findings summarised in Table 7-3 yield significant effects of

societal QOL on both the quantity and the quality of entrepreneurial activity which empirically validate QOL to be an indispensable component of an EE and further the understanding of EE.

Table 7-3 Effects of QOL factors on EI and entrepreneurial behaviours

QOL Indicator	Results	
	EB	EI
Personal Economic Resources	(n/a)	(–)
Unemployment	(–)	(n/a)
Societal Inequality	(+)	(+)
Public Safety	(+)	(n/a)
Formal Education	(+)	(n/a)
Health	(n/a)	(+)
Environmental Sustainability	(n/a)	(n/a)

(+) significant and positive associations
(–) significant and negative associations
(n/a) weak associations

The EE perspective suggests an EE is characterised by complex interactions among various contextual and individual factors (Auerswald, 2015; Boulton, Allen and Bowman, 2015; Isenberg, 2016; Stam and Spigel, 2017). The interactions are formalised by the EE framework in Figure 4-4 which suggests the joint effects of societal QOL factors and EI in explaining EB. The model is strongly supported

by the findings that expand the current understanding of the EE perspective. Excluding environmental factors overlooks the economic, social and cultural embeddedness and contextual dependence of entrepreneurship, while excluding individual factors ignores idiosyncrasy in entrepreneurship and underestimates the proactive role of entrepreneurs in the system (Davidsson, 1995; Ojiaku, Nkamnebe and Nwaizugbo, 2018).

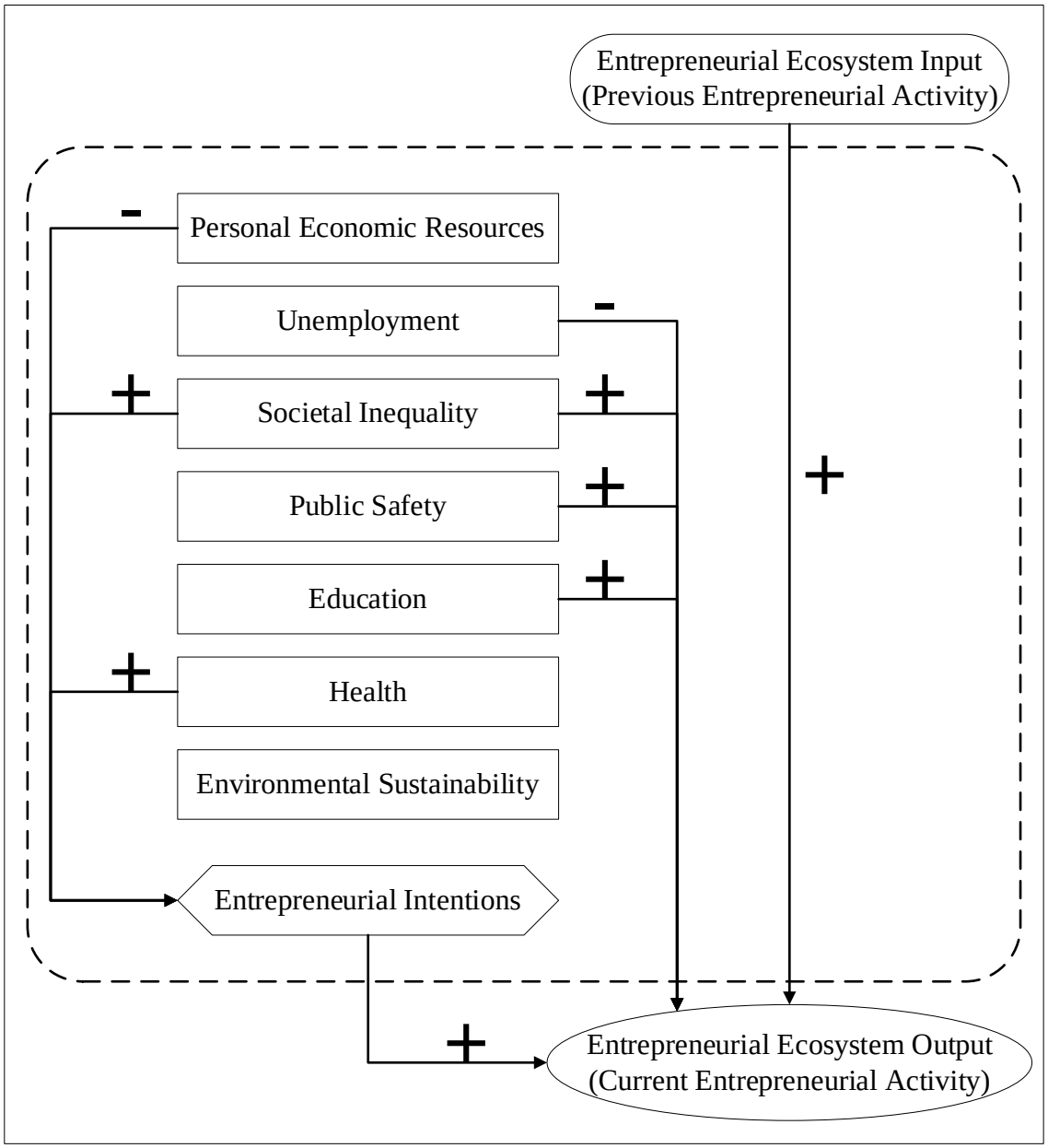
Further, the strong effects of EI on TEA support the argument that EI is the most direct antecedent and the most robust predictor for EB. Moreover, the findings support the PPM model of EI established on the TPB and the Entrepreneurial Event Theory which suggest the significant associations between EI and various contextual factors that corroborate the causal links between socio-economic and individual factors in entrepreneurship (Ojiaku, Nkamnebe and Nwaizugbo, 2018).

Besides, the mixed results of simultaneity and dynamic equations indicate the involvement of double causations as well as both long-term and short-term associations between QOL factor and entrepreneurship which highlight the dynamics of EE. The dynamics of entrepreneurship are further confirmed by the statistically significant effects of the lag term of TEA on TEA that enhance the understanding of the path-dependent feather of an EE. To sum up, the findings enrich current understanding regarding the complex, dynamic, multi-dimensional and path-dependent characteristics of an EE which has valuable managerial implications.

Figure 7-1 is an update of Figure 4-4 based on the analysis results. The model indicates that EB in the previous period positively affects that in the current period. EI is positively associated with EB. Besides, the availability of personal economic resources is negatively correlated to EI, while societal inequality and health have

positive effects on EI. Further, unemployment has direct negative impacts on EB, while societal inequality, public safety and formal education promote EB directly.

Figure 7-1 The updated conceptual model



(Source: developed by the author)

7.10 Managerial Guidelines

The findings highlight the significant and positive role of QOL in an EE. Variations in QOL affect both the quantity and the quality of entrepreneurial ventures. The

findings also underline the social side of entrepreneurship which suggests that, save the economic impacts, EI and entrepreneurial behaviours are subject to a wide range of social and cultural influences.

Considering the complexity, dynamics, multi-dimensionality and path-dependence of an EE, the findings underline the uniqueness of each EE that arises from the distinctive configurations of the contextual and individual factors. Thus, the managerial implications inform policymakers in both national and regional governmental organisations with a few broad policy guidelines.

7.10.1 For Governmental Organisations

Firstly, the findings indicate that welfare policies, such as unemployment reduction and investment in public education, not only significantly enhance the overall wellbeing of residents but also increase business creation in society. The improvements in QOL contribute to economic, social and technological prosperity through motivating growth-oriented, opportunity-driven and innovative entrepreneurship, thus promoting entrepreneurship needs efforts of various governmental organisations, saving those in the economic and business sectors.

Secondly, the heterogeneity of entrepreneurship suggests different types of entrepreneurial activity make distinctive contributions, and the findings indicate variations in personal economic resources and societal inequality significantly affect both the quantity and structure of entrepreneurship in society. Thus, entrepreneurship policy should nurture all types of EB, and the decision-making to prioritise certain categories of entrepreneurial ventures must suit the distinctive economic, social and cultural contexts to maximise the economic and social benefits of entrepreneurship.

Thirdly, the robustness of EI in predicting EB suggests motivating the formation of EI is an effective strategy to nurture business creation. The PPM model suggests push and mooring factors significantly affect EI (Ojiaku, Nkamnebe and Nwaizugbo, 2018). Economic development motivates intentions to exploit innovative-driven opportunities. The positive effects of societal inequality and health on EI suggest policies regarding communications of the stories of successful entrepreneurs and entrepreneurial ventures, a relatively free economic climate and enhancing the healthcare system can effectively promote the formation of EI.

Fourthly, the distinctive characteristics of an EE suggest that “EEs are not created overnight” (World Economic Forum, 2014a, p.74). The findings highlight the uniqueness of each EE by showing that entrepreneurship is not only subject to a unique configuration of distinctive economic, social, cultural and individual factors but also predetermined by its own history. Thus, the effective management of an EE calls on for a unique combination of tailored strategies. Further, the world is undergoing constant political, economic, social, cultural and environmental changes, a recent example is the outbreak of the coronavirus pandemic which swept the world in months and has cost millions of lives across the globe, underlines the necessity for constant modifications of policies.

Lastly, the findings further emphasise the role of non-governmental organisations such as higher education institutions, entrepreneurial incubators, venture funds and business angels in entrepreneurship. In the evolving process of an EE, Governments’ direct interventions can be a double-edged sword. Some government policies promote entrepreneurship by lowering the barriers to business creation, while some policies can limit market entries, favour certain

market segments, and create uncertainty and instability which negatively affect startups (World Economic Forum, 2014). To facilitate the sustainable development of EEs, governments need to empower non-governmental organisations and have a clear conscience of being a supporter instead of a player. World Economic Forum (2014a, p.74) suggest governments can "support opportunities for international studies, rational investment, bankruptcy regulations and fundamental scientific research (along with the pathways to commercialization)" to facilitate the healthy development of EEs which are more effective than direct interventions.

7.10.2 For Non-Governmental Organisations

The findings inform the complementary role of non-governmental infrastructures such as entrepreneurial incubators, venture funds and business angels to facilitate the sustainable development of EEs and promote business creation. However, their importance in entrepreneurship does not arise from their traditional functions such as simply providing working space and financial support but relies on their capacity of creating an entrepreneurial network. For example, these organisations can act as organisers and forums to activate the role model effects of high-impact ventures, facilitate the construction of the industrial chain, enhance the communication of entrepreneurship education and experiences, and boost the formation of EI.

7.10.3 For Entrepreneurs and Potential Entrepreneurs

The findings inform entrepreneurs and potential entrepreneurs of the geographic positioning of their ventures. Regions of higher levels of QOL are generally characterised by more access to funds and markets, lower business barriers and

higher levels of human capital which significantly enhance the formation of EI and the intention-behaviour transformations.

Moreover, the findings stress the importance of socialising behaviours in venture creation which suggests entrepreneurs and potential entrepreneurs should actively manage their social networks and engage in socialising and networking activities to access pivotal resources for their ventures such as knowledge and advice. Entrepreneurial parks and incubators can be good choices because the clustering of various entrepreneurial ventures forms foundations for active entrepreneurial networks.

Further, the findings support the role model effects that suggest high-impact ventures and successful entrepreneurs should be encouraged and motivated “to become investors, mentors and board members to leverage the human capital accumulated through their experience and networks” (World Economic Forum, 2013a, p.22) because these strategies can enhance not only the leadership of high-impact ventures in EEs but also the performance of newly created businesses.

7.11 Chapter Summary

This chapter synthesises the previous sections of this research and interprets the findings by linking the results of the data analysis to the literature. According to the discussion, personal economic resources significantly affect both the quantity and the quality of entrepreneurship, unemployment is significantly associated with EB but weakly with EI due to its “push” effects in entrepreneurship, and societal Inequality is a structural factor of entrepreneurship which implies a mutually reinforcing process, public safety weakly promotes business creation due to its positive effects on the overall business activities, formal education

contributes to entrepreneurship by promoting the nationwide general human capital while entrepreneurship education facilitates the formation of EI, the positive effects of health on EI confirm the “selection effect” assumption, and the growing awareness on environmental issues imply the increasingly significant role of environmental sustainability in entrepreneurship.

By linking the contextual factors to individual factors, the findings strongly support the ecological perspective of entrepreneurship which suggests an EE is characterised by multi-dimensionality, path-dependence, complexity and dynamics. Additionally, the findings provide empirical evidence to support Human Capital Theory, the PPM model, TPB and the Entrepreneurial Event Theory. However, the findings also manifest current limited understanding regarding the causal links between some QOL factors, such as public safety, health and environmental sustainability, and entrepreneurship which invites theoretical arguments and empirical examination in the future.

Based on the discussion, the conceptual model is updated, and several managerial guidelines are introduced for both governmental and non-governmental organisations, as well as entrepreneurs and potential entrepreneurs.

8 Conclusion

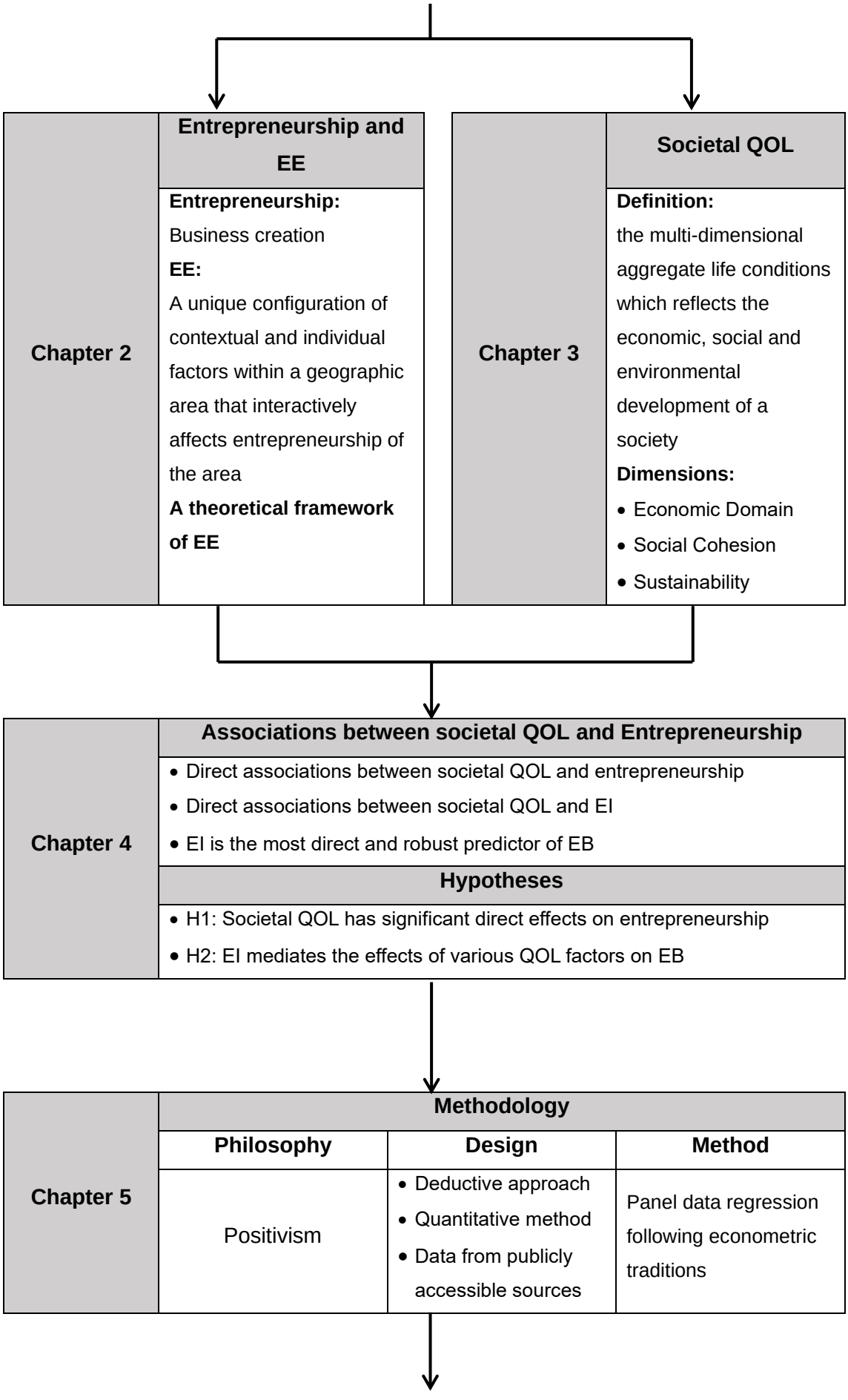
This chapter summarises the whole study which consists of two sections. The first section will review the research process and findings. Meanwhile, referring to the research aim and objectives, the contributions of this study will be articulated. The second section will cover the limitations of this study and suggestions for future research opportunities.

8.1 Research Process, Findings and Contributions

Figure 8-1 is the update of the research route map which presents the layout of the study and the key points in each section.

Figure 8-1 The updated research route map

<table>
<tr><td rowspan="3">Chapter 1</td><td>Research Background</td></tr>
<tr><td>• Growing economic and social significance of entrepreneurship
• Growing adoption but limited understanding of the EE perspective</td></tr>
<tr><td>Research Aim and Objectives</td></tr>
<tr><td colspan="2">Aim:
To enrich the understanding of both entrepreneurship and EE phenomena by providing a comprehensive evaluation regarding the associations between QOL and entrepreneurship at the societal level
Objectives:
• to critically assess the concepts of entrepreneurship and EE, and consolidate prior strands of the EE literature to develop a theoretical framework of EE;
• to critically review the concept of societal QOL and identify its key dimensions; and
• to examine to what extent various societal QOL factors affect entrepreneurship; additionally, to evaluate the mediating effects of entrepreneurial intentions.</td></tr>
</table>


Chapter 2
Entrepreneurship and EE
Entrepreneurship:
Business creation
EE:
A unique configuration of contextual and individual factors within a geographic area that interactively affects entrepreneurship of the area
A theoretical framework of EE
Chapter 3
Societal QOL
Definition:
the multi-dimensional aggregate life conditions which reflects the economic, social and environmental development of a society
Dimensions:
• Economic Domain
• Social Cohesion
• Sustainability
Chapter 4
Associations between societal QOL and Entrepreneurship
• Direct associations between societal QOL and entrepreneurship
• Direct associations between societal QOL and EI
• EI is the most direct and robust predictor of EB
Hypotheses
• H1: Societal QOL has significant direct effects on entrepreneurship
• H2: EI mediates the effects of various QOL factors on EB
Chapter 5
Methodology
Philosophy
Design
Method
Positivism
• Deductive approach
• Quantitative method
• Data from publicly accessible sources
Panel data regression following econometric traditions

	Results
Chapter 6	**Data source:** Publicly accessible databases of international bodies including GEM, WDI, WGI, HDR, GBD **Dataset:** A short, unbalanced panel made up of 444 observations of 76 economies covering a 9-year period from 2010 to 2018 **Results:** • Both hypotheses are accepted • Entrepreneurial intentions mediate the effects of personal economic resources, inequality and health on entrepreneurship • Unemployment, inequality, public safety, and education directly affect entrepreneurship

	Findings
Chapter 7	• Strong support for the EE perspective • Empirical confirmation for QOL to be an important construct of an EE • Managerial implications to inform policymakers, non-governmental organisations, entrepreneurs and potential entrepreneurs

	Contributions
Chapter 8	**Academic contributions:** • to be the first comprehensive and systematic empirical evaluation of the effects of QOL on entrepreneurship across countries based on the EE perspective; • to empirically corroborate the EE perspective, the Human Capital Theory, TPB, and PMM model in entrepreneurship; • to establish and test an EE model that is informative to the entrepreneurship and EE literature by validating the interactions between contextual factors and the individual factors in explaining EB **Practical contributions:** • to inform policymakers in both national and regional governmental

	organisations that entrepreneurship policies depend on the joint efforts from various governmental departments that are contingent on the distinct socio-economic contexts and subject to constant modifications • to inform various non-governmental organisations regarding their role in motivating entrepreneurial intentions and facilitating high-quality business creations • to inform the orientational and geographic positioning of entrepreneurs and potential entrepreneurs in the dynamic and fast-changing socio-economic contexts

Chapter 1 introduces the research background, research aim and objectives, and the structure of this study. In today's knowledge-based economy, with the growing awareness of the significant role of entrepreneurship in both economic and social development, entrepreneurship has become one of the most popular themes in the literature and one of the key considerations in both regional and national policymaking around the world. The EE perspective provides a new way of thinking in entrepreneurship; however, the limited understanding of EE significantly hinders the effectiveness of current entrepreneurship policies in promoting business creation. Although the QOL has been theorised to be an important construct of various EE models, few empirical studies have comprehensively evaluated the associations between QOL and entrepreneurship. To address this gap, this study aims at enriching the understanding of both entrepreneurship and EE phenomena by providing a comprehensive evaluation regarding the associations between QOL and entrepreneurship at the societal level which is supported by three objectives: to critically assess the concepts of entrepreneurship and EE and to develop a conceptual framework of EE, to critically review the concept of societal QOL and to identify its key dimensions, and to examine to what extent various societal QOL factors affect entrepreneurship and to evaluate the mediating effects of EI.

Chapter 2 addresses the first objective which clarifies the key concepts in entrepreneurship and justifies the theoretical lens adopted in this study. Entrepreneurship is defined as business creation. An EE is conceptualised to be a unique configuration of contextual and individual factors within a geographic area that interactively affect entrepreneurship of the area which is characterised by significant complexity, diversity, dynamics, geographical boundedness and path-dependent with entrepreneurs assuming the central role of the system. Various paradigms in entrepreneurship literature are also evaluated to justify the EE perspective as the appropriate theoretical lens for this study.

Chapter 3 addresses the second objective of the study by identifying the key dimensions and indicators of societal QOL to support subsequent analysis. In this study, QOL at the societal level is defined as the multi-dimensional evaluation of the aggregate life conditions which is reflective of the economic, social and environmental development of a society. By synthesising various models in the literature, three broad dimensions of societal QOL are identified: the economic domain, social cohesion, and social sustainability. The economic domain depicts the material aspect of QOL including the personal economic resources and unemployment; the social cohesion domain refers to the relational conditions in society including inequality and public safety; and the social sustainability is concerned with the developmental potential and inter-generational equity of a society which can be assessed from education, health and environmental sustainability.

Chapter 4 evaluates the associations between societal QOL factors and entrepreneurship in the literature which leads to the deduction of the two main hypotheses. H1 is developed based on arguments in the literature that various

societal QOL factors significantly affect business creation. H2 is drawn from the EE perspective which explicitly suggests entrepreneurship is subject to the interactive effects of both contextual and individual factors, EI is hypothesised to be the mediator bridging the effects of societal QOL on entrepreneurship because it is the most direct antecedent and the most robust predictor of EB.

Chapter 5 introduces the research methodology of the study. Based on a large body of EE and QOL literature, this study adopts the positivist philosophy, a deductive approach and a quantitative method. The study relies on analysing secondary data retrieved from various open databases including GEM, GERA, WDI, HDR, UNDP, GBD), and IHME which produces an unbalanced short panel consisting of 444 observations of 76 different economies for the period of 2010-2018. The dataset is processed by STATA based on panel data regression models following rigorous econometric traditions.

Chapter 6 presents the detailed statistics of the analysis results. The descriptive analysis shows that the dataset is a highly unbalanced panel dominated by observations from wealthy countries. A simultaneity and a dynamic equation are constructed to evaluate the direct effects of societal QOL on entrepreneurship. The two models generate mixed results that indicate the presence of significant time inertia and double causations which suggests the dynamic model is more appropriate and relevant. Then, the Simple Mediation Model Approach is adopted to examine the extent to which EI mediate the effects of societal QOL on EB based on system GMM specifications. The statistics confirm that EI strongly predicts TEA and further indicate EI mediates the effects of per capita Consumption and HALE on TEA, the coefficient of Human Inequality has significant influences on both EI and TEA. The unemployment rate, public safety

and formal education are significantly associated with TEA but weakly with EI, while no statistically significant effects of ENV are found on either TEA or EI.

Chapter 7 interprets the research findings by referring back to the literature. The findings empirically confirm the significant associations between QOL and entrepreneurship at the societal level which suggests that QOL is an indispensable component of EE. By linking the contextual factors to individual factors, the findings strongly support the ecological perspective of entrepreneurship which suggests an EE is characterised by multi-dimensionality, path-dependence, complexity and dynamics. Additionally, the findings provide empirical evidence to support Human Capital Theory, the PPM model, TPB and the Entrepreneurial Event Theory. Based on the research findings, the conceptual model is updated, and several managerial guidelines are introduced for the research recipients.

This study has both substantial academic and practical values. Academically, this study makes a threefold contribution to the entrepreneurship literature. Firstly, this study is the first comprehensive and systematic empirical evaluation of the effects of QOL on entrepreneurship across countries through the theoretical lens of the EE perspective. The findings yield significant evidence that societal QOL affects both the quality and the quantity of EB which empirically validate QOL to be an indispensable component of an EE.

Secondly, the study empirically corroborated the validity of the EE perspective, the Human Capital Theory, TPB, and PMM model in entrepreneurship studies.

Thirdly and most importantly, unlike extant EE literature that tends to emphasise the identification of EE constructs, this study establishes and tests an EE model

that is informative to the entrepreneurship and EE literature by validating the interactions between macro-level factors and the micro-level factors in explaining EB. By including EI as the individual factor, the model not only corroborates the robustness of EI in predicting EB but also indicates the significant variations in the effects of different contextual influences on the heterogeneity of entrepreneurship. Additionally, the model adds the causal links between contextual and individual elements which extends the understanding of the context-dependence of entrepreneurship and the proactive role of entrepreneurs in an EE that informs future studies of the necessity to include both the contextual factors and individual factors in EE modelling. Further, the study explicitly acknowledges EB to be both the primary inputs and outputs of an EE and makes comparisons among various panel data estimators. The findings showcase the dynamic and the path-dependent characteristics of an EE that inform future studies of the necessity to include both the contextual factors and individual factors as well as the dynamics of entrepreneurship in EE modelling.

Aside from the academic contributions, this study also generates practical implications to inform entrepreneurship policymaking. The study increases the understanding of the diversity of EEs that is attributable to the distinctive configuration of a wide range of socio-economic factors which can explain why few attempts by governments around the world to copy successful EE models such as the Silicon Valley have generated favourable outcomes. The uniqueness of EE suggests that an ideal EE model does not exist, and entrepreneurship policymaking is subject to the distinct economic, social, cultural, and environmental contexts which need joint efforts from various governmental departments instead of the business administration agency. Further, as the socio-

economic climate is increasingly dynamic, the effectiveness of entrepreneurship policies, to a large extent, depends on the constant revisions to suit the specific entrepreneurial context. A policy that facilitates the development of an entrepreneurial culture in society and the cultivation of entrepreneurial mindsets among citizens can be far more effective than direct interventions. Take China as an example, the decreasing direct participation of the government in business activities, heavy commitment to improving citizens' life quality, and the growing investment in higher education to promote knowledge creation and knowledge commercialisation in the last two decades have made the country one of the most active economies in entrepreneurship around the globe.

Besides, the study also informs various non-governmental organisations including business incubators, technology parks and business angels regarding their role in motivating EI and facilitating high-quality business creations. Besides traditional methods of funding, the findings suggest that it is important for these organisations to diversify their strategies to accommodate the needs of entrepreneurs and potential entrepreneurs such as specific human capital, market accessibility and talent recruitment. Possible measures may include playing a part in communicating entrepreneurship-specific knowledge and acting as a forum to enhance the role model effects of successful entrepreneurial ventures.

Additionally, this study informs entrepreneurs and potential entrepreneurs of the orientational and geographic positioning for their ventures in the dynamic and fast-changing socio-economic contexts. For example, the growing environmental values of the general public suggest the increasing importance of social entrepreneurship in the future.

8.2 Limitations and Suggestions

Although each of the methodological decisions has been well justified, the findings have several limitations that may present new avenues for future research. Firstly, one major limitation arises from the reliance on a quantitative approach. Although the methodological choice can be reasonably justified because this study is based on well-established theories and a large body of literature, it still suffers from the limitations of incapacity to include information-rich data and to produce in-depth understanding (Saunders, Lewis and Thornhill, 2016). The limitation invites future studies based on a qualitative approach to explore the causal relationships and mechanisms regarding the associations between QOL and EB.

Secondly, another limitation is the uneven distribution of the observational units in the dataset. The dataset being analysed in this study is retrieved from open databases including GEM, GERA, WDI, HDR, UNDP, GBD), and IHME. Due to the data collection strategies of the data sources, the sample is dominated by High- and Upper-Middle-Income economies which may produce biased results and undermine the generalisation of the research findings. Thus, it is necessary for future studies to probe into the EE phenomena in Low-income countries to examine the systematic variations concerning the patterns of EB, their antecedents and determinants among income groups to develop a more holistic view and a more generalised theory of EE.

Thirdly, the research findings are also subject to the limitation of a relatively small sample size. The dataset is an unbalanced short panel consisting of 444 observations of 76 different economies for the period 2010-2018.

To treat the problems of omitted variables, reverse causalities, measurement error and simultaneity, the data analysis heavily relies on dynamic panel data regression. Endogeneity, referring to the correlation between the explanatory variables and the error term, is the most important methodological consideration to avoid biased inconsistent estimates (Pothen and Welsch, 2019). Due to the relatively small sample size, only CON is assumed to be endogenous to avoid too many and weak instruments. Although the Sargan/Hansen statistics of each model indicate appropriate specification of instruments, the literature suggests multiple double causations which imply the possibility of multiple endogenous variables.

In addition, save the EE perspective, the study also draws from other important theories such as Human Capital Theory, TPB and so on. For example, besides EI, TPB suggests other individual factors such as perceptions and attitudes are also important antecedents of EB (Van Gelderen *et al.*, 2008; Liñán and Chen, 2009; Iakovleva, Kolvereid and Stephan, 2011; Kautonen, Van Gelderen and Tornikoski, 2013; Kautonen, van Gelderen and Fink, 2015; Anjum *et al.*, 2018).

Furthermore, the multi-dimensionality of the QOL factors indicates each of the QOL indicators can be measured from different angles. For example, HALE captures information regarding physical health while mental health is increasingly recognised to be an important health indicator and closely associated with entrepreneurship (Volery and Pullich, 2010; Cardon and Patel, 2015; Maridal, 2017; Hessels *et al.*, 2018; Stephan, 2018; Levasseur, Tang and Karami, 2019; Nikolova, 2019; Cubbon *et al.*, 2020; Hatak and Zhou, 2021; Xia *et al.*, 2021).

However, the relatively small sample size offers limited degrees of freedom which significantly constrain the variables included in the empirical models and the

instruments involved in estimates. Thus, one future direction is the study based on a larger sample size to accommodate the inclusion of more explanatory variables and the specification of more instruments in order to generate more information rich and accurate parameter estimates.

Besides the research opportunities motivated by the research limitations, the research findings also imply other routes for future studies. Literature suggests regional variations in some QOL variables are more significant than those across countries; and the research findings imply that the associations between QOL and entrepreneurship may also be regional phenomena (Pennings, 1982; Morris and Lewis, 1991; Berger-Schmitt, 2000, 2002; Kitchen and Williams, 2010; Hafeez *et al.*, 2011; Zivin and Neidell, 2013; White and Wynne, 2014; Matti and Ross, 2016). Thus, future studies examining the associations between QOL and entrepreneurship at the regional and local levels can effectively inform regional entrepreneurship policymaking. The research findings also reflect the current limited understanding of the associations between some QOL factors and entrepreneurship, such as public safety, health and environmental sustainability which invite future studies to assess various measures of each QOL indicator to establish more clear and robust causal relationships.

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Appendix I

Statistics of various specifications of Model 1

VARIABLES	Pooled OLS lnTEA	LSDV lnTEA	GLS lnTEA
lnCON	-0.377***	-0.850***	-0.274**
	(0.125)	(0.272)	(0.126)
UNE	-0.0358*	-0.0415**	-0.0563***
	(0.0197)	(0.0181)	(0.0159)
UNE2	0.000501	0.00125*	0.00141***
	(0.000684)	(0.000650)	(0.000527)
lnINE	0.825***	0.171*	0.344**
	(0.176)	(0.102)	(0.135)
PV	0.210***	0.0197	0.0146
	(0.0678)	(0.0641)	(0.0639)
PV2	0.0800	0.134***	0.0206
	(0.0517)	(0.0348)	(0.0464)
lnEDU	1.120	-1.453	0.460
	(0.961)	(1.204)	(0.840)
lnEDU2	0.0922	-1.769**	-0.253
	(0.735)	(0.824)	(0.659)
lnHALE	38.21	-143.8**	-70.75*
	(38.83)	(56.89)	(38.34)
lnHALE2	-4.555	17.74**	8.505*
	(4.735)	(7.168)	(4.678)
ENV	0.0263**	-0.00144	0.0109
	(0.0119)	(0.0122)	(0.00837)
Constant	-75.92	300.5***	151.6*
	(79.37)	(112.9)	(78.31)
F or chi(2) statistics	27.57***	3.382***	139.5***
R^2	0.597	0.908	
Adjusted R^2	0.587	0.883	
SSE	61.50	13.99	
SEE or $\hat{\sigma}_v$	0.377	0.200	0.209
$\hat{\sigma}_u$			0.313
θ_median			0.736

N	444	444	444
Number of economies	76	76	76

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix II

Group mean two-sample T-test of TEA between High-income economies and Low- & Middle-income economies

Paired Samples T-test							
TEA	Paired Differences				t	df	Sig. (2-tailed)
	Mean	Std. Error	95% Confidence Interval				
			Lower	Upper			
High-income economies – Low- & Middle-income economies	-8.753	0.669	-10.067	-7.438	-13.084	442	.000

Appendix III

Group mean two-sample T-test of the Motivational Index between High-income economies and Low- & Middle-income economies

Paired Samples T-test							
Motivational Index	Paired Differences				t	df	Sig. (2-tailed)
	Mean	Std. Error	95% Confidence Interval				
			Lower	Upper			
High-income economies – Low- & Middle-income economies	1.746	0.206	1.340	2.152	8.458	442	.000