The Effect of Entrepreneurial Ecosystems on Performance of SMEs in Low Middle Income Countries with a Particular Focus on Pakistan

by

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ABBREVIATIONS

ATT	Average Treatment Effect on Treated
BEEPS	Business Environment and Enterprise Performance Survey
CDA	Canonical Discriminant Analysis
EU	European Union
FDI	Foreign Direct Investment
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GEM	Global Entrepreneurship Monitor
GINI	Gross National Income Index
GMM	Generalized Method of Moments
GNI	Gross National Income
ICT	Information and Communication Technologies
IFC	International Finance Corporation
ILO	International Labour Organization
LMICs	Low-Middle Income Countries
MSME	Micro, Small and Medium Enterprises
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Square
PIDE	Pakistan Institute of Development Economics
PSM	Propensity Score Matching
R&D	Research and Development
SMEs	Small and Medium Enterprises
SMEDA	Small and Medium Enterprise Development Authority
TFP	Total Factor Productivity
WBES	World Bank Enterprise Survey
WEF	World Economic Forum

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Dedication

This thesis is dedicated to my wife Tooba Sami Ahmad, my daughter Moomal Sami Ahmad and my son Jahandaad Mustafa for their patience, support, encouragement and making life peaceful enough for me to compose my Ph.D. thesis.

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Declaration

This thesis is submitted to Lancaster University for the degree of Ph.D. in Management, 2019. No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other University or Institutions of learning.

ABSTRACT

The entrepreneurial ecosystem is a relatively new perspective within the field of entrepreneurship but is now one of the most discussed topics in that field. It emphasizes the role of broader framework conditions that promote or constrain entrepreneurial activity in any region. The supportive institutional framework (reduced number of government regulations, ease in compliance of taxation system and control over corruption) and physical conditions (ease in access to finance, developed infrastructure, stability in political environment, the availability of an educated workforce and reduced competition with informal sector) create an entrepreneurial ecosystem where entry, survival and growth of firms will be at the highest rate. These elements of the institutional framework and physical conditions are interactive in nature, therefore, policymakers around the world are trying to achieve a balance between these components of the entrepreneurial ecosystem.

There is a paucity of research on the entrepreneurial ecosystems of developing countries, therefore, the findings of this thesis will not only be an addition to the literature but will also be useful for policymakers in these countries. In this study, pooled cross-sectional data for Pakistan and 41 low-middle income countries (LMICs) covering the period 2006-13 have been used to identify different entrepreneurial ecosystems and explain their impact on the performance of small and medium enterprises (SMEs). The performance of SMEs has been measured through the annual change in sales growth, employment growth and labour productivity growth.

The findings based on the analysis of the entrepreneurial ecosystems for the group of LMICs show that all of the identified components can have a negative effect on the performance of the SMEs. However, ranking of components on the basis of magnitude and statistical significance of effect shows that corruption has the most negative effect on firm performance, which warranted further examination. Therefore, we compare the firm

performance of the most corrupt and least corrupt LMICs through the use of propensity score matching (PSM) methods. The results of matching methods show that firm performance in the most corrupt countries is at least 10% lower than firms in the least corrupt countries. Thus, LMICs need to take steps to improve their control over corruption in order to achieve better performance of their SMEs.

However, only the individual components of the entrepreneurial ecosystems could be assessed for LMICs because of the heterogeneity of the institutional frameworks and physical conditions of these countries. Therefore, the entrepreneurial ecosystem of Pakistan has also been analysed to determine its existence and composition, and its effects on the performance of SMEs. The entrepreneurial ecosystem of Pakistan is examined using firm level survey data provided by the World Bank Enterprise Survey (WBES) for the years 2007 and 2013. A cluster analysis and canonical discriminant analysis (CDA) is undertaken to identify the composition of the entrepreneurial ecosystem existing in Pakistan. This bottom-up approach, recommended in the literature, has been used to measure the interactive effects of components of the entrepreneurial ecosystem of Pakistan. None of the studies in the literature has measured and empirically tested the entrepreneurial ecosystem of Pakistan using this approach.

The findings indicate that the entrepreneurial ecosystem of Pakistan is a combination of elements of the institutional framework and physical conditions. Except for government regulations and political stability, all other components contribute negatively to the entrepreneurial ecosystem of Pakistan. Thus, the aggregate effect of the entrepreneurial ecosystem is negative on the performance of SMEs. Moreover, an index was calculated using the interactive weighted effect of the components of the entrepreneurial ecosystem of Pakistan. The regression estimates based on the index values affirmed the negative effect of the entrepreneurial ecosystem of Pakistan as a system.

Our findings for Pakistan can be used as a guideline for policymakers in other developing countries with similar institutional frameworks and physical conditions. However, it can be inferred that there is no shortcut to create a supportive entrepreneurial ecosystem. The gradual improvements, with government acting as facilitator, are required to make the entrepreneurial ecosystems in LMICs conducive for entry, survival and growth of businesses. The specific recommendations for both policymakers and entrepreneurs are given at the end of the thesis.

CHAPTER 1 - INTRODUCTION

Entrepreneurship is regarded as one of the most discussed topics across the globe. The word was searched on Google 10 million times in January 2016 (Isenberg, 2016). The field of entrepreneurship has achieved new heights since the last decade of the 20th century. The recognition of the value of entrepreneurship dates back to the seminal work of Schumpeter (1934), in which he labelled entrepreneurs as 'agents of creative destruction' and emphasized their vital role in economic growth. Since 1934, this field has been widely researched and policymakers have been on a quest to configure the most suitable policies to promote SMEs, given their local conditions.

Researchers, practitioners and policymakers have broadly agreed on the variety of social, economic and developmental benefits arising because of entrepreneurship, and developed a broad consensus that entrepreneurship is important and it matters (Acs and Audretsch, 1988; Acs et al., 2014; Blanchflower, 2000; Grimaldi et al., 2011; Parker, 2009; Terjesen and Wang, 2013). Therefore, many governments and development agencies have allocated substantial amounts of money for financing and training entrepreneurs. These initiatives have been aimed at increasing the sheer volume of entrepreneurial activity in different regions on the basis of the argument that all kinds of entrepreneurship will generate economic activity.

Early research on entrepreneurship focused mainly on the personality traits of successful entrepreneurs (for a summary see Van de Ven, 1993), with the aim of finding the set of individual characteristics needed to be a successful entrepreneur. This aspect of entrepreneurship is still the focus of much research, however, later developments in the field shifted the focus to firm-specific factors: the skills of the employees, the geographical location of the firm and management practices, for instance, to find reasons for the success or failure of entrepreneurial ventures. The most recent perspective views entrepreneurship as

interactive and interdependent (Motoyama and Knowlton, 2017). This modern systematic view of entrepreneurship has been termed the entrepreneurial ecosystem by Daniel Isenberg. The entrepreneurial ecosystem has been defined as an interactive relationship between entrepreneurs, and institutional framework and physical conditions, for providing a thriving environment for businesses. The entrepreneurial ecosystem is a complex set of elements aimed at making the environment conducive for entry, survival and growth of entrepreneurship in a region.

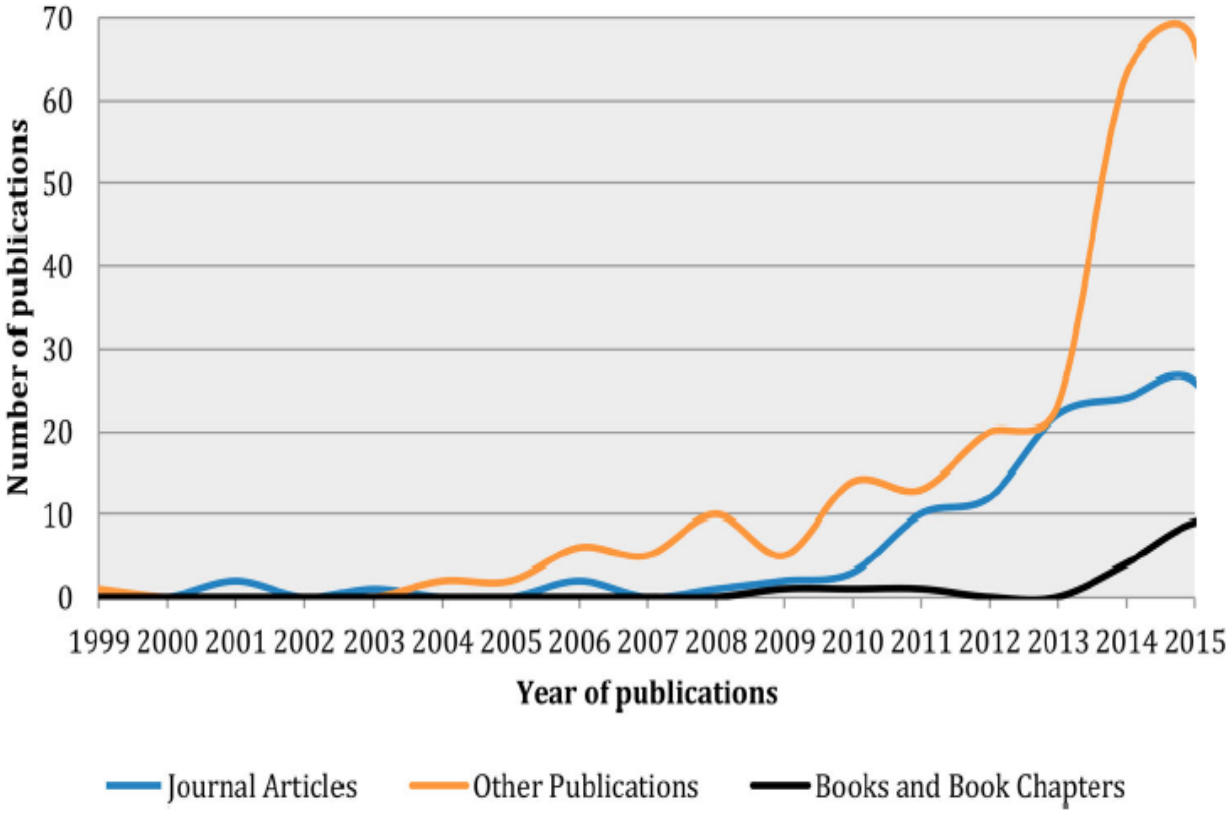
1.1 Entrepreneurial Ecosystems and Small and Medium Enterprises

This idea of taking a systematic view of entrepreneurship is relatively new and underdeveloped, and scholars have stressed the need to empirically test the effect of individual and interdependent components of the entrepreneurial ecosystem on the level of entrepreneurship in a region (Alvedalen and Boschma, 2017; Spigel and Harrison, 2018). The research in this field is providing useful insights for improvements in academic (Cavallo et al., 2018; Stam, 2015) as well policy (Acs et al., 2014; Foster et al., 2013; Isenberg, 2010; Stangler and Bell-Masterson, 2015; Taich et al., 2016) understandings of this concept. The objective behind the use of the entrepreneurial ecosystems approach has been to create resilient economies which are self-regulating and self-sustaining through entrepreneurial activity.

The concept of an entrepreneurial ecosystem has established itself as the most recent trend in the research area of entrepreneurship (Brown and Mason, 2017; Isenberg and Onyemah, 2016; Martin, 2015; Stam, 2018). It can be seen in Figure 1.1 below, that research on entrepreneurial ecosystems has increased substantially in recent years. Moreover, most recently an international conference held in Washington March 25-26, 2017, organized by the International Business Innovation Association was based on the theme of building thriving entrepreneurial ecosystems. The participants agreed on creating collaborative strategies to

create encouraging entrepreneurial ecosystems and emphasized the need for further research in this direction. Also, the *Journal of Entrepreneurship and Public Policy* and *Entrepreneurship & Regional Development* have called for papers on entrepreneurial ecosystems for special issues to be published in 2019.

Figure 1. 1: The trend of publications based on the Entrepreneurial Ecosystems (1999-2015)



Source: Adopted from Alvedalen and Boschmaa (2017)

The World Economic Forum (WEF), the Organisation for Economic Co-operation and Development (OECD) and the World Bank have all sponsored workshops, seminars, conferences and published reports on the topic of entrepreneurial ecosystems in recent years. The Kauffman Foundation has recently started a programme to understand and explain the measurement and performance of entrepreneurial ecosystems (Stangler and Bell-Masterson, 2015). Thus, entrepreneurial ecosystems can be regarded as a contemporary issue, yet there is

still a long way to go in developing our understanding as different aspects of this concept are unfolding through research in different contexts and time periods.

The concept of the entrepreneurial ecosystem is based on the theories of organisational ecology, institutional theory, regional economics and a systems approach. It emphasises self-organizing and self-regularizing mechanisms for competitive market policies. The combination of formal institutions (government regulations and taxation system), informal institutions (corruption perception) and physical conditions (access to finance, supportive infrastructure, a stable political environment, a skilled labour force and a formal economy) are expected to create an entrepreneurial ecosystem where the entry, survival and growth of firms will be at its highest rate. The institutional framework and physical conditions will determine the health of the entrepreneurial ecosystem, and how supportive or constraining it is. A supportive entrepreneurial ecosystem is expected to promote business activity and self-regulate the market by screening out the poor performing firms, whilst also attracting those which challenge the status quo with differentiated and innovative products.

Since most businesses start from either a small or medium scale, a high rate of SME formation has been used in the literature as an indicator of entrepreneurial activity. Thus, the role of the entrepreneurial ecosystem has been to ensure high rates of entry and survival of SMEs with growth potential. In supportive entrepreneurial ecosystems, the survival and growth of SMEs is given more importance in comparison to the entry rate. The high rate of survival and growth of SMEs in the USA and Europe has been accredited to their institutional support, facilitative physical conditions and low entry costs. On the other hand, the entrepreneurial ecosystems of developing countries have been blamed for a high exit rate of firms in their markets because the institutions here are seen to be relatively inefficient.

As, SMEs contribute significantly to economic growth, productivity and innovation (Memili et al., 2015; Schlogl, 2004); therefore, policymakers should emphasize the provision of a supportive environment for better economic performance. Moreover, it has been argued that if the encouragement and facilitation of SMEs is continued, the long-term economic objectives including skilled human resources, alleviating poverty, dispersing economic activity to deprived regions, the involvement of minorities in economic activity and the utilization of untapped entrepreneurial potential, can all be achieved (Beck, 2007; Bouri et al., 2011; Kuntchev et al., 2012; Oecd, 2005). Thus, SMEs can play a momentous role in the economic turnaround of any developing economy.

The lower capital needs and labour intensive nature of SMEs give them unprecedented importance in the solutions to the economic problems of developing countries (Rodrik, 2014; Stephens et al., 2013). Moreover, unskilled and semi-skilled labour is often the target of the SMEs because of their usually low tech and labour intensive production processes. Moreover, it is believed that the sheer number, size and operational nature of SMEs give them an added advantage to spur endogenous growth and accelerate the economic development of developing countries. Their vital role in promoting domestic firm performance in existing and new industrial sectors to create a resilient economy in the contemporary competitive world is inarguable. However, apart from due recognition of their contributions, the challenges this sector faces should not be underestimated too, particularly when the widespread phenomenon of market globalization is giving added advantages to large firms due to their resource base.

However, without undermining the chances of success of SMEs, it is also a bitter reality that many of the new firms fail during the process of entry, establishment and sometimes expansion. The non-exhaustive list of the reasons for failure includes: financing constraints, liquidity problems, inexperienced entrepreneurs or the wrong selection of the

market, for instance. However, the ecosystem perspective points to the constraining entrepreneurial ecosystem, based on inefficient institutional framework and physical conditions, as a reason for the high rate of failure of firms (Feld, 2012). It is argued that the constraining entrepreneurial ecosystem of developing countries does not allow entrepreneurial activity to increase beyond a certain level. Entrepreneurs are not free to ensure self-regulation or self-sustainability; rather their actions are tightly controlled by the regulators.

So the question is what should governments in developing countries do to promote SMEs? The general answer is that they should ensure the provision of an environment conducive for the entry, survival and growth of SMEs. The indigenous entrepreneurial ecosystem should be gradually improved using a bottom-up approach, with the role of governments as facilitators rather than strictly controlling the entrepreneurial activity. However, governments should also allow market forces to operate to ensure the screening of underperforming firms, rather than intervening to save the poor performers.

Moreover, the recent research suggests that, although there are notable contributions from small and new firms, only high growth firms started by ambitious entrepreneurs are contributing significantly to the economic development of a region (Audretsch and Belitski, 2017; Cavallo et al., 2018; Isenberg and Onyemah, 2016; Mason and Brown, 2014; Spigel and Harrison, 2018; Stam, 2015; Wong et al., 2005). The earlier belief that all types of entrepreneurship (productive, unproductive, destructive) contribute in creating economic activity has been rejected by contemporary empirical findings. It has now been argued that the benefits of entrepreneurship can be realised in a society only if the economic benefits of productive entrepreneurship supersede the unproductive entrepreneurship, and this is possible only when the institutions are performing their role efficiently and effectively, and supportive physical conditions are provided to the entrepreneurs.

Thus, recognizing the contributions of ambitious entrepreneurs and the role of institutions and physical conditions in the performance of the private business sector, governments in developed countries have changed their policy direction. The most recent policy shift has been to move from pushing for increasing the number of entrepreneurs (quantity) to improving the quality of entrepreneurship in a region by increasing the number of high growth firm (Acs et al., 2018; Stam, 2007). Thus, only high growth SMEs are the centre of policy related attention with respect to the development of entrepreneurial ecosystems in developed economies.

1.2 An Explanation of the Entrepreneurial Ecosystems of Low-Middle Income Countries

The state of entrepreneurial activity and entrepreneurial ecosystems in developing and under-developed economies has been entirely different from the developed world. It has been empirically demonstrated that the challenges and opportunities faced by entrepreneurs in developing countries have been entirely different (Acs et al., 2018; Auerswald, 2015; Ayyagari et al., 2014; Cavallo et al., 2018; Isenberg, 2011; Mason and Brown, 2014). The institutions in developing countries are not efficient, physical conditions are in poor state, and governments are dealing with entrepreneurs using a 'grabbing hand model', rather than using the 'invisible hand model'. Government interventions are aimed at taking control of the economic activity to avoid market failure. These conditions do not allow the market to adopt self-regulation mechanisms. Thus, the entrepreneurial ecosystems of developing countries are different from developed countries and have been a constraint on the performance of SMEs.

The differences between developed and developing economies are very broad and, apart from cultural and social diversity, the within group differences in incomes of developing countries are also substantial. Therefore, the income based categorization of countries by the World Bank—low income, low-middle income, upper-middle income,

middle income and high income—has been used to select a group of LMICs for an analysis of the effect of their entrepreneurial ecosystem on firm performance. According to the World Bank definition LMICs are those having Gross National Income (GNI) in the range of US$1,035–US$4,035. These countries are different in culture, economic conditions, social wellbeing, political structure and resources, but they show common characteristics being poor in monetary terms. Although LMICs are very diverse yet they face the same kinds of problems, both at the domestic level and at the international level, which sums up their reasons for underdevelopment.

The economic challenges of LMICs are two-fold. Firstly, they have lost the advantage of low costs of production by graduating from the low income category to the next level but they are not yet able to compete with the advanced technology of high income countries. Secondly, the up-gradation to the next group of relatively better economies has resulted in increased income disparity and changed the consumption patterns of citizens (Easterly, 2007; Foster et al., 2013; Martin, 2015; Tilly, 2004). Therefore, they are in dire need of finding the right policies at this point in time to meet the challenges of financial and social development.

It has been argued that a thriving private business sector could be a solution to the problems of these LMICs. Indeed, despite the gloomy economic circumstances of these countries, and the constraining institutional framework and physical conditions, the entrepreneurial activity is still increasing. Therefore, it is important to study the entrepreneurial ecosystem of these countries to find answers to a range of questions: what type of entrepreneurial ecosystem exists? How do components of the entrepreneurial ecosystem (elements of institutional framework and physical conditions) individually and interactively affect the entrepreneurial activity? And how do they affect the performance of SMEs? No policy guidelines, based on local empirical evidence, have been available for these countries to improve their prevailing entrepreneurial ecosystems. Therefore, this study

will follow a bottom-up approach and contribute significantly to explaining the role of the entrepreneurial ecosystem in the performance of SMEs in LMICs. Policy implications will also be discussed.

The analysis of entrepreneurial ecosystems of LMICs provides a very broad macro level view. However, it has been argued in the literature that different entrepreneurial ecosystems can exist at different levels within a country, province, city and even a group of industries (Spigel, 2017; Stam, 2018). Therefore, it is necessary to go further to more micro-levels and examine these ecosystems. Pakistan has been part of the LMICs group and the economic worries of Pakistan are not different from the other group members. The findings based on entrepreneurial ecosystem of Pakistan can be used by other LMICs facing similar economic and business challenges.

The assessment of the health of institutional framework and physical conditions, and their effect on performance of SMEs, is expected to reveal interesting and somewhat different findings in comparison to studies of developed countries. Just like other LMICs, the institutions of Pakistan are inefficient and negatively affect entrepreneurial performance. Adverse physical conditions add fuel to the fire and make the entrepreneurial ecosystem of Pakistan a constraint on performance of firms. The policies to revive the economy are inconsistent and to date have had short-term benefits, thus they remain unable to achieve economic stability for the long-term.

Entrepreneurship has been considered as a way forward for economic stability and growth. This study will provide a clear picture of the existing entrepreneurial ecosystem in Pakistan and its impact on the performance of SMEs. This will be the first ever study of its kind for Pakistan and it will suggest appropriate policy guidelines for improvements in the entrepreneurial ecosystem at national level. Therefore, this study is expected to reveal

valuable findings for existing as well as potential entrepreneurs and policymakers besides contributing to the body of knowledge on developing countries.

1.3 Aims and Objectives of the Thesis

This thesis is aimed at measuring entrepreneurial ecosystems and explaining their effects on the performance of SMEs in Pakistan and a group of LMICs. The two empirical chapters (Chapter 4 and 5) will separately address the relevant research questions. The analysis will focus on explaining the individual, and interactive, roles of the components of the entrepreneurial ecosystem, including the institutional framework (government regulations, taxation system and corruption) and physical conditions (access to finance, infrastructure, political stability, educated workforce and competition with the informal sector) on the performance of SMEs. The World Bank Enterprise Survey (WBES) database has been used for the analysis of LMICs and for Pakistan. Moreover, we use advanced statistical techniques to analyse these data in an attempt to find unbiased estimates of the effect of the entrepreneurial ecosystems on the performance of SMEs.

The main objectives of the thesis are as follows:

- To measure the effect of the components of entrepreneurial ecosystems on the performance of SMEs in LMICs;
- To identify the weakest link in entrepreneurial ecosystem of LMICs and test its effect on firm performance in LMICs;
- To identify the composition of the entrepreneurial ecosystem existing in Pakistan and measure the relative importance of different components;
- To estimate the systematic effect of the entrepreneurial ecosystem of Pakistan on the performance of SMEs.

1.4 Structure of the Thesis

The thesis is structured as follows. Chapter 2 explains in detail the literature on measurement of performance of SMEs and entrepreneurial ecosystems. The theoretical development of entrepreneurial ecosystems approach has been provided in a synthesis of the existing literature. Different models of entrepreneurial ecosystems and their components are explained in detail with reference to earlier research but with special emphasis on the limited number of studies on developing countries. Moreover, the measures of firm performance from both internal and external control perspectives are discussed in detail. Chapter 3 focuses on the data and the methodology used to find answers to our research questions. Different databases used in the literature are discussed and we justify the selection of the World Bank Enterprise Survey (WBES) database. The statistical methods used for analysis are discussed and their application in this study is explained in detail.

Chapter 4 is the first empirical study, explaining the effect of components of entrepreneurial ecosystems on the performance of SMEs in LMICs. The pooled cross-sectional data from WBES database containing firm level responses of 22,267 SMEs from 41 LMICs for the period 2006-14 has been used for analysis in this chapter. The effect of individual components of the entrepreneurial ecosystem has been tested, and further investigation is carried out on the weakest link, corruption. The results of propensity score matching (PSM) methods are used to examine the differences in firm performance in the most corrupt and the least corrupt LMICs.

The identification of an entrepreneurial ecosystem for all LMICs is not feasible with available data, due to differences in the institutional frameworks and physical conditions between different LMICs. Therefore, in Chapter 5 the role of the entrepreneurial ecosystem on the performance of SMEs in Pakistan is explained. The WBES data of 2049 SMEs from Pakistan, based on survey of 2007 and 2013, is used for analysis in this chapter. A cluster

analysis and canonical discriminant analysis (CDA) has been used for measurement and identification of national level entrepreneurial ecosystem in Pakistan. The cluster analysis is used to identify patterns in responses of firms on components of institutional framework and physical conditions. The relative importance of different components of institutional framework and physical conditions is determined through coefficients of discriminant functions, and an index is created to examine the interactive effect of components of the entrepreneurial ecosystem of Pakistan on the performance of SMEs. Finally, Chapter 6 concludes the study by giving policy recommendations for both entrepreneurs and policymakers. Further research directions are also suggested on the basis of findings of this study.

CHAPTER 2 – A REVIEW OF LITERATURE ON THE PERFORMANCE OF SMES AND NATURE AND DETERMINANTS OF ENTREPRENEURIAL ECOSYSTEMS

In this chapter the literature related to the entrepreneurial ecosystems and performance of SMEs is reviewed with an emphasis on LMICs. We begin in section 2.1 with a review of the literature on the definition of SMEs and their contributions to the economy. Moreover, why contributions to the economy differ on the basis of firm performance and how it is affected by internal and external factors is also discussed. In sections 2.2 and 2.3 the literature on entrepreneurial ecosystems, and why performance of SMEs depends on them has been reviewed. These sections further elaborate the role of the institutional framework and physical conditions which are key parts of entrepreneurial ecosystems. The summary of literature reviewed is given in section 2.4 to facilitate the analysis of key aspects.

2.1 A Definition of Small and Medium Enterprises

There is a long history of research on SMEs, but yet there is no globally agreed definition of them due to the differences in economic, cultural, social and industrial structures of countries across the globe (Matlay et al., 2006). SMEs have been defined in a number of ways based on a variety of parameters throughout the world. All or some of the criteria, including the number of employees, sales volume and value of assets have been used by organizations and countries across the globe to define SMEs. For example, in Egypt firms having a number of employees between 5 and 50 are termed SMEs, while in Vietnam SMEs are defined as firms having between 10 and 300 employees; in contrast, firms with 50 to 500 employees are considered as SMEs in the USA, Canada and New Zealand (Bouri et al., 2011). According to the World Bank, SMEs are those firms with less than 300 employees, an annual sales volume of less than $15 million and total value of assets more than $15 million. Interchangeably, the

Inter-American Development Bank (IADB) defines SMEs as firms with less than 100 employees and annual sales revenues of less than $3 million.

These variations in the definition of SMEs make the cross country comparisons complex and practically less meaningful. These differences also pose serious questions for the findings of earlier cross-country comparative studies on SMEs. However, the WBES is a unique database which has scaled the organizations across the globe according to one definition of SMEs; therefore, the cross country comparative results based on this survey data are more valid. According to the WBES, small enterprises are those with between 5 and 19 employees and medium enterprises are those with between 20 and 99 employees. This definition of SMEs by the WBES has been adopted in this study.

2.1.1 The Contributions and Performance of SMEs

SMEs are vital change agents in the conventional market due to their flexibility and innovative ability. The effect of their innovative practices is particularly visible in knowledge-based sectors although they are widespread in almost every sector of business activity. There are SMEs which are technologically advanced and fulfilling the specific needs of certain niches through their specialized and differentiated products and services (De Ferranti and Ody, 2006). Some are expanding their sphere of influence by associating themselves across borders through strategic alliances with other firms. Also, the increased use of information and communication technologies (ICT) and e-business applications has broadened the scope and range of benefits for them in multiple sectors.

SMEs dominate in terms of the number of businesses in countries across the globe with shares ranging from 95% to 99% of all businesses in an economy (Oecd, 2005). Small enterprises constitute 95% of manufacturing businesses in the majority of the countries of the world. At the upper end of this scale, small firms constitute 99% of manufacturing firms in

Italy whereas, on the lower side, only 80% of manufacturing firms of USA are of a small size. According to the estimates, SMEs account for 95% businesses and contribute 60% of the private sector employment in OECD countries (Oecd, 2005). Japan is among the world leaders in terms of the number of SMEs with more than 99% SMEs, Australia has 96% and South Africa has 91%. The estimates of 27 European Union (EU) countries suggest that there are over 23 million SMEs which constitute 99.8% of all businesses (Wymenga et al., 2011). In France 99.9% of tourism business has been operated by the SMEs.

The contributions of SMEs are equally significant in developing countries where 90% of the non-agriculture business is carried out by this sector. In Morocco 93% businesses are SMEs while in Ghana this number is 92%, which contribute 70% to the GDP of the country. In Pakistan 90% of non-agricultural businesses are SMEs and in India SMEs constitute 80% of the businesses (Abor and Quartey, 2010). Therefore SMEs are equally dominant in both developed and developing countries.

SMEs are not only significant in terms of the number of businesses across the world economy, but they also contribute significantly in terms of productivity, employment, innovation and economic growth. The 23 million SMEs in European economies contribute 67% in employment. The employment growth in SMEs in Austria was 8.1% in the period from 1995-2003. The contribution of SMEs to employment in Australia is over 63%. SMEs' share in employment in the manufacturing sector is more than 75% in Italy, Spain and Portugal (International Finance Corporation, 2013; Oecd, 2005).

SMEs are assumed to be the engines of job creation. Their contribution in creating employment opportunities in both developed and developing countries have encouraged policy makers to implement pro-SME policies. Moreover, donor agencies, including the Inter-American Development Bank, the World Bank, the African Development Bank and

United Nations Industrial Development Organization, have allocated multi-billion dollars in aid to support SMEs (Pires et al., 2013).

The share of SMEs in total manufacturing output and value added is more than 50% for a majority of OECD countries with Italy, Spain, Japan and New Zealand being exceptional contributors. The average contribution of SMEs in the manufacturing value added is 57% for European economies (Oecd, 2005). On the other hand, in the services sector, SMEs dominate in terms of both the number of businesses and employment. In the USA, medium sized hotels share 56% of the employment in this sector, whereas in the UK similar sized hotels constitute 40% of the employment in this sector. However, in the research and development (R&D) sector, large firms dominate and constitute more than 50% of employment in this sector in countries including the UK, USA, Netherlands and Germany (Kushnir et al., 2010; Wymenga et al., 2011).

Owing to the scale and noteworthy contributions in innovation, employment and economic growth in both developed and developing economies, SMEs have been extensively researched from multiple domains including management, leadership, marketing, finance, economics, entrepreneurship etc. Management researchers have looked at the role of management practices in the establishment, survival, trans-generation and growth of SMEs (Hong and Jeong, 2006; Kotey, 2005; Reuber and Fischer, 1997). The researchers from the field of leadership have looked at SMEs from the lens of leader/owner/manager's role in the establishment, survival and growth of firms (Matzler et al., 2008; Nicholls-Nixon, 2005; Smallbone et al., 1995). In the field of economics, the role of SMEs in economic growth and development has been widely investigated with regard to how and how much they contribute to employment growth, poverty reduction, social wellbeing, regional growth and sectoral growth (Aghion and Howitt, 1992; Beck et al., 2005a; Kirzner, 1999; Smallbone et al., 2001). Researchers from the entrepreneurship domain have worked on the basic but most frequently

asked question of why some SMEs succeed while others fail (Islam et al., 2011; Warren and Hutchinson, 2000)?

SME failures are usually considered as alarms for newcomers about something being wrong with either the market or the entrepreneurs. The research about factors affecting the performance of the entrepreneurial ventures has resulted in fruitful guidelines for potential entrepreneurs, investors, policy makers and aid agencies. However, the data on performance is difficult to obtain, moreover, the collection of comparable data has been a persistent problem over the years. Also, there has been lack of consensus on the use of measures of performance in entrepreneurial research.

The management research in this direction has been dominated by the domains of organizational theory and strategic management. Historically, the empirical research grounded on organizational theory has used three main approaches— a goal-based approach, systems approach and multiple constituency approach—to measure organizational effectiveness. The goal-based approach proposed in this regard advocates the use of organizational goal achievement for measuring performance (Etzioni, 1964). The weakness of this approach is non-comparability, as firms can have varied and contradictory goals. The second approach is the systems approach, which covered some weaknesses of the earlier approaches by focusing on multiple generic aspects of firm performance (Georgopoulos and Tannenbaum, 1957; Steers, 1975; Yuchtman and Seashore, 1967). The third approach, the multiple constituency approach, used the achievement of goals of different stakeholders as the performance measure (Connolly et al., 1980; Goodman and Pennings, 1977; Pfeffer and Salancik, 2003; Thompson, 1967). However, there has been no consensus among the researchers over which approach among these is the best measure of performance. Researchers of strategic management used three constructs—financial performance, operational performance and market share—either in the form of a hierarchy or individually,

to estimate the performance of an organization (Chakravarthy, 1986; Kaplan, 1983; Sandberg and Hofer, 1988).

The dimensions of firm performance used in previous research and their measures and frequency of use as adopted from the review article by (Murphy et al., 1996) are described in Figure 2.1. The earlier research studies mostly used only one dimension with a maximum of four measures of performance. Studies based on resource-based views of management describe changes in firm performance due to internal factors only. Therefore, efficiency and profitability related dimensions of performance were used. However, more recent studies in organizational theory, strategic management and population ecology have adopted institutional theory and suggested research on the effect of the external environment on the firm performance (Ayyagari et al., 2007; Cooper, 1993; Haltiwanger et al., 2013; North, 1991).

Components of the business environment beyond the control of firms like business regulations, infrastructure, corruption, access to finance etc., can possibly affect the firms at any stage of the business life cycle. The growth-related dimensions of firm performance are more vulnerable to external environmental conditions. Also, this research is aimed at explaining the relationship between the entrepreneurial ecosystem and performance of SMEs whereas the entrepreneurial ecosystem is something external and beyond the control of any single industry or firm. Therefore, in this study the performance of SMEs has been measured using the indicators mentioned under the growth dimension in Figure 2.1.

Figure 2. 1: Dimensions and Measures of Firm Performance

Dimensions	Measure	Frequency
Efficiency		30
	Return on investment	13
	Return on equity	9
	Return on assets	9
	Return on net worth	6
Growth		29
	Change in sales	23
	Change in employees	5
	Market share growth	2
	Labour productivity	2
	Change in net in margin	2
Profit		26
	Return on sales	11
	Net profit margin	8
	Gross profit margin	7
	Net profit level	5
	Net operating profit	5
	Pre-tax profit	3
Size		15
Liquidity		9
Success/Failure		7
Market share		5
Leverage		3

Source: *Adopted from Murphy* et al. *(1996)*

2.2 Entrepreneurial Ecosystems

It is only in the last decade or so that the entrepreneurial ecosystems approach has emerged and received significant attention of academics and policy makers around the world. The entrepreneurial ecosystems approach has been mostly regarded as a novel way of looking at development, yet it is not only consistent with the traditional economic development approaches through entrepreneurship rather in some aspects it complements them.

There is no consensus on how to define an entrepreneurial ecosystem, therefore, this approach has usually been explained by dividing it into two parts. Firstly, 'entrepreneurial' refers to entrepreneurship which is considered as a process through which people identify and select business opportunities to pursue their business creation dreams (Shane, 2009; Stam, 2015). Entrepreneurs exploit opportunities by taking risks and allocating resources to get benefit by creating and selling innovative goods and services (Isenberg, 2010). Innovation is used in terms of either invention or radical improvement in the existing solutions or modification in the existing products, but it definitely adds value to society (Lester and Piore, 2004). More recently, the focus on the quality of entrepreneurship has narrowed down entrepreneurship to high growth firms only (Mason and Brown, 2014; Stam, 2015). There are few reservations about this narrowed focus being too exclusive, but the recent literature on entrepreneurial ecosystems has specifically focused on this aspect, so self-employment is no longer used as an indicator of entrepreneurial activity (Henrekson and Sanandaji, 2014; Shane, 2009; Stam et al., 2011).

The second part is 'ecosystems'. An ecosystem has been defined in the Oxford Dictionary as a biological community of interacting organisms and their physical environment. Thus, apart from its literal meaning, ecosystem means an interaction of interdependent actors related to entrepreneurial activity. This context can be encouraging—

motivating the entrepreneur to mobilize resources—as well as discouraging—constraining start-up activity.

The definition of entrepreneurial ecosystems by Stam (2015) is most widely used in academic research because it comprehensively covers this approach. According to Stam (2015: pp.5), "... the entrepreneurial ecosystem is a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship." The entrepreneurial ecosystem is thus about the environment in which entrepreneurship takes place, the role of individual and interdependent factors that enable or constrain the entrepreneurial activity. The complex set of elements of the entrepreneurial ecosystem help in nurturing entrepreneurship in a region. The entrepreneurial ecosystems approach emphasizes social context in terms of its role in making entrepreneurship encouraging or discouraging. Innovative aspirations and achievements of individual entrepreneurs depend on how ingrained entrepreneurial culture is in the society.

Entrepreneurs are the focal point of an entrepreneurial ecosystem which accentuates the context to be conducive for entry, survival and growth of entrepreneurship. In the entrepreneurial ecosystem, entrepreneurs are considered as leaders and the other supporting stakeholders, such as the government are considered as the feeders (Feld, 2012). However, to properly understand the entrepreneurial ecosystems approach it is necessary to understand its theoretical development.

2.2.1 Theoretical Development of Entrepreneurial Ecosystems Approach

The recent theoretical developments in this approach have drawn heavily from the literature on entrepreneurship, regional economics, including industrial districts and clusters, and innovation systems approach. These domains of knowledge have focused on

entrepreneurship, institutional context and location specific attributes to study the differences in business activity.

The common attribute in the clusters approach and entrepreneurial ecosystems approach is Marshall's (1920) argument, that the competitive advantage of a firm is based on factors outside the control of an organisation and within the environment in which it operates. The industrial districts and clusters approach emphasizes the role of a common technology base shared by multiple competing and cooperating firms to determine the success or failure of an organisation. However, whereas the focus of the clusters approach is on increasing the number of firms, complementing each other in a specific location, the emphasis of the entrepreneurial ecosystems approach has been on entrepreneurs themselves. In entrepreneurial ecosystems approach, entrepreneurs are not only users of the institutional and physical conditions, but they also feed into this system through the feedback loop mechanism (Spigel and Harrison, 2018). However, understanding the context in which firms operate plays a significant role in their survival, and growth is the common point among these approaches.

The innovation systems theory took centre stage in policy making in 1990s with the publication of books by Lundvall (1992), Nelson (1993) and Edquist and Johnson (1996). Their main theoretical contribution was that the fundamental resource of every successful economy is knowledge, and the institutional context of any country enables that knowledge to convert into innovation. This approach emphasized the systematic view of innovative activity based on the assumption that knowledge is power, and supportive framework conditions for use of knowledge can result in innovative outcomes. Hence, the capacity of any economy to produce innovative outcomes is embedded into the structure of its institutions. It was assumed that innovation system failure happens as a result of weaknesses of institutional elements (lack of information about financing sources or other sources of knowledge), or due

to lack of interaction of the agents (institutions and firms). Therefore, it is the institutional framework (rather than individual R&D efforts and individual entrepreneurs) that triggers innovation in any country. The shortcoming of this innovation systems approach is its emphasis on institutions and firms, while the role of individual entrepreneurs remained a "black box". This is despite the fact that this idea of innovation systems theory was based on the work of Schumpeter.

While research on innovation systems theory was at its peak, research on entrepreneurship was entirely individual focused (i.e. the personality traits of entrepreneurs) and never looked at the relationship of entrepreneurs with the broader economic framework (Cavallo et al., 2018). The researchers in this domain tended to ignore the effect of external environment (context) on the entrepreneurs. However, literature on regional development focused on the impact of context and concepts like industrial districts, clusters and innovation systems started to gain importance (Acs et al., 2017a; Acs et al., 2017b).

Thus, taking an institutional and regional context is common in the entrepreneurial ecosystems approach, as well as in the regional development approaches (industrial districts, industrial clusters and innovation systems approach). However, in contrast to these regional development approaches, the literature on the entrepreneurial ecosystems gives central position to entrepreneurs, as it is the judgement and action of an individual which triggers entrepreneurial activity. The mere existence of business opportunities is useless unless an entrepreneur conjectures the existence of opportunity and tries to exploit it, thinking it feasible and profitable (Autio et al., 2013; Mcmullen and Shepherd, 2006). Therefore, the shift from an innovation systems approach, and industrial districts and clusters approaches, to an entrepreneurial ecosystems approach emphasizes the interaction between the entrepreneurs and institutional structures in determining the entrepreneurial output. The entrepreneurial ecosystems approach adopts an evolutionary approach and takes into account the mutual

learning of institutions and entrepreneurs as result of this interactive process. It has shifted the unitary and individual focused research on entrepreneurship to a more institutional and interactive level (Stam and Spigel, 2016).

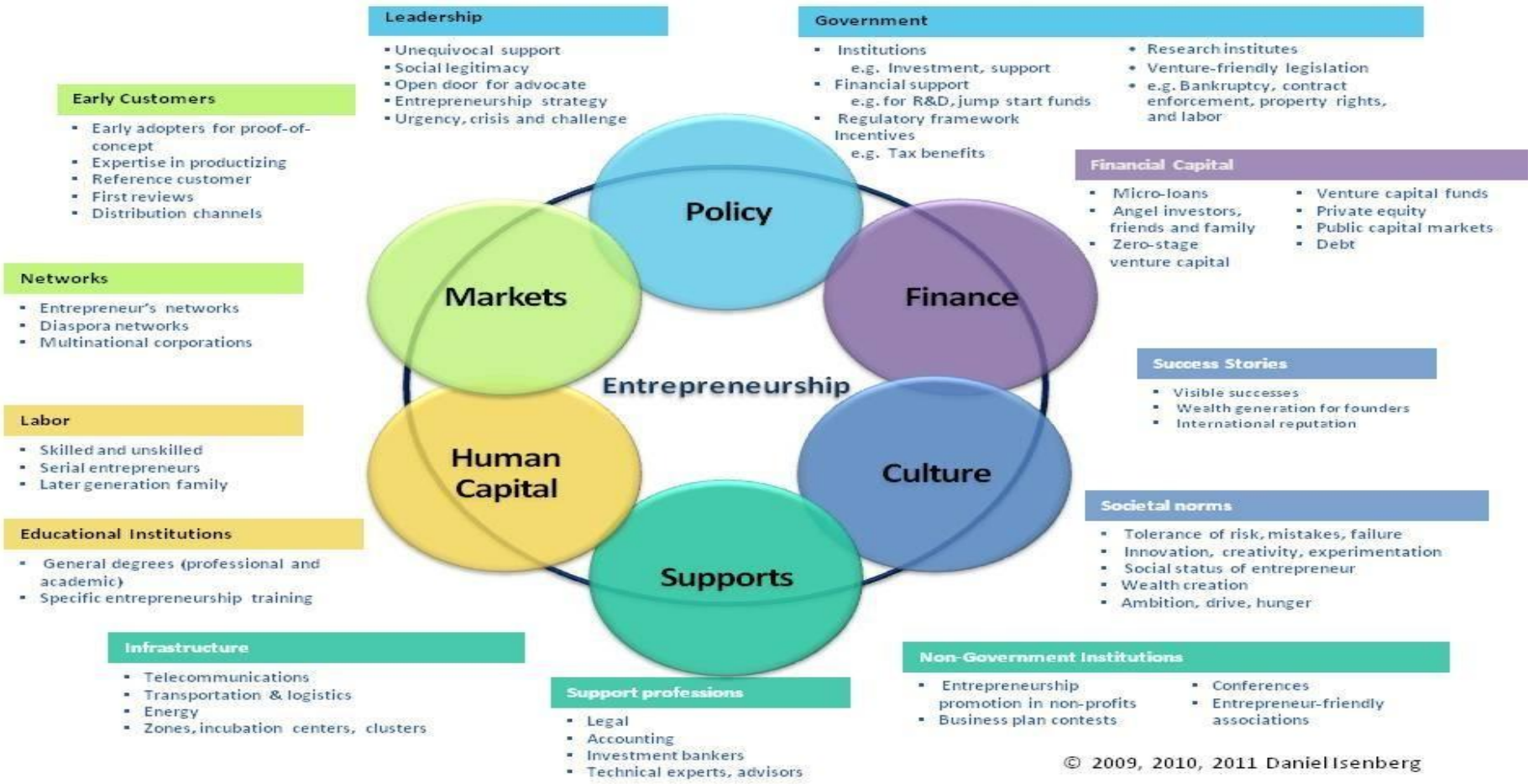
The entrepreneurial ecosystems approach is in a developmental phase, and it has not yet strictly demarcated itself by explaining all the conceptual questions. It is still not clear how to measure the entrepreneurial ecosystems. Therefore, it is important to undertake a constructive synthesis of literature in this domain to understand the components of the entrepreneurial ecosystems contributed by different earlier studies. Moreover, the entrepreneurship development from regional context can help in developing a framework for measurement of the entrepreneurial ecosystems.

2.2.2 A Synthesis of Literature on the Entrepreneurial Ecosystems

Isenberg (2010) and Feld (2012) are the pioneers of the entrepreneurial ecosystems approach. They suggested to policymakers that culture and community play a significant role in determining the success of entrepreneurship at any place (Cavallo et al., 2018; Spigel, 2017; Stam and Spigel, 2016). As a result, a number of studies tried to investigate the concept of entrepreneurial ecosystems. The recent literature on this approach has resulted in several different lists of factors contributing to explain different combinations of entrepreneurial ecosystems.

Isenberg (2010) argued that there is no exact combination of factors to create a successful entrepreneurial ecosystem, but policy makers should focus on understanding the local conditions and their value in gradually creating an entrepreneurial ecosystem. Isenberg (2011) suggested a bottom-up process for devising any entrepreneurial ecosystem and propose the model of entrepreneurial ecosystem as shown in Figure 2.2.

Figure 2. 2: Isenberg's model of an Entrepreneurship Ecosystem



Source: Adopted from Isenberg (2011).

These six domains of Isenberg's model are not only too generic in nature but also there is a very long list of elements to measure the effect of each domain. Moreover, the indicators of these dimensions interact and are interdependent with each other in hundreds of idiosyncratic and extremely complex ways. Therefore, finding a causal link is not only extremely difficult, and even if achieved, is of limited value because of complex interactions. However, his emphasis on the value of context, and the argument that each entrepreneurial ecosystem emerges and matures in a unique balance of conditions is a significant contribution to this approach.

Another model developed to measure entrepreneurial ecosystems was proposed by Feld (2012). Figure 2.3 adopted from Feld (2012) shows that nine factors play an important role in the success of an entrepreneurial ecosystem. The emphasis on access to resources and the supportive role of the government and context, besides the interaction of entrepreneurs and the entrepreneurial ecosystem, are the central points of this Feld model. However, the interdependence of these components still remained unaddressed.

The ideas of Isenberg (2011) and Feld (2012) were adopted by the World Economic Forum (WEF), the Kaffman Foundation and the OECD. These groups developed models with lists of indicators to measure entrepreneurial ecosystems. A wave of research followed this approach in an effort to examine the characteristics of entrepreneurial ecosystems and their effect on entrepreneurial activity (Acs et al., 2014; Alvedalen and Boschma, 2017; Audretsch and Belitski, 2017; Auerswald, 2015; Mack and Mayer, 2016; Qian, 2017; Spigel, 2017; Stam and Bosma, 2015; Stam and Spigel, 2016).

Figure 2. 3: Attributes of successful start-up communities

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

Source: Adopted from Feld (2012 pp.186-187)

The list of eights pillars of an entrepreneurial ecosystem by the World Economic Forum (2013) is shown in Figure 2.4. It is largely an overlap of attributes of the entrepreneurial ecosystems mentioned by Feld (2012) and the Babson entrepreneurship ecosystems model by Isenberg (2011). These pillars of entrepreneurial ecosystems focused on access to resources in the form of access to finance and human resources, and role of formal and informal institutional frameworks for the progress of entrepreneurship.

Figure 2. 4: Entrepreneurial ecosystems pillars and their components

Pillar	Components
Accessible markets	Domestic market: large/medium/small companies as customers and governments as customer Foreign market: large/medium/small companies as customers and governments as customer
Human capital/workforce	Management talent, technical talent, entrepreneurial company experience, outsourcing availability and access to immigrant workforce
Funding & finance	Friends and family, angel investors, private equity, venture capital and access to debt
Support systems/mentors	Mentors/advisors, professional services, incubators/accelerators and networks of entrepreneurial peers
Government & regulatory framework	Ease of starting a business, tax incentives, business-friendly legislation/policies, access to basic infrastructure, access to telecommunications/broadband and access to transport
Education & training	Available workforce with pre-university education, available workforce with university education and those with entrepreneurship-specific training
Major universities as catalysts	Promoting a culture of respect for entrepreneurship, playing a key role in idea-formation for new companies and playing a key role in providing graduates to new companies
Cultural support	Tolerance for risk and failure, preference for self-employment, success stories/role models, research culture, positive image of entrepreneurship and celebration of innovation

Source: Adopted from WEF (2013, pp. 6-7)

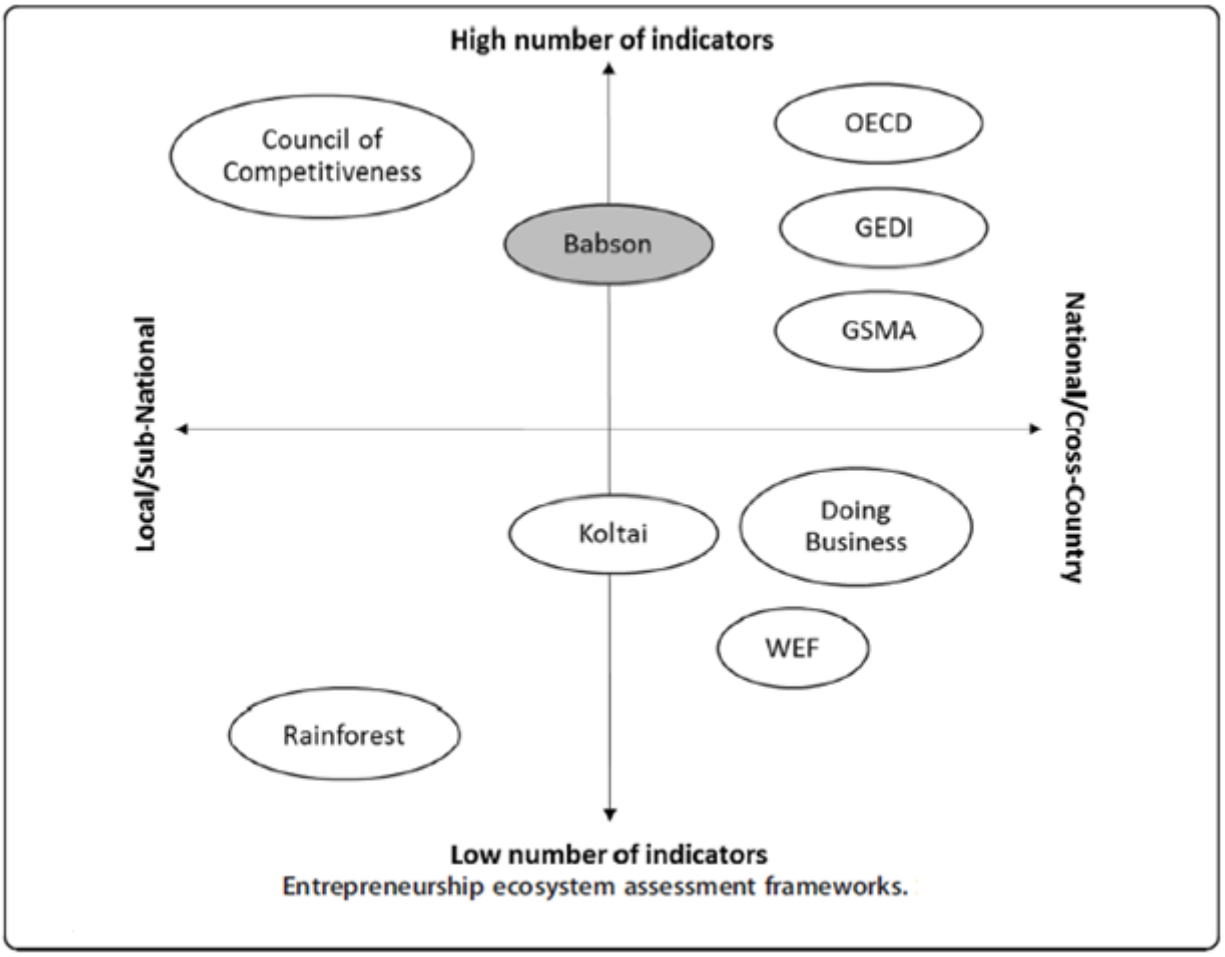
The common attribute of all these models is a shift in the traditional economic understanding about entrepreneurship in general, and the role of entrepreneurs and their interaction with institutions. Moreover, the entrepreneurial outcome is achieved using different modes of governance and the institutional context allows or restricts entrepreneurship. However, there is a general consensus in the field that entrepreneurial activity is the outcome of different combinations of social, institutional and economic factors. Moreover, the varying combinations of these factors are expected to create entrepreneurial ecosystems which vary from place to place (Brown and Mason, 2017; Spigel, 2017; Stam and Spigel, 2016; Stangler and Bell-Masterson, 2015).

The models of entrepreneurial ecosystems developed by different organizations can be seen below in Figure 2.5. These frameworks vary in their scope, level and comparability. For example the Entrepreneurship Measurement Framework by the OECD, ICT Entrepreneurship by GSM Association, the Doing Business Global Ranking by the World Bank, and Global Entrepreneurship and Development Index by George Mason University have been developed to assess the entrepreneurial ecosystem at national level, and to perform cross-country comparisons. However, these frameworks mostly emphasise the entrepreneurial environment and policy domains, and their implementation is severely affected by scarcity of comparable data.

The OECD framework is considered the most comprehensive model yet developed for analysing the entrepreneurial ecosystem of different countries because it focuses on including all the domains that can possibly affect the entrepreneurial activity, directly or indirectly. However, it is unknown how these factors are interdependent on each other in different regions at different time periods. Moreover, what are the key mechanisms which will work to make an ecosystem successful is yet unknown?

In contrast to these national level measurement models, the Asset Mapping Roadmap, Babson Model and the Innovation Rainforest Blueprint frameworks are focused more at assessment of local ecosystems while ignoring cross-country comparison. Moreover, they are more theoretical and conceptual and lack the common set of variables for comparing different regions in terms of their entrepreneurial ecosystems. In addition, it is important to note that the majority have never been tested in any developing countries.

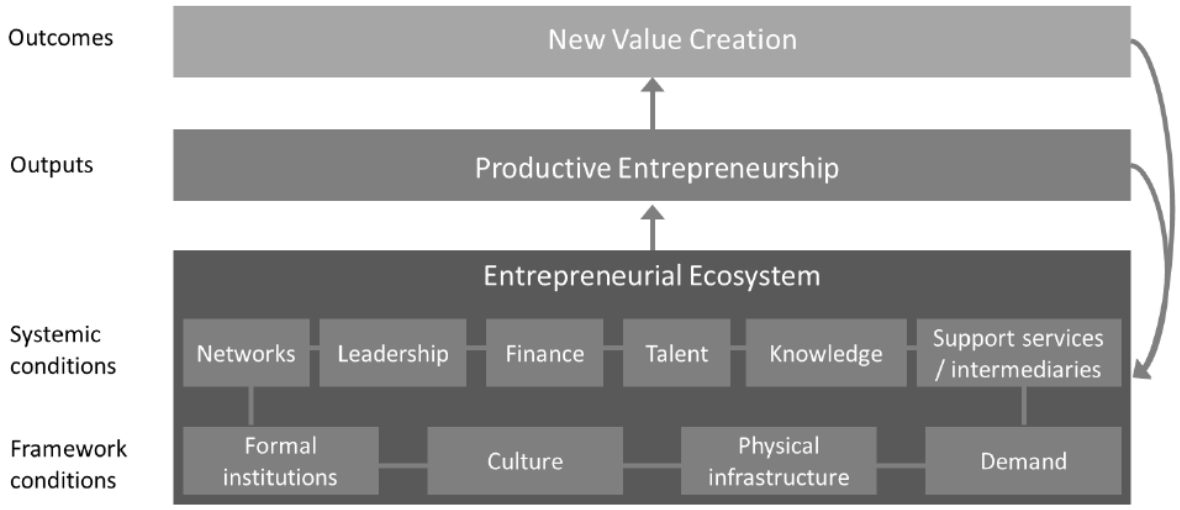
Figure 2. 5: The assessment of Entrepreneurial Ecosystems frameworks



Source: Adopted from the Aspen Network of Development Entrepreneurs (2013)

More recently, Stam (2015) used innovation systems theory and an entrepreneurship geography-based approach to suggest that entrepreneurial ecosystems are based on the interactive nature of entrepreneurial outcomes, entrepreneurial output, systematic conditions and framework conditions. The model given in Figure 2.6 shows that systematic conditions and framework conditions affect the entrepreneurial output (productive entrepreneurship), which in turn contributes to value creation in society at large. Also, a feedback loop is added to show the effect of entrepreneurial activity on the systematic and framework conditions. However, this model is inherently linear in nature as it does not account for the interactive nature of indicators of systematic and framework conditions.

Figure 2. 6: Key element, outputs and outcomes of the entrepreneurial ecosystem



Source: Adopted from Stam (2015, pp.1765)

It can be concluded that the entrepreneurial ecosystems approach is still underdeveloped and very few studies have tried to explore its systematic nature (Acs et al., 2014; Brown and Mason, 2017; Cavallo et al., 2018; Spigel, 2017; Stam and Spigel, 2016; Stangler and Bell-Masterson, 2015). According to Stam (2015), the under-theorisation of the entrepreneurial ecosystems concept has led to the approach of policy focus leading to theoretical development rather than the other way round. This practice has affected the richness of this field with a number of potential aspects still needing further development and understanding. The review of gaps in the literature, identified through an explanation of theoretical development, as well as a synthesis of the literature on the entrepreneurial ecosystems approach, is explained in the following section.

2.2.3 Gaps in the Literature

The entrepreneurial ecosystems approach has been popular in policy circles. Indeed, the more recent research in this domain is more theoretical and discursive in nature and mainly

targets practitioners and policy makers. There is a scarcity of empirical research in this domain.

Moreover, as of today, the research in this domain has produced long lists of factors, without consistently finding a cause and effect relationship between entrepreneurial ecosystems and their outcomes (Stam, 2015). These factors and their combinations provide useful information but their coherent and interdependent nature has not yet been confirmed. It also lacks causal depth and the empirical evidence is extremely limited. Aside from developing countries, where data limitations are always a problem, this approach has not yet been rigorously tested in many developed countries.

Existing frameworks also provide a static view of components of the entrepreneurial ecosystems while ignoring their evolutionary nature (Alvedalen and Boschma, 2017). Ideally, all the components of the entrepreneurial ecosystem should be measured continuously over time, tracking their development. However, data limitations hamper such measurement efforts (Brown and Mason, 2017; Cavallo et al., 2018; Stam, 2018; Stam and Spigel, 2016; Stangler and Bell-Masterson, 2015). It is suggested that data should be collected annually, and if possible semi-annually and quarterly at different geographical levels.

Moreover, it is not clear as what the unit of analysis should be using this approach (Stam, 2015). Should it follow geographical boundaries to determine different entrepreneurial ecosystems across different regions, countries, cities or sectors and groups of firms? It is assumed that the entrepreneurial ecosystem can be different at a national level and a sub-national level. At the local level there might be different ecosystems for different sectors and different sets of entrepreneurs—serial entrepreneurs, established, emerging and nascent entrepreneurs—(Napier and Hansen, 2011; Spigel, 2017).

There is no limit to determining what could be the minimum and maximum scale of the entrepreneurial ecosystem. It could encompass cities, different geographical regions within a country, a country, or even a group of countries (Brown and Mason, 2017; Feld, 2012; Saxenian, 1996; Senor and Singer, 2011). Moreover, all scales can be related to each other and can be nested to make the larger scales in the way that cities collectively will make a national scale system, and some countries can be nested to make multi-country entrepreneurial ecosystems. For example, some researchers perceive Europe as one entrepreneurial ecosystem due to several interconnected cities in different countries (Stam, 2014).

Isenberg (2011) suggested that a 'one-size-fits-all approach' for developing an entrepreneurial ecosystem is not practical, because the different contexts bring different sets of challenges and opportunities. Therefore, the entrepreneurial ecosystems can be different at different geographical locations and a bottom-up approach is the right way to proceed.

Lastly, the empirical studies to date have focused only developed countries, and entrepreneurs in developing countries facing an altogether different set of challenges and opportunities, are least discussed in the literature. Thus, in the context of developing countries, it seems plausible that finding the effect of individual components of the entrepreneurial ecosystems on firm performance will be a contribution in the body of knowledge. According to Taich et al. (2016), estimation of the effect of individual components of the entrepreneurial ecosystem will help in identification of the weakest and strongest components. These findings can guide policymakers about where to start their work to improve the entrepreneurial ecosystem. Moreover, Cavallo et al. (2018) argued that for less studied regions, even identification of weak and strong links in the entrepreneurial ecosystems can contribute significantly in helping policymakers take steps in the right direction.

In this thesis, the effect of components of the entrepreneurial ecosystems in LMICs is measured and weak links are identified. Moreover, interactive effect of the entrepreneurial ecosystem in Pakistan is measured in a systematic manner to explain its effect of performance of SMEs. These are significant contributions to the body of knowledge because no study in the literature has measured the entrepreneurial ecosystem of any LMIC. Moreover, the findings can be compared with other countries having entrepreneurial ecosystems similar to Pakistan.

2.3 Entrepreneurial Ecosystems of Low-Middle Income Countries

The shift of developing countries from centrally controlled or mixed economies to market-based economies have changed their economic landscape (Acs et al., 2018). The entrepreneurs in these countries are gaining more importance. Previously developing countries built their economies on the advantages of low cost labour, but now they are competing with the developed economies in terms of innovation. Therefore, apart from further theoretical and conceptual development, the scope of this approach should also be explored and tested in the context of developing countries as well.

The probability of increasing wealth and reducing poverty in low and LMICs has been directly related with the level of entrepreneurship in these economies. The existence of entrepreneurship in abundance in any country can play an important role in employment generation, increasing productivity, competitiveness and innovation, reducing poverty and promoting economic growth. All of these are desired possible practical outcomes of entrepreneurship, which are ambitiously pursued in developing countries. Unfortunately, entrepreneurship in these countries is the least studied area. This study is aimed at partially filling this gap by empirically investigating the entrepreneurial ecosystems of LMICs.

The existing literature on entrepreneurship in developing countries has focused mainly on the types of entrepreneurial initiatives, rather than investigating the framework which policy makers should devise for the establishment, survival and growth of entrepreneurship. The existing models of entrepreneurship are based on the data collected from developed economies which cannot necessarily explain what entrepreneurial ventures are facing in developing countries.

Entrepreneurship in developing countries has been relatively less studied as earlier practitioners and scholars either presumed that it is the same in both developed and developing economies, or the data was not available (Aterido et al., 2011). However, recent research studies based on WBES and Global Entrepreneurship Monitor (GEM) databases have posed questions which challenge these assumptions, and found that entrepreneurial ventures in developing countries are diverse. Here, entrepreneurs survive and grow in entirely different environments and face a unique set of challenges that businesses in the developed world never face.

However, these studies on developed countries can be used as a guide to develop a bottom-up approach for examining the health of existing entrepreneurial ecosystems in LMICs. Although there is no common definition of entrepreneurial ecosystems, the widely shared theme in the literature shows that economic and social conditions are common areas of interest for development of a supportive entrepreneurial ecosystem (Spigel, 2017; Spigel and Harrison, 2018). Moreover, there is yet no consensus on what elements collectively makes an entrepreneurial ecosystem, however, the existing literature does show that the output of an entrepreneurial ecosystem should be measured through the performance of existing firms. The higher growth rates of the firms indicate the existence of a supportive entrepreneurial ecosystem. Moreover, drawing on existing models, it can be argued that the success of

entrepreneurs depends on the institutional framework and other physical conditions necessary for entrepreneurial ventures.

According to North (1990), institutions decide the rules of the game in a society. These formal and informal institutions target reductions in uncertainty and decide the costs of production and profit for the entrepreneurial activity. The institutions not only directly affect the entrepreneurs through compliance but also indirectly by changing the values, culture and mindset of the general population (Ahlstrom and Bruton, 2002; Tonoyan et al., 2010).

The efficiency of institutions depends on the interplay of formal and informal institutions (Williams and Vorley, 2017). The efficient institutions reduce transaction costs for the business and provide an enabling environment to existing and new ventures (Fritsch and Storey, 2014; Welter and Smallbone, 2011; Williams and Vorley, 2015). The development and stability of the institutions ensures a stable and low risk environment for the entrepreneurial activity. On the other hand, inefficient institutional structures create barriers to entrepreneurial activity. Thus, entrepreneurial activity is negatively affected by the inefficient functioning of formal institutions and widespread corruption (Vorley and Williams, 2016).

The congruence of formal and informal institutions will synergize the positive effect of policy reforms, and asymmetry will undermine the effects of reforms in formal institutions (Williams and Vorley, 2015). Thus, it is important for policy makers to look at both formal and informal institutional framework conditions to foster entrepreneurship. Government regulations, and the taxation system have been used as indicators of formal institutions, whereas corruption, perceived or not, has been used as an indicator of informal institutions.

However, it is not enough for the entrepreneurs to have a supportive formal and informal institutional framework, they also need supportive physical conditions from which

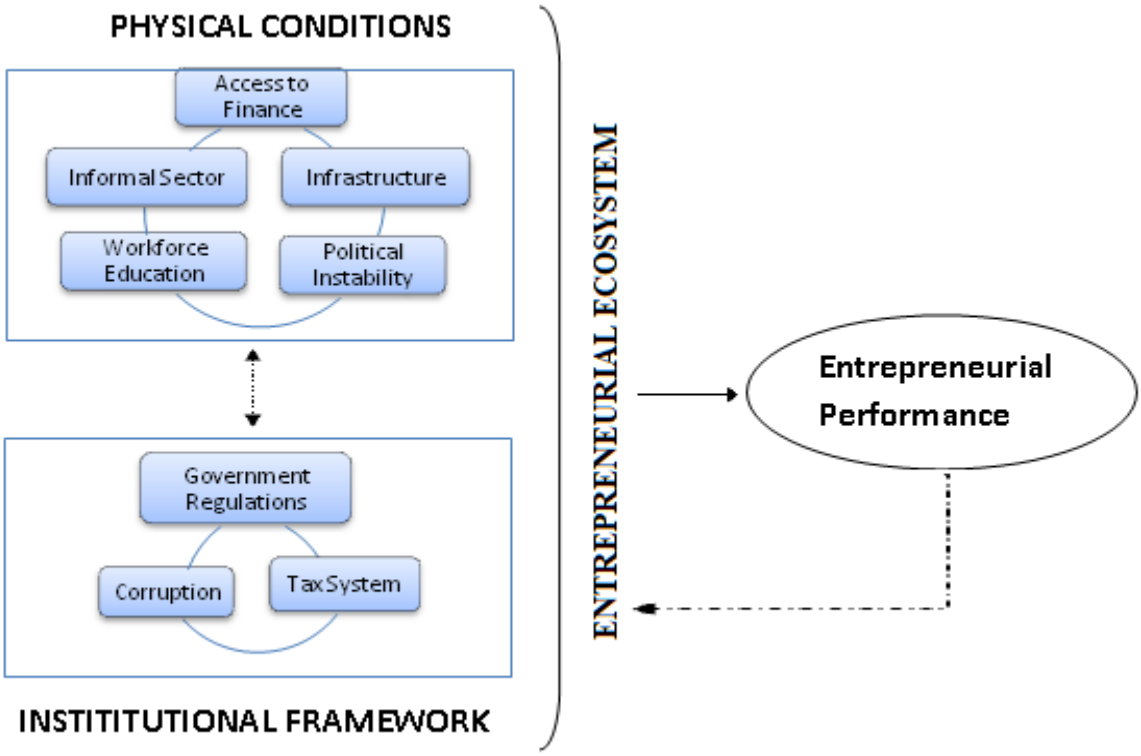
they will gather their resources to start a business. These physical conditions are the backbone for the success of an entrepreneurial ecosystem (Stam, 2018). The presence of these conditions and their interactive effect is expected to play a crucial role in the entrepreneurial ecosystem. For example, entrepreneurs need finances and a skilled workforce to start business. Higher proportions of skilled labour and ease in obtaining finance are expected to have positive effects on the performance of entrepreneurs. The accessibility to low cost formal financing is an important determinant of the survival and growth of new firms (Beck et al., 2008). Basic infrastructural support facilities are required right from the beginning. Thus, resources including infrastructural support, access to finance, an educated workforce, stable political conditions and a competitive market can be called a group of physical conditions necessary for entrepreneurial activity. Thus, regions rich in these physical conditions are expected to attract and retain more entrepreneurs as compared to others requiring investment in these non-productive areas for a new business (Kenney and Patton, 2005).

The interaction of the institutional framework and physical conditions create an entrepreneurial ecosystem which is shown in the Figure 2.7. The insights from previous literature are used to determine different components of the entrepreneurial ecosystems, and more importantly, it provides a causal path for understanding how the institutional framework and physical conditions are related to each other and affect performance. It is important to note that these components are used as a starting point. Other researchers are expected to contribute a revised list of components and their interactions. Moreover, entrepreneurial ecosystems can be different in different regions, therefore, it is important to look for different compositions.

The path diagram in Figure 2.7 shows the effect of the institutional framework and physical conditions on the entrepreneurial performance, and a feedback mechanism is shown

through the effect of entrepreneurial performance on the entrepreneurial ecosystem. The measurement of the feedback mechanism is, however, beyond the scope of this study, as no such data is yet available.

Figure 2. 7: Entrepreneurial Ecosystem of LMICs



The effect and significance of these factors is expected to be different in developed and developing countries, and so will be the priorities of the governments. Thus, it is important to at first acknowledge that entrepreneurship is different in developing countries due to difference in the environment in which they operate. Therefore, studying the entrepreneurial ecosystem of LMICs will reveal interesting, and possibly contrasting findings in comparison to research studies carried out in the developed world. The discussion on how

these components contribute to explain the entrepreneurial ecosystems and what are findings of existing studies about these components is given in the following sections.

2.3.1 Institutional Framework

The effect of the institutional environment is substantially higher on new entrepreneurs as compared the established firms. Weak institutions compel the entrepreneurs to engage in corrupt practices for survival in the market (Vorley and Williams, 2016). Perception about the efficiency of formal institutions is shared quickly among other members of a society. The entrepreneurs in societies with a shared belief about the efficient functioning of formal institutions have a higher probability of taking risks and implementing their innovative ideas than their counterparts (Aoyama, 2009).

An economy with a weak institutional framework, not only significantly affects the existing entrepreneurs, but also affects the investment decisions of prospective entrepreneurs (Sautet, 2013). Weak institutional framework conditions make it difficult for entrepreneurs to exploit the business opportunities due to the risk of *ex-post* transaction costs through uncertain taxation or corruption (Sautet, 2013). Ukraine is an example of a country where institutional reforms have proved inefficient and turbulent, and constrained entrepreneurial activity (Smallbone et al., 2010).

However, it has now been argued that entrepreneurs do not merely follow the rules of game but also evade them and use political entrepreneurship to control the institutions. Henrekson and Sanandaji (2011) found that entrepreneurs are not only the recipients of institutional reforms but also perpetrators. Their findings also suggest that entrepreneurs abide, evade or alter the institutional requirements. Therefore, institutional change happens as a result of an interaction between entrepreneurs and institutions.

According to Henrekson and Sanandaji (2011) the "abiding" entrepreneurs adapt to the exogenous institutional requirements. They tend to change the institutions through creative destruction, for example by introducing new technology. On the other hand, "evading" entrepreneurs do not alter the existing rules of the game, but rather innovatively use the imperfections of the institutions. The most common illegal forms of such behaviour include tax evasion. One form of evasion is when entrepreneurs shift some of their business activity to the shadow economy to avoid compliance with frequent changes in tax policy (Smallbone and Welter, 2001). These evading entrepreneurs follow Burt's structural hole theory, to use institutional inefficiencies to their benefit. For example, they use their contacts or trace the right official and produce the right amount of bribe to get the work done (Burt, 1995). The third type of entrepreneurs are the "altering" entrepreneurs; they use lobbying and their political connections to bring about institutional amendments in their favour (Henrekson and Sanandaji, 2011). These behavioural responses suggest that it is the interaction of the entrepreneurs and institutions that will develop framework conditions for the entrepreneurial activity.

The effect of institutional framework conditions has been divided into formal and informal institutions. Formal institutions are measured through government regulations and taxation system, whereas informal institutions are measured through perception about corruption. The details about these components are given in following sections.

a) The Effect of Government Regulations on Entrepreneurial Ecosystems

Regulations have been introduced by successive governments to improve productivity while keeping the macroeconomic stability and removing the barriers to market efficiency in the microeconomic domain. The effect of market regulations can be both positive and negative. The positive effect of regulations comes through protection of property rights or protection from market failure, which is an indicator of improved economic performance. The negative

effect of regulations is that entrepreneurs have to spend money on compliance costs rather than investing in other productive areas.

According to the public interest theory of regulation by Pigou (1938), markets which are regulated by governments are less vulnerable to failure due to externalities but are prone to becoming monopolistic. Government regulations are meant for nothing else but protecting the public from market failures. The objective of government regulations is to ensure the maximum survival of eligible entrepreneurs, registered after screening for certain standardized entry requirements. It is assumed that these formally registered businesses have gained the confidence of the public and other business entities by fulfilling those public needs for which they were registered (Van Stel et al., 2007). Therefore, public interest theory implies a higher rate of survival, growth and maturity of businesses in a market through supportive government regulations (Djankov et al., 2002a).

In contrast to public interest theory, Tullock (1967) favoured public choice theory and presented an opposite perspective on the role of government regulations. He portrayed them as a means of reducing the efficiency of a social welfare process. According to him, regulations are not introduced to correct market failures, but for rent seeking and are negatively related with economic growth. In economics, regulations are considered as a source of achievement of social benefits, such as employee health, safety and access to products and competition in markets. The proponents of this view argue that the regulations are used for rent seeking, votes and bribes. The permits and other formal business registration requirements are only there to provide the legal power to the regulators, so that they can collect bribes for those issuing permits (Mcchesney, 1987; Murphy et al., 1993).

The positive side of this rent seeking approach is that bribes in exchange for permits can make the process of registration very efficient. This is referred to as the greasing the

wheel hypothesis. According to Hallward-Driemeier and Pritchett (2015), compliance of the prescribed procedure to get a driving licence can take a long time. However, if you could hire an agent, you can get it the next day, without even going to the testing centre. However, practically this is quite different for firms because at every step the toll collectors (politicians and/or bureaucrats) have different demands which make the process costly and inefficient. In addition, these toll collections do not go to government revenues and thus serve no purpose to the general public.

Stigler (1971) was among the early economists to undertake a cost-benefit analysis of government regulations. According to his theory of regulatory capture, the government is influenced by the industry to make business regulations and industry primarily initiates only those suggestions which are beneficial to them. The industry incumbents follow a rent seeking approach and usually the regulations are promoted to increase entry barriers for controlling competition in the market and increasing the profit of the existing businesses. Thus, most of the regulations align with the famous "red tape" theory of Bozeman (2000). According to red tape theory, administrators introduce excessive and unjustified regulations to ensure their power and manipulation. These regulatory burdens constrain business performance.

Djankov et al. (2002a) reported that in Italy entrepreneurs are required to pay US$3,946 and it takes almost 62 days in fulfilling the 16 procedures required for registration of a formal business. In Mozambique, it takes US$256 and at least 149 days to complete the 19 different regulatory requirements to register a formal business. In contrast, Canadian entrepreneurs are required to complete only two procedures and it takes two days and cost only US$280 to start a new formal business. According to the Doing Business Survey (2015), starting a business in OECD countries takes 9.2 days; in contrast, it will take 27 days on average in sub-Saharan Africa. Similarly, an application to obtain a construction permit takes

around 199 days in South Asia. Procedural delays and their compliance costs in developing countries make it difficult to follow the government regulations.

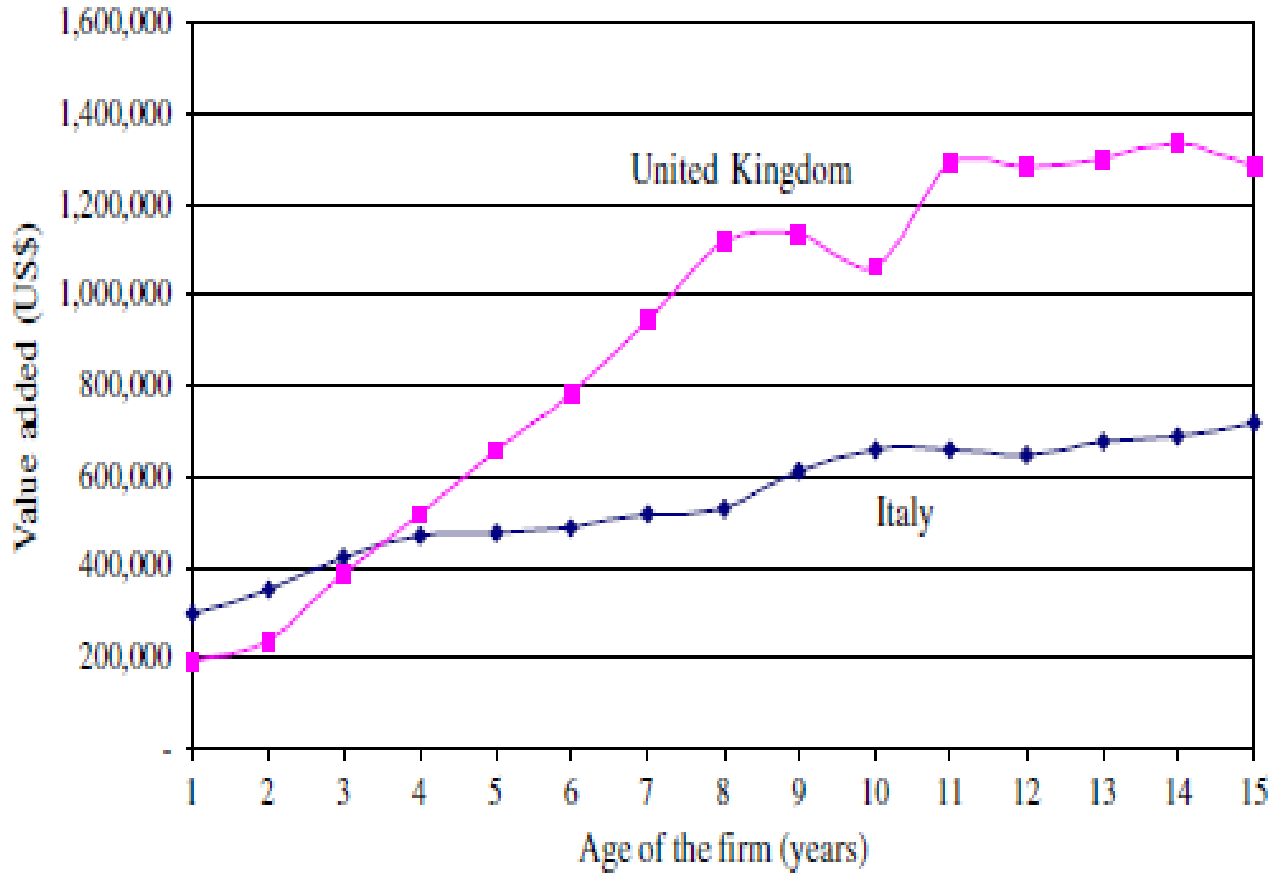
Eifert, Gelb and Ramachandran (2008) investigated the effect of indirect costs on the performance of manufacturing firms of African countries. The findings of the study suggested a statistically significant negative effect of compliance cost on firm performance of all sizes and ages. The study of Mexico by Bruhn (2011), showed a statistically significant positive effect of business regulation reforms on the level of entrepreneurial activity. The reforms in the package named Rapid Business Opening System, over the period 2002-06 for 103 municipalities, reduced the unnecessary regulatory burdens and the number days required to start a business from 30 to 2. In addition, a 1% improvement in the regulatory reforms is expected to increase the new business entry rate by 3% and the chance of an employee starting a new business by 6%. Thus, regulatory reforms are expected to help in removing the barriers to entry for new entrepreneurs.

Eifert (2009) investigated the impact of business regulations reforms in India from 2003-07. The findings of the study show a statistically significant positive effect on the contract enforcement and days required to register a business. A 10% improvement in government regulations is expected to decrease the contract enforcement period by 15 days and business registration period by 21 days. Thus, regulatory reforms not only make it easy to start a business but also reduce the compliance costs.

The study by Klapper et al. (2006) found that excessive firm entry regulations increase the cost of start-up and significantly reduce the number of new entrants especially in high entry rate sectors; they show that a 1% increase in entry costs is expected to decrease the rate of entry by 17%. Also, the performance of young SMEs decreases by 4% when the free market entry is prevented. Figure 2.8 shows that firms in Italy (with higher entry cost) start as

large in the early years, but their growth is much slower than firms in the UK (with low entry cost), where firm growth is twice as compared to Italian firms after 10 years in business.

Figure 2. 8: Age and growth of firms in Italy and the UK



Source: Adopted from Klapper et al. *(2006)*

Busse and Groizard (2008) used indicators from the World Bank Doing Business Survey for measurement of the government regulations and found that foreign direct investment (FDI) is significantly positively associated with GDP growth. The estimates suggest that 1% additional FDI due to improved business entry regulations is expected to increase GDP growth by 5.6%. However, 2.5% of that effect is eaten up by poor market entry regulations. Therefore, constraining market regulations not only nullify the direct positive

effects of FDI on economic growth, but also slow down the frequency of knowledge spillovers and technology transfers, thus negatively affecting economic growth.

The cost of regulations is born by both the public sector and the private sector. The bureaucracy has to bear the administrative cost of development, administration and implementation of market regulations. The private sector has to bear the financial as well as structural cost of regulations. This cost is sometimes in the form of capital investment when regulations require investment in fixed assets like ICT. Such costs of complying with business regulations by the private sector are labelled compliance costs (De Jong and Van Witteloostuijn, 2015).

The study by De Jong and Van Witteloostuijn (2015) used firm level data for 530 private enterprises in the Netherlands—a country which is often acknowledged for its better business regulations (Linschoten et al., 2009)—and measured their effect using the perception of managers. The findings showed that all three types of regulatory burden, including regulatory cost, regulation change and regulation inconsistency, exhibit statistically significant negative impacts on firm performance. Moreover, a 1% increase in regulatory burden disproportionately negatively affects the sales growth of medium sized firms by 15%, and young firms by 11%. Moreover, a 1% increase in inconsistency of government regulations is expected to disrupt market efficiency and reduces sales growth by 6%.

Regulatory burden also affects the ability of a firm to invest in R&D and innovative activities, because substantial amounts of resource are invested in compliance with regulations and other non-developmental administrative functions. Griffith et al. (2010) studied the effect of market deregulation on the profitability of firms in the EU. The findings pointed out that a 10% increase in deregulation is expected to increase competition in the market and reduced profitability of the firms by 25% and increase investment in R&D by 6%,

making it an attractive option for firms. Thus, it can be argued that if product market regulations are introduced in a perfectly competitive market to reduce the level of competition without making it closer to a monopoly, then it can increase the profitability of firms, and allow them to invest in innovative activities.

It can thus be concluded that regulations are an important component of the entrepreneurial ecosystem. Regulatory burden can play a significant role in the location decision of entrepreneurs as a relaxed regulatory framework attracts them. However, relatively few studies have tested the effect of regulations on firm performance in developing countries. Moreover, the LMICs vary in regulatory burden; therefore, it will be interesting to see how regulations contribute to their entrepreneurial ecosystems.

b) The Importance of Taxation in the Entrepreneurial Ecosystems

Every government relies on different types of taxes—property tax, income tax, consumption tax, corporate tax—for generating revenues. Since tax collections of different types from different sectors of the economy have different effects on growth, it is of utmost importance to choose the right mix. In the literature different tax reforms have been acknowledged for their different, but long-lasting, effects on economic growth.

Countries introduce changes in different types of taxes to have direct and indirect effects on economic growth. In knowledge-based economies, the changes in tax policies have been implemented for the promotion of innovation and the creation of entrepreneurship. In contrast, in newly industrialized LMICs, governments have changed corporate taxes to attract local and foreign investors.

The study by Giroud and Rauh (2015) investigated the effect of state business taxation policy on the investment decisions of firms operating in more than one state of the US. The data used in the study was obtained from the U.S. Census Bureau's Longitudinal

Business Database, the Census of Manufactures and the Annual Survey of Manufactures. The data regarding state taxation policy was obtained from the Michigan Tax Database and Tax Foundation. The findings showed that a 1% increase in the corporate tax rate is expected to reduce the level of investment by 3% for each firm. Moreover, due to increases in taxes, business owners shifted their investment to the other states with relatively lower tax rates. However, there is also a possibility that high taxation will allow governments to invest more in the welfare of the region, which improves the overall business climate and makes it more attractive for business activity.

Policy makers also use tax incentives as a tool to attract investors. Developed economies have introduced targeted tax incentives for definite time periods, usually through reduction in income tax. On the other hand, developing countries offer tax incentives for both targeted and general reasons. The outcomes of these incentives have been mixed. Therefore, some countries have curtailed their programmes whereas others have reintroduced them (Zee et al., 2002). However, generally speaking, developing countries are today engaged in intense competition with each other in seeking to lure foreign firms through tax privileges. It is argued that despite potential reduction in tax revenues, for instance, due to tax rebates to the foreign firms, the FDI through this activity still offers benefit to developing countries.

The findings of the study by Hajkova et al. (2007) showed that labour taxes have a statistically significant negative impact on FDI, when compared to different types of corporate taxes. A 1% increase in labour taxes is expected to decrease the FDI by 4%. It is argued that labour taxes increase the costs of labour which discourages foreign investors looking for the benefits of low cost labour. Djankov et al. (2010), studied the effect of an effective corporate income tax rate on investment, R&D and entrepreneurship in 85 countries. The findings of the study showed that corporate income tax has a statistically significant negative effect on investment in the private sector, FDI and on the level of entrepreneurship

in a country. A 10% increase in the average of effective corporate tax rate in the last five years will decrease the investment, FDI and entrepreneurial activity by 25%, 22% and 20%, respectively. The results are robust when control variables for value added tax, sales tax and property tax are introduced to the model. Further analysis indicates that a 10% increase in the statutory corporate tax rate will result in a 2% decrease in investment as a percentage of GDP.

According to Johansson et al. (2010), corporate taxes can decrease TFP for the following reasons: 1) higher corporate taxes hinder the firms from investment in productive sectors and lead to a re-allocation of resources to non-corporate sectors with less productivity. 2) the complexity in corporate taxes can increase compliance costs, which deters firms from investing in productive activities, thus reducing the efficiency and productivity. It also increases the administrative workload of the government; 3) the high corporate tax rates discourage investment in R&D activities, since the financial benefits after tax payments will possibly be unattractive; and 4) the transfer of the latest technology and knowledge spillover from foreign to domestic firms is affected by high corporate tax rates as it discourages FDI.

Moreover, the rise of globalisation and increased capital mobility in today's digital age has increased the effect of taxation on the location decisions of foreign firms (Da Rin et al., 2011). Studies have shown that taxation systems can influence the investment decision due to the difference in pre-tax and post-tax profits. Firms need to invest time and money for compliance with tax policies, in addition to what they have to pay as tax on profit, because the tax policies are usually complicated. Therefore, an overall tax cost can stifle the level of entrepreneurship (Braunerhjelm and Eklund, 2014; Reynolds and Rohlin, 2014). However, due to uncertainty about the tax differences, the response of firms has been mixed (De Mooij and Ederveen, 2003; Devereux and Freeman, 1995; Hines, 1999).

Cullen and Gordon (2007) used individual tax return data to investigate the effect of taxation on the general behaviour of individuals, and on entrepreneurial risk-taking behaviour in particular. The study focused on how differences in income tax and business income tax, as well as other aspects of tax policy, affected individual behavioural outcomes. The findings showed that increases in tax rates had a negative effect on entrepreneurial risk-taking behaviour of individuals and decreased it by 6%. Thus, increases in taxes can negatively affect the level of entrepreneurship in a country.

Johansson et al. (2010) have investigated the effect of taxation on firm performance and economic growth in OECD countries. The findings based on country, year and industry fixed effects indicated that a 10% increase in corporate tax reduced the investment by young medium sized firms by 40%, which is relatively high as compared to a 34% reduction in investment by small firms. Similarly, a 10% increase in corporate tax rate will decrease the investment by medium sized older firms by 10% which is marginally higher than the 8% reduction in investment by small old firms. Also, increase in corporate tax reduces the productivity of medium sized young firms by 2.8% and medium sized old ones by 3.6%. Thus, it can be concluded on the basis of these findings that corporate tax has a statistically significant negative effect on all firms but it is more challenging for the medium sized and old firms.

Mayende (2013) found statistically significant positive effects of tax incentives on the performance of firms enjoying tax incentives in Uganda. A panel data of manufacturing firms was analysed using generalized least squares regression estimation. The results showed that tax incentives have improved both sales and manufacturing value added by 8%. The effect of tax incentives was greater on the sales of large firms which improved by 8.5% as compared to a 4.5% improvement in sales for medium sized firms. Thus, the tax incentives had a

positive and statistically significant effect on the performance of all firms, but large firms derived the most advantage.

In summary, studies of the effect of taxation on entrepreneurship and economic growth have presented mixed findings but generally endorsed the negative effect of taxation. However, the findings of these studies were based on either a small sample of countries, or most importantly, ignored the impact of the overall business environment within a country. Omitting these variables is likely to result in biased estimates and an exaggerated effect of tax on investment decision making. The investment decision is usually based on a mix of different structural and policy factors. Although tax is an important component of the entrepreneurial ecosystem, it is only one component. Therefore, it is important to see the effect of all the components of the entrepreneurial ecosystem in tandem as well as individually.

c) The Importance of Control over Corruption in Entrepreneurial Ecosystems

Corruption has been a widely discussed topic in the literature. It is considered as both positive and negative. The positive side of corruption is proposed as a "greasing agent" in the rigid and inefficient bureaucratic procedures or as a "substitute price" for efficient allocation of market resources (Huntington, 1968). It is perceived to be negative when considered as unofficial taxes which never reach the government revenues. However, in reality it is much worse than that. Corruption not only deprives a government from important revenues but it also results in uncertain, unethical and often illegal contracts with high transaction costs, which cannot be pursued by the public in the courts (Shleifer and Vishny, 1993). Therefore, despite the 'positive' views of corruption, it has been widely shown to be detrimental to economic growth.

Corruption has been defined in a number of ways by academics, practitioners, regulators, development agencies and donors. Most of these definitions are very broad in nature and some are also very vague. Shleifer and Vishny (1993) defined corruption as "the sale by government officials of government property for personal gain" (p.108). Transparency International defines corruption as "the misuse of entrusted power for private gain". The World Bank has broadly defined corruption as "the abuse of public office for private gain". Due to its widespread incidence and perceived importance, a number of measures of corruption have been devised including the Corruption Index by the World Bank, Corruption Perception Index by Transparency International and the Ethics and Corruption Index as part of the Global Competitiveness Index produced by the WEF.

Corruption can be differentiated on the basis of purpose and breadth of corruption. State level corruption could be intentional, by bribing for changes in the content of laws and rules. The informal payments made to public officials and bureaucrats for taxes, licenses, permits, customs and other public services is called administrative corruption (World Bank, 2000). In this form of corruption, the officials who are gate keepers of government property like permits, licenses, etc. sell them for their personal benefits. In most cases the permissions are of the kind that without which business activity cannot be started (Shleifer and Vishny, 1993). The most common form of corruption is bribery in which the public official demands informal monetary or non-monetary payments to perform a legal or illegal task (De Rosa et al., 2010).

The study by Gonzalez et al. (2007) used firm level survey data of 33 African and Latin American countries to measure the incidence of corruption. Despite variability in the response of firms within each region, there is a 3% greater probability for a firm in Africa to be asked for a bribe as compared to a firm in Latin America. In addition, a 10% increase in ease of doing business is expected to decrease the demand for bribes by 6.5%. In his study on

Asian firms, Wu (2009) found corruption playing a significant role in determining the success of the organization. The results of this probit model suggested that small firms are 38% more likely to bribe officials as compared to larger firms. Also, a 10% increase in the competition in the market increases the probability of offering bribes by 7.3%. In cases of intensified bidding wars, firms are not only victims of high rates of corruption but they are also perpetrators of the corruption because of their high involvement in bribing the officials.

A more recent study by Blagojević and Damijan (2013) investigated the impact of corruption on firm performance in Central and Eastern Europe. The study used the Business Environment and Enterprise Performance Survey (BEEPS) for the period of 2002-09 for 27 transition economies. The results showed that with the improvement in government control over corruption after 2004, the involvement of firms in corrupt practices reduced sharply and firm performance improved by 6%.

Corruption could be widespread at the local government level in a country where it is strictly controlled at the central government level and vice versa. The US and India are good examples of widespread corruption at the local level, combined with efficient control at the central government level (Knack, 2007). Many Asian and African countries have been rated high in terms of corruption by Transparency International. Bangladesh, Myanmar and Somalia are among the most corrupt countries. This high level of corruption poses a serious threat to their economic growth by reducing FDI, distrust of people in government, lack of funds for public welfare and the retarded development of political institutions (Habib and Zurawicki, 2002; Mauro, 1995; Wei, 2000).

Corruption negatively affects business activities in two ways. Firstly, corruption payments increase the cost incurred on the production and selling of goods and services. Secondly, due to the additional bribe payments, the financial cost increases along with the

uncertainty about how much to pay (Fisman and Svensson, 2007). In countries where corruption is pervasive at grass root level, firms may have to pay bribes by all means if they want to get what they are even legally entitled to, and this is often the case in many LMICs. Here, firms believe that their bids for projects will not be opened on merit, and thus bribe the relevant officials to win the project and become part of the vicious circle of corruption.

The rate of involvement in corruption is the same for both small and large firms in countries with high level of corruption. However, the effect felt by the small firms is much higher and deeper as compared to large firms as the amount of bribes paid in proportion to the revenue is higher for small firms than large firms. Large firms have better political connections to avoid the bribe payments, whereas, small firms are considered as easy targets by corrupt officials (Svensson, 2003). Also large firms have well established procedures to avoid any fraud while small firms usually lack such internal protocols. Therefore, small firms usually have to be corrupt to keep themselves in line with the operating requirements in the market.

The study by Aterido et al. (2007) empirically tested the impact of investment climate variables on firm performance in 107 countries. The results of this study showed that corruption significantly affects the performance of SMEs. A 10% increase in corruption is expected to decrease the performance of medium sized firms by 26% and small firms by 13%. Analysis of the subset of exporter firms only showed that a 10% increase in corruption is expected to decrease the performance of exporters by 22%. Fisman and Svensson (2007) used firm level survey data to investigate the effect of corruption on the growth of firms in Uganda. The measure of corruption was aggregated with respect to location of industry to avoid the problem of endogeneity and measurement error. The findings indicated that a 10% increase in bribe payments in the region was expected to reduce the growth of all firms by 33% and foreign owned firms by 22%.

The study by De Rosa et al. (2010) used the BEEPS to investigate the effect of corruption on productivity of firms in 28 low income, low-middle income, higher middle income and high income countries. The results showed that a 1% increase in bribes is expected to reduce the productivity of all firms by 6% and medium sized firms by 5%. The negative effect of corruption on the productivity of medium sized firms was substantially higher than the 2.4% reduction in productivity of the large firms. The results were statistically insignificant with respect to the age of firm.

Governments and entrepreneurs need to play an important role in combating the daunting challenge of corruption through reforming institutions. Four models of interaction between entrepreneurs and government institutions have been proposed by Frye and Shleifer (1997). The first one, the 'invisible-hand model', suggested governments should have a lower involvement in decisions regarding the allocation of resources, and provide only law and order and legal services. It allows the entrepreneurial system to be sustained by learning on its own. This model is most favoured for the entrepreneurial ecosystem. The 'helping-hand model' on the other hand suggests some involvement of the government in regulating the markets and institutions to help nurture the entrepreneurial environment. The politicians and bureaucrats in this system have some powers and can possibly use it for limited and organized corruption. It is argued that politically well-connected large firms usually exploit this model for their own benefits. Also, this model is more suitable to politically mature and established economies. The extreme version of this is called 'the iron-hand model', which the authors suggest is used in Korea and Singapore. A fourth model is called 'the grabbing-hand model', which suggests a rent seeking approach of the government and bureaucrats. It indicates the massive government regulations allowing politicians and bureaucrats to do large and disorganized corruption. The legal system becomes corrupt and contract enforcement is

done privately by mafias. The role of government is perceived as oppressive in this model. This model usually prevails in politically unstable and least developed countries.

Corruption reflects the conditions of economic, political, cultural and legal institutions of a country (Svensson, 2005). It can be described as an outcome of a bundle of useful or harmful rules. Widespread corruption has thwarted the ambitious efforts of LMICs to provide enabling environments for new ventures. However, some emerging economies from this group have tasted success as well.

The earlier research efforts investigating the effect of corruption on firm performance have been affected by the lack of credible information on the incidence of corruption. The measures of corruption used in studies have been mostly based on aggregation of multiple macroeconomic indicators. The cross country survey databases are either based on opinion of a limited number of experts or households only, which do not truly reflect both the level of corruption and firms' experience of corruption (Gonzalez et al., 2007). Moreover, the study by Knack (2007) critically reviewed the aggregate macro level corruption measures and suggested the use of a single index and single source measure of corruption for methodologically accurate results. He has further suggested that studies investigating the effect of corruption on firms should prefer firm level responses over aggregate measures of corruption. Therefore, it is expected that our analysis using firm level data on corruption and its effect on the firm performance in LMICs will reveal interesting findings.

2.3.2 Physical Conditions

The physical conditions play a central role in making the entrepreneurial ecosystem encouraging for entrepreneurs. The success of any entrepreneurial ecosystem largely depends on the existence and interdependence of elements of physical conditions (Stam, 2015). For example, access to finance from formal financial institutions plays a crucial role in securing

investment for long-term projects with risk and uncertainty, and it plays an important role in the success of a promising entrepreneurial venture (Kerr and Nanda, 2009). Similarly, the availability of a skilled workforce is another important component for the success of an entrepreneurial venture. The presence of an educated workforce with diversity in skill-set not only improves the performance of existing firms, but also creates more business opportunities (Audretsch and Lehmann, 2005; Lee et al., 2004).

Moreover, infrastructural support plays a pivotal role in attracting new entrepreneurs and improving efficiency of existing firms especially in developing countries. The lack of infrastructural facilities necessary for doing business leads to non-productive investment in business, which increases both start-up cost and operating cost for business. Therefore, the existence of such support facilities is important for making an entrepreneurial ecosystem encouraging for entrepreneurs. Moreover, political stability and existence of informal sector are crucial for developing the trust of entrepreneurs. The consistency of policies and existence of formal economy enables the effective distribution of resources and flow of information related to business environment. Therefore, it is of utmost importance to focus on providing physical conditions for the success of the entrepreneurial ecosystem. The role of components related to physical conditions in the success of the entrepreneurial ecosystem is explained in the following sections.

a) The Role of Access to Finance in Entrepreneurial Ecosystems

There is long theoretical literature on the relationship between access to finance and firm performance. A number of studies have investigated the impact of financial constraints on the performance and growth of firms (Beck et al., 2005b; Cowling et al., 2016; Demirgüç-Kunt and Maksimovic, 1998; Galindo and Micco, 2007; Oliveira and Fortunato, 2006; Rajan and Zingales, 1998). One of the earliest studies in this area was carried out by Butters and Lintner

(1945). They found that small firms rely on internal financing for growth opportunities as it is extremely difficult for them to get external financing on favourable terms.

A more recent study by Ayyagari et al. (2008) used the WBES database and found the effect of access to finance on growth of firms to be the most robust among finance, crime and political instability. A 10% improvement in access to finance, crime and political instability was estimated to improve firm growth by 34%, 33% and 22% respectively. The study further investigated the effect of these components on firms in LMICs. The findings show that access to finance and political instability are a significant problem for these firms, with a negative effect of 4% and 5%, respectively on firm performance.

In the literature, the effect of access to finance has been further investigated with respect to sizes and age of firms. The effects of financial constraints on the growth of firms are expected to be more severe for small firms in comparison to large firms (Angelini and Generale, 2008; Beck, 2007; Beck and Demirguc-Kunt, 2006; Beck et al., 2005b; Kuntchev et al., 2012). Beck et al. (2005b) found that the effect of limited access to finance on firm growth is statistically significant for all firms but higher in magnitude for SMEs as compared to large firms. It was estimated that a 1% improvement in access to finance will improve the growth of SMEs by 3.4% and 3.1%, but improvements in the growth of large firms will be 2.3%. Similarly, findings of Ayyagari et al. (2008), show that medium sized and small sized firms have exhibited 6% and 4% additional growth in comparison to large firms, with improvement in access to finance. According to Beck (2007), the probability of a small firm reporting finance as a major constraint on growth is 39%, whereas for large firms it is 32%.

Moreover, developed and developing countries have been compared for the effect of access to finance on firm performance, in a study by Aterido et al. (2007). This study used the WBES database to investigate the effect of the business climate on firm performance

covering the period 2002-06. The findings show that access to finance is a relatively more significant obstacle for the performance of small firms as compared to medium sized firms. A 1% increase in access to finance as an obstacle is expected to decrease the employment growth of small firms by 11% whereas for medium sized firms this decrease is 8%. Moreover, the estimates suggested that a 1% increase in obstacles to access to finance will reduces the employment growth of older firms by 4%.

Hallward-Driemeier and Aterido (2007) compared Africa with the rest of the world by using the WBES database to investigate the effect of access to finance, infrastructure and corruption on employment growth. They used both objective and subjective measures of access to finance, including the percentage of working capital financing by banks and the perception of owners on access to finance as an obstacle to doing business. The overall effect of improvement in access to finance was higher in the rest of the world when compared to Africa. A 10% increase in investment in private business activity is estimated to improve employment growth by 7% in the rest of the world, with only a 4% increase in Africa. However, their findings also showed that the comparative effect of improved access to finance is greater for small firms in Africa than the rest of the world. The further analysis showed that a 10% increase in financing through bank loans will decrease the employment growth of small firms in Africa by 3%, whereas the effect on small firms in rest of the world is statistically insignificant.

Subsidies have also been used as a tool for improvement in access to finance. There are however, mixed results on the success of this approach in developing countries. Oliveira and Fortunato (2006) in their study using unbalanced pooled data for Portuguese manufacturing firms for the period 1990-2001 found that small firms exhibit higher growth than medium and large firms when credit constraints are eased by the regulatory bodies through use of subsidized lending. A reduction in financing constraints by 1% is expected to

improve the growth of small firms by 4% and medium sized firms by 2%. Thus, state subsidies helped in softening the budget deficit by subsequently improving growth prospects.

Zia (2008) studied the effect of the export finance scheme on textile firms in Pakistan using pre subsidy and post subsidy data of firms. The findings pointed out that ineligibility for subsidized export credit negatively affected the sales of small firms. On the contrary, Banerjee and Duflo (2014) analysed the effect of financial subsidy policy by the Indian government, on small, medium and large sized firms in the period 1996-2002. The findings show that bank loan percentage for small firms decreased from 11% to 7%, whereas it increased for medium sized firms from 4% to 11%. The policy was later changed because of failure to achieve the desired increase in financing for small firms.

One of the reasons behind the mixed outcomes of subsidized financing has been the under-developed financial markets of developing countries. The financial institutions require high value collateral for granting loans, whereas the small firms extensively rely on intangible assets and this makes it difficult for them to secure loans, whereas medium and large size firms are in a relatively better position to secure loans in such circumstances due to possession of valuable physical assets. Moreover, large firms are well connected to administrative and political institutions and support any reform in the financial system that increases the fixed cost for firms and negatively affects the small firms' access to external finance (Greenwood and Jovanovic, 1990; Haber et al., 2003). The large firms are even against the reforms ensuring equal access to finance for all firms, because such reforms will diminish their competitive advantage over the small firms. The better access to finance improves the market since firms can compete on an equal footing.

Therefore, rather than providing subsidies to small firms, the efforts should be directed towards improving the financial system of the country to improve the survival and

growth of small firms. The financial development of a country improves the ability of small firms to secure loans. Beck et al. (2005b) investigated the effect of developed financial institutions on the access to finance for small, medium and large firms. The findings show that small firms gain the most advantage from the development of financial markets. Beck et al. (2008) indicated that development in financial systems has a disproportionately positive effect on small firms with improvement in their performance being 43% with a 10% improvement in credit to private business. This study is, however, based on the data of developed countries only.

It is the responsibility of institutions to reform the inefficient financial markets of LMICs. Due to inefficient financial institutions in LMICs, small firms have to excessively rely on internal financing, borrowing from friends and family, and private moneylenders (Carpenter and Petersen, 2002). The findings of studies by Beck and Demirguc-Kunt (2006) and Ayyagari et al. (2008) as reported earlier, indicated that financial constraints inhibit the growth of small firms in developed countries but more so in developing countries. Also, the studies by Rand (2007) on Vietnam, Paulson and Townsend (2004) on Thailand and Banerjee and Duflo (2014) on India found severe financial constraints faced by SMEs.

This constraining financial environment is destructive to the entrepreneurial activity. The limited access to finance is proving to be discouraging for not only the nascent entrepreneurs but also for the huge number of household businesses, which are often started in the face of necessity (Mazumdar and Sarkar, 2008). If these household businesses successfully expand they can significantly increase their productivity, and employ more skilled and trained labour from outside the family (Breman, 2010). However, the rate of transition from informal household business to a formal small and later large scale business is very low in developing countries, owing to the poor financial system. Therefore, it is of

significant importance that financial systems be improved to make the context supportive for the entrepreneurial ecosystem.

b) The Importance of Infrastructure in the Entrepreneurial Ecosystems

There have been a number of studies indicating the multi-pronged effect of infrastructure quality on different economic aspects of a country (Escribano and Guasch, 2005; Guasch, 2004; Reinikka and Svensson, 1999). Huge government investments and funding by aid agencies have been witnessed in recent decades for improvements in hard infrastructure including roads, ports and railways to reduce the logistics cost and improve connectivity. The World Bank in collaboration with the Multilateral Investment Guarantee Agency and International Finance Corporation have spent more than US$50 billion in the past decade on the development of the transport sector, and this investment is close to 12% of its overall expenditure in this period (Sequeira, 2013). The poor quality of infrastructure—roads, railways, communications, information technology (IT), electricity, water and sanitation and trade services—negatively affects business by increasing the transaction costs and reducing the competitiveness of the products. It also limits the access of the people to the market and supply of products to the people in distant markets.

However, the generalisability of the role of infrastructure in economic performance has been affected by ambiguous and sometimes contradictory results with little robustness. The reason behind these contradictory results has been endogeneity from three sources: 1) the use of proxies for infrastructure measurement; 2) omitted variables bias; there might be unobserved variables which are affecting the relationship between infrastructure and economic performance; and 3) the correlation between economic performance and infrastructure as improvement in economic conditions provides an opportunity for governments to increase spending on infrastructure.

Multiple studies have tried to resolve these methodological issues. Calderón and Servén (2004) have tried to control for endogeneity bias by using generalized method of moments (GMM) on panel data, and reported improved results. Fedderke et al. (2006) found that infrastructure investment and its outcomes happened simultaneously for South Africa. Fedderke and Bogetić (2009) controlled for endogeneity and undertook robustness analysis and found that infrastructure capital has a positive impact on the economic growth.

More recently, studies have reported that the quality of infrastructure not only affects the overall economic performance of the country but also firm performance. The positive effects of access to means of transportation on trade and income generation are comparatively more significant for developing countries (Atkin and Donaldson, 2012; Sequeira, 2013). Studies on Brazil, Mexico and Chile have found that improvements in infrastructure can result in improved firm productivity and exports (Escribano et al., 2009).

Mitra et al. (2002) used fixed effect regression models and found that government investment in infrastructure, including roads, railways and electricity has significantly positive effects on the total factor productivity (TFP) of all manufacturing firms of India, especially on those in food products, wood and furniture products and metal products. It has been estimated that an additional 10% investment in infrastructure is expected to improve TFP of Indian manufacturing firms in food products by 21%, metal products and parts by 39% and wood and furniture firms by 43%. The study used macro level indicators for the measurement of different components of infrastructure e.g. per capita industrial electricity consumption, length of road networks.

The study by Estache et al. (2005) used the World Bank indicators for the period of 1976 to 2001 for 41 Sub-Saharan African countries to investigate the effect of infrastructure on economic growth. They used the data from different sources of the Private Sector

Development and Infrastructure Vice Presidency of the World Bank to develop measures of infrastructure. The findings showed that existing infrastructural facilities have a negative effect on the total factor productivity (TFP) of firms, although recent investments in electricity generation, the extension of road networks and water supply have significantly positive effects on economic growth.

The LMICs lag far behind in all infrastructural facilities, which not only increases the cost of doing business but also negatively affects the competitiveness of firms. However, a number of studies have reported shortage of electricity and road/railway networks as the most significant issues affecting firm performance in LMICs. Fjose et al. (2010) found electricity to be the most significant obstacle in doing business, with more than 50% of businesses reporting it to be the most significant problem in Sub-Saharan Africa.

In a further study of African countries Escribano et al. (2010) also found that among infrastructure elements, electricity supply has a strong and statistically significant, negative, impact on firm performance. The contribution of electricity to average productivity of Zambia and Eritrea was found to be 68% and 49% respectively. Similarly, Moyo (2012) has found that power outages have negatively affected the productivity of Nigerian firms. It has been estimated that a 10% increase in hours of power outage is expected to reduce the productivity of all firms (small, medium and large) by 3.2%. The further analysis in this study compared small firms with large firms and found that a 10% increase in power outages duration (hours) is expected to reduce the productivity of small firms by 4%, whereas the effect is insignificant for large firms, probably due to their own power generation arrangements.

Kirubi et al. (2009) reported that the availability of electricity can increase the output of carpenters and tailors of rural Kenya by 100-200%. However, the study was based on a

sample of only 12 carpenter shops and 5 tailor shops, which could lead to biased results. Grimm et al. (2012) collected data from the informal tailors of Burkina Faso to investigate the effect of electricity use on productivity. The findings of the study suggested that tailors using electricity have 51% higher revenues than those with no access to electricity. However, the findings of the study are limited to the effect of using electric machines for sewing. It does not explain the effect of improved access to electricity or power outages on the productivity of tailors already using electric sewing machines.

The study by Scott et al. (2014) investigated the effect of electricity provision on TFP and per worker output for Bangladesh Nepal, Pakistan, Nigeria, Tanzania and Uganda by using the WBES database. The measure of the electricity infrastructure was the number of power outages in a month. The findings of the study show that power outages have statistically significant negative effects on the TFP of all the countries but the magnitude of this effect was highest for Uganda, Pakistan and Bangladesh. A 10% increase in power outages per month was expected to reduce the TFP of SMEs by 42%, 22% and 14%, respectively. Moreover, per worker output of SMEs was most significantly negatively affected in Nepal, Uganda and Bangladesh, where a 10% increase in the number of power outages per month was estimated to reduce output per worker by 28%, 13% and 9%, respectively. Thus, shortages of energy have a significantly negative effect on the performance of SMEs. It can be argued on the basis of these findings that improved infrastructural facilities reduce the logistics costs of business and allow businesses to invest in the latest machinery and advanced technology rather than investing in relatively unproductive assets like generators.

However, it is difficult to establish causality between electricity supply and firm performance due to the effect of many exogenous factors. In a review article, Attigah and Mayer-Tasch (2013) concluded that the use of electricity will not automatically result in

improved performance. However, if the pre-conditions, like access to the markets and improved infrastructure are met, then it may deliver the intended outcomes. The study by Bernard (2010) on micro-enterprises has reported the effect of electrification to be small but significant. The study by Scott et al. (2014) as mentioned above, found the overall negative relationship between electricity shortages and firm performance in Bangladesh, Pakistan, Nigeria, Nepal, Tanzania and Uganda. The manufacturing SMEs suffered significantly due to the poor energy situation in these regions. In contrast, the study of Senegal by Cissokho and Seck (2013) reported counter-intuitive results. They collected survey data from the firms regarding the scale efficiency and technical efficiency of the firms and power outages. Their findings show that performance of SMEs was significantly positively related with the power disruptions with a regression coefficient of β= .043. The authors argue that this situation could be the result of efficient resource management practices in the face of prevailing energy crises and the exit of non-competitive, inefficient firms from the market. However, the results could be different due to the use of different variables and measurement mechanisms. They constructed the measure of firm performance using a data envelopment approach on scale efficiency and technical efficiency.

The railway network is another important element of infrastructure. It has been considered the safest and cheapest long distance goods transport source for businesses. However, the impact of access to railways on economic performance is not conclusive. Banerjee et al. (2012) have found in a study of Chinese firms that the effect of railways on growth has been significantly positive but the magnitude of this effect is very small. A 10% improvement in railway networks is expected to increase the firm performance by only 2%. On the other hand, Donaldson (2010) and Jedwab and Moradi (2013) found that railways have not only significantly decreased the logistics cost of trade, but have also improved trade between different states within India as well as Ghana. Similarly, Sequeira (2013) conducted

a study of the effect of access to railway transportation, as a measure of infrastructure, on firm performance in South Africa. She used a difference-in-difference modelling approach and found limited gains for the firms that had access to a railway. A 1% improvement in access to railways is expected to improve firm performance by 5%.

The study by Escribano et al. (2010) on 26 counties in the African region used the Business Climate Survey database for the period of 1999-2005, and found that infrastructure problems including electricity and transportation are relatively important for firms in low income countries. In contrast, the firms in comparatively high income countries of the region are more severely affected by the customs and import and export problems.

To the best of my knowledge, most of the studies to date have focused on the direct effect of infrastructure investments on the economic performance of a country. There are very few studies which investigate the relationship between infrastructure and firm performance. Theoretically speaking, the improved infrastructure will be beneficial for firms. It will reduce the logistics cost, increase access to markets, increase access to highly skilled labour in other locations and increase competition (Datta, 2012; Graham, 2007; Holl, 2006; Kremer et al., 2013; Murphy et al., 1988). Thus, it can be concluded that infrastructure is likely to be a very important component of the entrepreneurial ecosystem. Good quality infrastructure improves the entrepreneurial ecosystem and makes it attractive for not only the new entrepreneur and high growth firms, but also generates other externalities that are beneficial for the entrepreneurial activity.

c) The Effect of Political Environment on Entrepreneurial Ecosystems

Economists and political scientists consider political instability as a factor that severely hampers the economic growth of a country. It results in rapid change or even discontinuation of long-term macroeconomic policies, hence providing sub-optimal economic outcomes. The

uncertainty caused by political instability plays a crucial role in investment by the private business sector. In the face of political instability investors prefer short-term investments with quick and high profits because long-term investments have a high probability of being held hostage with the change in the ruling party.

The findings of studies by Alesina and Perotti (1996) and Alesina et al. (1996) suggest that political instability negatively affects investment and hence decreases the share of investment in GDP. Alesina and Perotti (1996) used data on the socio-political instability of seventy countries for the period 1960-85 to investigate the effect of political instability on investment and ultimately income inequality. They found that Asia and Africa are the most politically unstable regions, whereas OECD member countries are politically the most stable economies. The regression estimates for the effect of political instability on investment in the private sector suggest that a 10% increase in socio-political instability of a country or region is expected to reduce investment in business activity by 45%.

Abadie and Gardeazabal (2003) conducted a study on the Basque region to investigate the comparative economic growth of the region under terrorist activities and used a peaceful region as a control. The findings suggested that, as a result of increased terrorist activities, the excess return over the risk free rate of return was 13% lower than the control regions, which were unaffected by terrorist activities.

Short-term speculative businesses dominate in countries exhibiting high levels of political instability through regime shifts. Business investors tend to decrease their fixed investments in machinery, equipment and land and prefer to keep their savings in some stable foreign currency, or in gold, for instance, which could retain its value (Aisen and Veiga, 2013; De Haan, 2007; Feng, 2001). Therefore, high exit rates are expected in politically vulnerable conditions. Collier and Duponchel (2013) used an employer survey conducted by

the World Bank in 2007 to investigate the effect of conflict and violence on the survival rate of firms in Sierra Leone. The findings showed that conflict and violence has significantly negatively affected the region with a 53% exit rate of firms during the period of conflict.

Camacho and Rodriguez (2013) studied the relationship between armed conflicts and firms' exit rate in Columbia. They obtained panel data of firms for the period 1993-2004 from the census of Columbian manufacturing industries, and measured conflicts using the rate of terrorist attacks per 100,000 of civilian population. The results of a fixed effect regression model indicated that the productivity of manufacturing firms decreased by 3% due to these armed conflicts. Moreover, a 1% increase in the number of attacks is expected to increase the exit rate of manufacturing firms by 5.2%.

Africa is rated as politically the most unstable region in the world. The political instability of the African region has proved to be a significant impediment to its economic growth (Jedwab and Moradi, 2013; Sequeira, 2013). The qualitative studies by Fosu (1992) and Gyimah-Brempong and Traynor (1996) have shown that political instability of the Sub-Saharan region has resulted in diminishing investment and economic growth. However the increasing investment of Shell in Nigeria has presented a new puzzle for researchers, given that Nigeria has been described as a country most difficult to do business in due to high levels of political instability. The study by Frynas (1998) pointed out that the increase in investment by Shell has been based on three different firm specific aspects of political instability. Firstly, Nigeria has been the most profitable place for Shell with the first mover advantage and dominant market position. The political instability of Nigeria has discouraged other oil companies from investment which has indirectly helped Shell to maintain its position in the market. Secondly, Shell has well established structural ties with all the political parties of the region. Thirdly, the strategic approach of Shell makes it neutral to the political instability in the external business environment of Nigeria.

Political Instability directly affects savings and investment patterns of both individuals and businesses, which are determinants of sustainable economic growth. In times of unstable political conditions, individuals tend to reduce their savings because in this uncertain environment their savings can possibly lose value with a change in government. Thus, there will be a decrease in demand for investment and the supply of financial capital will fall. Moreover, businesses are expected to face a decrease in profitability.

Guidolin and La Ferrara (2007) have studied the effect of the ending of a civil war in Angola in 2002 on its diamond mining firms. The findings of the study indicated that during the conflict period the regression coefficient for market return was β= 0.004, whereas after the end of the war the regression coefficient for market return decreased to β= -0.003, which means that the end to conflict resulted in 1.75% decrease in market returns for the firms. The sample however, consisted of firms enjoying concessions from the Angolan government during the political instability, and an unstable law and order situation. Therefore, with the improvement in security conditions, the government removed that concession, which negatively affected the market returns, rather than these being a direct effect of political instability per se. It can further be argued that instability can be beneficial to some well-connected firms.

Besides affecting the overall economy of a country, political instability also poses serious threats to the performance of the private business sector. It not only significantly negatively affects the decisions about future investment in the private sector but also decreases the performance of existing firms. The growth in revenues, access to finance, technology adaptability, the skill set of the labour force and the productivity of firms is severely affected by activities related to political instability.

Cerra and Saxena (2008) investigated the effect of financial and political crises on the productivity of firms in 190 countries for the period 1960-2001. They measured political crises through civil war and quality of governance. The data were obtained from the World Bank Economic Indicators, Polity International and Correlates of Interstate War Data. Using a fixed effect regression model their results indicated that war decreased the productivity of firms by 6% but the firms were able to recover from that loss after four years. The analysis of a subset consisting of LMICs indicated that the productivity loss due to civil war was 5%, but the firms were able to recover only 1% with a 4% loss sustained after the end of civil war due to the poor quality of governance.

Klapper et al. (2013) studied the effect of political instability on firms operating in Côte d'Ivoire in the period of 1998-2003. The data for the population of registered firms was obtained from the National Statistics Institute of Cote d'Ivoire, and armed conflict was measured using number of armed conflicts per 100,000 civilians. A fixed effect regression model by controlling for region, year and industry was used in this study. The findings show that political instability and unrest decreased the overall productivity of firms by 11% and the productivity decreased by a further 5%, if there were foreign employees in the firm. This political instability also significantly reduced the size of the market by 30%.

The most threatening form of political instability is civil war and terrorist activities. Collier and Duponchel (2013) found that during times of conflict and violence in Sierra Leone the revenues of firms decreased by 6%. The persistent violence and conflicts also affected the skill development of the labour. The findings however, covered only those firms that survived the war. It is logical to expect that many firms would have left the market due to the war. Therefore, the absence of data on those firms can create potential bias in the results.

Petracco and Schweiger (2012) studied the effect of armed conflicts on firm performance in the face of conflict between Georgia and Russia in 2008. The WBES data on firms for before and after the conflict period were used. The first round of the survey took place in 2008 and finished just a few days before Georgian troops were deployed to South Ossetia and Russia initiated bombardment on Tbilisi. The second round was started in 2009 and the participating firms were then able to indicate the effect of conflict on their performance. A difference-in-difference model was used to analyse the effect of armed conflict on the firms' performance in the affected cities. The data were divided into different panels to separately test the effect on firms of different sizes and ages. The estimates suggested that sales of all firms decreased by at least $24,595 due to this conflict. The sales of large firms had the larger decrease, with a reduction of at least $1,530,169, whereas for SMEs the effect was insignificant. The conflict decreased the exports of young firms by at least $65,070. The sales growth of small and old firms was unaffected by the conflict. The effect of conflict significantly negatively reduced the employment growth of large firms by decreasing 2 employees per firm on average. Thus, it can be argued that medium and large sized young firms were most significantly affected by the political conflict.

On the basis of the studies above it can be concluded that political conditions of a country play an important role in determining the nature and level of entrepreneurship. The studies on the impact of political instability on firm performance have in general found a negative effect on the productivity and growth with the exception of firms that have good political connections. Since SMEs are usually less politically connected, they are expected to face negative consequences rather than benefits.

d) The Impact of Workforce Education on the Entrepreneurial Ecosystems

The skill enhancement of the labour force has historically remained, and will continue to be, a central point in government policies across the globe. According to Neave (1989), after

World War II western governments invested heavily in education, on the assumption that it can significantly reduce social inequalities and improve economic performance. This thinking gave rise to the trend called the “social paradigm of education”.

In early studies by Schultz (1961), Becker (1962) and Mincer (1962) the positive correlations between education and economic growth were demonstrated empirically. However, later studies by Arrow (1973) and Cain (1976) showed that this relationship was statistically insignificant, and in some instances improved human capital could lead to economic problems, such as a high percentage of educated but unemployed workers. Therefore, the level of government investment in education continues to remain controversial.

Nevertheless, with the emergence of endogenous growth theory in the 1980s the importance of human capital as a determinant of economic growth was reaffirmed. This theory proposed an endogenous effect of education and technology on the productivity and performance of employees. Studies based on endogenous growth theory later empirically demonstrated a positive relationship between education and economic performance (Benhabib and Spiegel, 1994; Blundell et al., 1999).

Early studies focused more on the macroeconomic effects of education. However, more recent ones have pointed out that education not only affects economic growth, but it is also positively associated with firm performance (Psacharopoulos and Patrinos, 2004). It has also been argued that improvements in human capital can offset the competitive advantage gained through physical assets (Griffith et al., 2004; Youndt et al., 2004).

Furthermore, institutional theorists have investigated the effect of education at the regional level, and they show that a more literate population is positively correlated with the level of entrepreneurship. Areas with high literacy rates have a higher proportion of their

labour force as entrepreneurs (Doms et al., 2010). In addition, educated entrepreneurs are more likely to survive, earn higher profits and succeed in competitive markets. Therefore education plays a significant role in entrepreneurial success.

The study by Bosma et al. (2004) investigated the effect of investments in human capital on firm performance. They use longitudinal data for 1994 and 1997, based on a questionnaire completed by Dutch entrepreneurs. Firm performance was measured in terms of survival, profitability and employment growth, whereas human capital was measured in terms of education level. The findings of the study show that a higher level of education of entrepreneurs is expected to increase the profitability of firm by 2.5%. Moreover, for entrepreneurs with a higher level of education and greater experience in the industry, the chance of survival of the firm increases by 5%, profitability by 6.2% and employment growth by 4.9%.

The studies focusing on the effect of the educational level of employees on firms adopted a resource based view of strategic management, which proposes that organizations are a mix of valuable resources (Barney, 1991). Among these bundles of resources, human capital is unique, valuable, scarce and non-substitutable, which helps organizations in retaining their competitive position (Lado and Wilson, 1994). The theory of human capital suggests that knowledge, skills and abilities possessed by individual employees are unique, scarce and have economic value for the organization (Tsang, 1987). The non-substitutability of these abilities and skills requires organizations to spend considerable resources on acquiring, development and retention of these human resources (Mahoney and Pandian, 1992).

Alvarez and Lopez (2005) analysed the effect of skilled labour on the possibility of SMEs to start exporting. They used the data of SMEs in manufacturing from the Annual

National Industrial Survey of Chile for the period 1990-96. The findings showed that an increase in labour skills has a statistically significant positive effect on the possibility of a firm to start exporting. A 10% increase in skill-level of the labour force is expected to increase chances of firms starting exporting by 27%. Moreover, the improvement in the skill-level of the labour force has also a positive effect on the TFP of firms.

Doms et al. (2010) used panel data for 4000 newly established US firms to investigate the impact of workforce education on the performance of entrepreneurial ventures started after 2004. The findings of the study showed that with the addition of one more graduate worker the revenues and profit of the firms increased by 5%, and an additional employee with a college degree resulted in a 4% increase in revenues and profit. Similarly adding an employee with a college degree, or a graduate, increased the chance of survival of the firm by 20%. These findings also suggested that educated entrepreneurs prefer to start their business in metropolitan areas, with a higher percentage of skilled workers, and the rate of success of such entrepreneurs is higher than those starting a business in a region with low literacy levels.

Technology has become more skill biased since the 1970s. Rapid technological developments, due to industrialization, have increased the demand for skilled workers (Falk and Seim, 2001). However, lack of skills to operate the technology has resulted in lower productivity of workers in developing countries, as compared to those in developed countries with better human capital (Goldin and Katz, 2009). Therefore, it is now more than ever important to start a business in areas of LMICs, with a readily accessible educated workforce. Hence, besides being educated themselves, entrepreneurs will benefit more if the local workforce is also skilled and educated.

Oyelaran-Oyeyinka and Lal (2006) investigated the technology adoption of workforces of SMEs in Nigeria, Uganda and India. The findings of the study suggested that

informal and on the job self-learning of new technology was preferred by the workforce, however, formal training overseas has also a statistically significant positive effect on technology adoption of the workforce. Moreover, self-learning by searching from the internet is expected to increase the understanding of management information systems by 7%.

The study by Banker et al. (2008) investigated the effect of workforce education on the profitability of firms in the IT sector of Taiwan. The findings showed that the level of education of a firm's employees and investment in R&D activities have significant positive effects on the profitability of IT firms. It was estimated that a 10% increase in the level of education of the workforce will improve the profitability by 10%, whereby a 10% increase in investment in R&D activities will result in a 4% increase in profitability. Moreover, the interaction effect between education and R&D investment indicated that firms investing in training and development of employees are 18% more profitable by taking advantage of their investment in R&D activities.

Galindo-Rueda and Haskel (2005) combined data obtained from the Annual Business Inquiry and Employers Skill Survey for businesses in the UK to investigate the effect of education on the productivity of firms. The results showed that the addition of an employee with a graduate or high-vocational qualification is expected to improve the productivity of the firm by 3.1%, but this is especially beneficial for manufacturing firms, with an improvement in productivity being 6%. The further analysis revealed that individuals with these qualifications and working in the services industry earn 6.2% more than equally qualified individuals working in the manufacturing industry. The study further argued that education level of the workforce has directly benefited both workers and the organizations, and indirectly it improves the regional development prospects.

The workers acquire skills through training and education which increases their wages and improves productivity of the organization. The interaction of educated workers, competitors and customers raises the level of competition among organizations of that area. In addition, it also increases the organization's technology adaptability. On the other hand, the higher ratio of educated workforce in a region increases the chance and frequency of knowledge spillovers. Such externalities play a significant role in individual and social wellbeing and improve organizational performance. Thus, level of education of a region plays a significant role in providing a supportive environment to entrepreneurs for their survival and growth. In developing countries, there is a dire need of human capital development, especially in areas with fewer educational opportunities to avoid saturation in already developed areas.

e) The Role of Competition with the Informal Sector in the Entrepreneurial Ecosystems

In the literature, formal and informal businesses have been defined in multiple ways and the debate is yet not concluded. However, the most common component of all the definitions of informal businesses is that they are non-registered. Therefore, only registered firms are considered as formal businesses and non-registered ones are considered as informal in this study.

Moreover, it is very difficult to obtain representative samples of data for the informal economy. For example, in a recent effort to collect data about the number of enterprises in 132 countries, only 16 countries were able to share estimates about the informal economy and accuracy of data is doubted by the researchers (Kushnir et al., 2010). Moreover, the differences in the definition of the informal economy make it extremely difficult to include the informal sector in any analysis. Nevertheless, the considerable employment contributions of the informal sector in many countries cannot be ignored e.g. in India there are 26 million

informal micro SMEs (MSMEs) as compared to 1.6 million registered ones (Kushnir et al., 2010). Hemmer and Mannel (1989) found that informal businesses trained more individuals than the apprenticeship schemes of the government and formal education system in developing countries.

Some neutral observers have assessed the value of the global informal economy to be more than $9 trillion, and around 4 billion people are associated with it. In some countries the informal economy is as large as 70% of GDP e.g. Nigeria, Egypt and Thailand (Schneider, 2005), while in some others it is more than 50% of GDP e.g. Mexico (Eilat and Zinnes, 2002). The most frustrating fact is that, despite rigorous reforms in the business environment across the globe, the informal economy is growing every year (Loayza and Rigolini, 2006; Schneider, 2005). This has not only affected states' abilities to control poverty and unemployment but also tax revenues are lost, which has then impinged on the provision of services to the general public. The findings of a study by Besley and Persson (2014) suggest that high income countries have 17.4 percentage point higher share of tax in their GDP in comparison to low income countries.

The losses in revenues have forced the number of LMICs to depend on loan and aid provided by development agencies despite having made commendable efforts to improve their business environment in the last decades. They have introduced a number of reforms in this regard. However, they have yet to resolve several daunting challenges, with formalizing the informal economy being the most important among them. The majority of micro-level businesses in these countries are reluctant to formally register themselves as a business entity or a tax payer, and prefer to operate in the informal economy. However, firms operating in the informal economy remain unable to achieve their maximum economic potential because they cannot use legal, financial and marketing benefits offered by the formal economic system (Zinnes, 2009).

The study by Williams et al. (2017) investigated the impact of experience of firms in the informal economy on their performance after registration. The firm level data for 127 developing countries were obtained from the WBES. The findings showed that sales growth of registered firms which started as unregistered was 14.5% higher than those that had started upfront as registered firms. Moreover, the employment growth of these firms was 31.6% higher than firms that had started out as a registered business.

In a similar study on Turkish firms by Williams and Kedir (2017b), the findings suggested that formal businesses with experience of the informal economy had 13% higher sales growth as compared to formal businesses with no experience of being informal. Thus, experience of the firm in the informal economy in the beginning of a business contributed positively to performance as a formally registered business.

Also, the existence of a large informal economy encourages new entrants to stay outside of the regulations of government, which hinders the ability of the government to shape a macroeconomic environment through policy reforms. As reported by Maloney (2004), the informal economy of newly industrialized countries is an entry point for unskilled youths who can establish informal small businesses. However, policies should be aimed at getting these informal firms into the formal economy after learning in the early years, otherwise they cannot grow.

The study by McCann and Bahl (2017) analysed the effect of competition with the informal sector on the new product development by registered firms. The data of 30 East European and Central Asian countries from the BEEP survey by the World Bank was used for analysis. The findings suggest that a 1% increase in competition with the informal sector is expected to increase the likelihood of new product development by the formal sector by 14%.

Figure 2.9 describes the typology and kinds of businesses based on the degree of informality (see Djankov et al., 2002b). According to this model, the business owners in the subsistence enterprise group usually lack skills, education and capital, therefore, there are slim chances of their growth. This raises very important policy questions for the regulators of the entrepreneurial ecosystem; can this group of business owners be ignored or can special policies be introduced to bring them into the formal network?

Figure 2. 9: Typology of the degree of enterprise informality

	Least dynamic			Highly dynamic
	Completely informal			Partially formal
	Informal economy			Formal economy
		Unofficial enterprises		
Characteristic	Subsistence enterprises	Mostly unregistered	Mostly registered	Official enterprises
Degree of Informality	100 percent	High proportion of sales undeclared and workers not registered	Some proportion of sales undeclared and workers unregistered. May use outside the official purview (e.g., Internet to deliver software)	
Type of activity	Single street traders, cottage/micro enterprises, subsistence farmers	Small manufacturers, service providers, distributors, contractors	Small and medium manufacturers, service providers, software firms	
Technology	Labor intensive	Mostly labor intensive	Knowledge and capital intensive	
Owner profile	Poor, low education, low level of skills	Poor and non-poor, well educated, high level of skills	Non-poor, highly educated, sophisticated level of skills	
Markets	Low barriers to entry, highly competitive, high product homogeneity	Low barriers to entry, highly competitive, some product differentiation	Significant barriers to entry, established market/product niche	
Finance needs	Working capital	Working capital, some investment capital, supplier credit	Investment capital and working capital, letters of credit, supplier credit	
Other needs	Personal insurance, social protection	Personal and perhaps business insurance	Personal and business insurance, business development services	

Source: Adopted from Djankov et al. *(2002b:p.4)*

The structural holes in the institutions allow registered large firms to hide a proportion of their sales and mis-report the size of their permanent workforce. These irregularities can be countered through neutral external auditing processes. The middle group consists of SME owners who are more educated and skilled than subsistence enterprise owners. This group of business owners consist of contractors, small manufacturers to whom large firms outsource their activities. This group of entrepreneurs has maximum potential compared to the rest of the firms in the informal economy.

The decision-making regarding the choice between the formal or informal business options is affected by three things. Firstly, the presupposition that being formal is an option indicates the weakness of the legal framework conditions of the business environment of the country. Secondly, the quality of information possessed by the decision makers affects the choice they make. In regions where information about registration requirements is not properly advertised and entrepreneurs mostly depend on hearsay information, the decision to be formal or not will be biased. Thirdly, the decision to formalize depends heavily on the household structure of the entrepreneurs because usually it is a mix of agents from business and family that makes this decision.

A study of Nicaragua by Sutter et al. (2017) used the data of 1800 dairy farmers, who had transitioned from informal businesses to formal registration. The findings of the study suggested that successful transition depends on the facilitation of the formal institutions responsible for registration. These institutions should play a facilitative role to attract entrepreneurs from the informal economy. However, this change in the approach can happen only through reforms in entry regulations.

There are a number of implicit costs of formalization, however, the explicit cost of registration include taxes, labour market regulations and production and product regulations.

Also, there are costs of specific licenses and permits imposed by the sub-national governments. Most of these registration costs are fixed and more taxing for small firms as compared to large ones. Therefore, most of the small enterprises intentionally underperform to remain undetected by the inspection teams and tax collectors.

The benefits of formally registering a business and following regulations include improved access to external financing, protection of ownership and property rights and access to markets and services. The tax rebates and government subsidized funding for small businesses usually require them to be registered. Also, more relaxed financial terms and conditions are offered by the banks to facilitate registered SMEs (Zinnes, 2009). Therefore, instead of relying only on family and friends for investment in business, the formalization can expand their financing opportunities. Training and business development programs funded by governments, development agencies and international donors are also targeted at registered businesses. Registered firms enjoy security of their property rights, which enables them to protect their trademarks, licenses and contracts, and helps them in dispute resolution through a judicial system within country.

Nevertheless, the formal business sector presents important benefits to both society and enterprises. The taxes and fees paid by firms in the formal economy to the local government and national authorities can be used for development purposes. On the other hand, as mentioned, formally registered firms have better access to finance, import/export markets and legal protection. Therefore, cost-benefit analysis to aid decision-making enables policy makers to highlight those features of formalization that can play a significant role in motivating business owners towards formal registration. The entrepreneurial ecosystem reforms should be aimed at reducing the costs associated with the registration of a business and also other further compliance of government regulations. The benefits of business

registration should be increased through protection of property rights, access to finance, legal protection and dispute resolution.

2.4 Summary of Literature Review

The literature related to performance of SMEs and the entrepreneurial ecosystem and its components has been reviewed in this chapter. The findings of the literature review are summarized below:

- The definition of SMEs by the WBES has been adopted in this study—firms with 5-19 employees are defined as small firms and firms with 20-99 employees are considered as medium sized firms.
- The growth of SMEs is dependent on both internal (resource based view) and external factors (institutional theory). This study follows the most recent approach by analysing the firm performance from external environment perspective called the entrepreneurial ecosystem approach.
- There are different measures of firm performance including profitability, efficiency and growth. However, the growth dimension is most relevant to the research based on the effect of the external environment on firm performance. The growth dimensions including annual sales growth, annual employment growth and annual labour productivity growth have been used in this study to measure firm performance.
- The entrepreneurial ecosystem is an environment in which entrepreneurship takes place and its individual and interdependent factors enable or constrain the entrepreneurial activity. This approach draws from entrepreneurship theory, institutional theory, innovation systems theory, industrial clusters and districts and regional economic geography.

- According to institutional theory, institutions (formal and informal) decide the rules of the game and make the environment constraining or conducive for the entrepreneurs. The role of institutional framework conditions in an entrepreneurial ecosystem is assessed through government regulations, taxation system and corruption.
- Physical conditions are the backbone for the success of any entrepreneurial ecosystem. The effect of physical conditions is examined using access to finance, infrastructure, political stability, informal sector and workforce education.
- The interaction and interdependence of components of institutional framework conditions and physical conditions make the entrepreneurial ecosystem. The entrepreneurial ecosystem can vary across time and space, therefore, bottom-up approach suggested by Daniel Isenberg is most appropriate for assessment and improvement in existing entrepreneurial ecosystems.
- The local entrepreneurial ecosystem is not just meant for local interactions; rather its interconnectivity with other regional and national entrepreneurial ecosystems is essential for promoting it. Thus, the success of the entrepreneurial ecosystem approach relies heavily on how governance structures allow the flexible recombination of the already existing resources for promoting entrepreneurship.
- The entrepreneurial ecosystem of LMICs is different from that of developed countries. The physical conditions and institutions of LMICs are under-developed, and inefficient, thus present different sets of challenges and opportunities for entrepreneurs and policy makers.
- The effect of the entrepreneurial ecosystem is different for firms of different size and age. A component of the entrepreneurial ecosystem significantly affecting performance of young firms can be insignificant for older firms due to their adaptability to the system and vice versa. Therefore, firm size and age are important

determinants for analysing difference of effect of the components of an entrepreneurial ecosystem.

- The existing studies have methodological as well as measurement problems. The aggregate measures and proxies have been used to measure the components of an entrepreneurial ecosystem which cannot truly reflect the problems faced by firms, especially SMEs. In this study responses of owners/managers of SMEs have been used, which is methodologically more appropriate than country level aggregate measures.
- Most of the studies have followed a linear approach to measure entrepreneurial ecosystems and ignored the systematic, interactive and interdependent nature of relationship of these components. Therefore, future research should be aimed at exploring the interactive effect of entrepreneurial ecosystem on entrepreneurial activity.

Table 2. 1: Literature Reviewed on Entrepreneurial Ecosystem and its Components

Entrepreneurial Ecosystem

Sr. #	Year	Author	Dependent Variables	Independent Variables	Data	Methodology	Findings
1	2010	Smallbone, Welter, Voytovich & Egorov	Entrepreneurship	Government institutions	289 survey questionnaires and 30 case studies	Descriptive statistics and Qualitative data analysis	Institutional change in Ukraine resulted in institutional deficiencies and triggered new opportunities for small firms in the emerging business services sector.
2	2011	Henrekson & Sanandaji	Entrepreneurial activity	Institutions	Existing studies and examples from history	Concept paper	Entrepreneurial response to the institutions could be abide, evade, or alter. Like business entrepreneurship, innovative political activity may be productive or unproductive, depending on the incentives facing entrepreneurs.
3	2011	Welter & Smallbone	Entrepreneurial Behaviour	Institutions	Earlier studies	Conceptual Analysis	Emerging market and transition economies have uncertain, ambiguous and turbulent institutional framework. Institutions not only influence entrepreneurs but entrepreneurs may also influence institutional development by contributing to institutional change.
4	2014	Acs, Aution & Szerb	National Systems of Entrepreneurship		Global Entrepreneurship Development Index (GEDI)	Conceptual paper	The development of entrepreneurship as a systematic phenomenon is discussed and its theoretical link with regional economics and national systems of innovation is explained. The computation of GEDI has been used to account for interactive effects of components of a national system of entrepreneurship. The quality of measurement is affected by data quality

						and availability.
5	2016	Taich, Piazza, Carter & Wilcox	Entrepreneurial Ecosystem	Interviews and survey of entrepreneurs in 150 metropolitan areas in the US	Factor analysis, multiple regression	The Stangler and Bell-Masterson model is used to measure the entrepreneurial ecosystem. The estimations are used to measure the health of the entrepreneurial ecosystem. The effects of individual components show the bottlenecks in the entrepreneurial ecosystem. It is important to understand the health of an existing entrepreneurial ecosystem before introducing any reforms, however, data limitations affect the measurement of systematic nature of effect of the entrepreneurial ecosystem.
6	2016	Isenberg	Entrepreneurial Ecosystem	Analysis of literature	Concept paper	There have been five mistakes in the definition of the entrepreneurial ecosystem using the ecosystem metaphor. These mistakes include the creation mistake, the centralized control mistake, the geography mistake, the intention mistake, and the entrepreneur-centrality mistake. The concept of the entrepreneurial ecosystem should therefore be further empirically tested.
7	2017	Alvedalen & Boschma	Entrepreneurial Ecosystems	Existing research	Review of existing literature	The findings based on a review of existing literature on the entrepreneurial ecosystem suggested that the concept is still in the developing phase. The analytical framework is not yet clear and theories including network theory can further explain the interdependence of different components of entrepreneurial ecosystem.
8	2017	Brown & Mason	Scope of Entrepreneurial Ecosystem	Existing research	Critical review and conceptualisation of the ecosystems concept	The entrepreneurial ecosystems vary across time and space and need evaluation of local conditions for developing bespoke policy interventions by governments.

9	2017	Spigel	Components of entrepreneurial ecosystem	Economic outcomes of ecosystem	Semi structured interview of entrepreneurs	Qualitative analysis of case studies of Waterloo, Ontario, and Calgary, Alberta, Canada	The cultural, social and material attributes of different regions affect the entrepreneurial ecosystems, which can then significantly affect the entry and exit rate of the firms in a specific region. The need for further research in different regions has been stressed for further explanation of the entrepreneurial ecosystem and its outcomes.
10	2018	Stam	Measurement of the entrepreneurial ecosystem		Data on components of an entrepreneurial ecosystem of provinces in the Netherlands	Developed an index for measurement of entrepreneurial ecosystem and used multiple regression analysis to estimate its effect on high growth firms	Data on indicators of framework conditions and systematic conditions is used to develop an additive index for measurement of the entrepreneurial ecosystem of provinces in the Netherlands. A feedback loop mechanism is introduced to indicate how entrepreneurs can feed into the system. The measurement is linear in nature and ignores the weighted effect of different components, and their interactions.

Firm Performance

Sr. #	Year	Author	Dependent Variables	Independent Variables	Data	Methodology	Findings
1	1993	Cooper	Predictors of entrepreneurial performance		Survey of earlier research	Critical evaluation	More theory driven empirical research required. Research on the effect of external factors needs to be carried out & more variety in methodologies is needed to better understand this field.
2	1996	Murphy, Trailer & Hill	Performance measurement		Survey of existing studies	Factor Analysis	The performance dimensions should be carefully chosen. It is possible that an independent variable is strongly related to one dimension while insignificant for others.
3	2003	Ayyagari, Beck & Demirguc-Kunt	Employment and GDP	Size of SME sector	SME250 (an average over time and sources) indicator was	Correlations and graphs	The contribution of SMEs in high income countries is 57.24% and in low income countries it is 17.56%. The contribution to GDP is 51.45% for high

					developed using employment and SME data from different sources for different countries for any time period after 1990s.		income countries whereas for low income countries it is 15.56%. SME250 means the share of the SME sector in the total formal labour force in manufacturing when 250 is taken as a cut-off point for the number of employees in the definition of a SME.
4	2005	Beck, Demirguc-Kunt & Levine	Poverty, GDP	Size of SME sector	Sample of 45 countries from SME250 database for the period 1990-2000	OLS Regression	In OLS regression the effect of the SME sector on GDP was significantly positive (β= 2.197 p-value.000) but not robust because when the instrumental variable was added the effect becomes insignificant. There is no evidence found for the role of SMEs in poverty alleviation.
5	2013	Haltiwanger, Jarmin & Miranda	Job creation	Size and age of firm	US Census Bureau's Business Dynamics Statistics and Longitudinal Business Database for period 1992-2005	Non-parametric regression approach	The findings suggested a negative relationship between firm size and employment growth. However, when controlled for age, then no systematic relationship has been found.
6	2014	Ayyagari, Demirguc-Kunt & Maksimovic	Employment, job creation and growth	Firm size and age	WBES database	OLS Regression	Small firms (<20 employees) have the smallest share of aggregate employment, the SME sector's (<100 employees) contribution is comparable to that of large firms. Small firms have the largest shares of job creation and highest sales growth and employment growth, even after controlling for firm age. Large firms, however, have higher productivity growth. Conditional on size, young firms are the fastest growing, and large mature firms have the largest employment shares but small young firms have higher job creation rates.

Impact of Government Regulations on Entrepreneurial Ecosystem							
Sr. #	**Year**	**Author**	**Dependent Variables**	**Independent Variables**	**Data**	**Methodology**	**Findings**
1	1997	Frye & Shleifer	Entrepreneurship	Legal and regulatory environment	Survey of 105 small shops owners/managers in Moscow and Warsaw.	Descriptive statistics and independent sample t-test	Neither government is an ideal type, the evidence points to the relatively greater relevance of the invisible-hand model to describe Poland and of the grabbing-hand model to describe Russia. The law-enforcement and regulatory evidence in particular shows that Polish local governments are more supportive of business.
2	2002	Djankov, La Porta, Lopez-De-Silanes & Shleifer	Social and economic outcome	Entry regulations	Written information about number of procedures, time and cost of start-up in country's largest city was obtained from government publications, reports of development agencies such as the World Bank, USAID and government web pages on the internet.	OLS regression	Countries with heavier regulation of entry have higher corruption and larger unofficial economies, but not better quality of public or private goods. Countries with more democratic and limited government interventions have lighter regulation for entry. Entry regulations benefit politicians and bureaucrats.
3	2006	Klappera, Laevena & Rajan	Entry rate, size and growth of firms	Entry regulations	Djankov *et al* (2002) data and 2001 edition of Amadeus database by Bureau van Dijk	Tobit regression and difference-in-difference estimation	Costly regulations hamper the creation of new firms and cause incumbent firms in naturally high-entry industries to grow more slowly
4	2007	Ayyagari, Beck & Demirguc-Kunt	Size of SME sector	Business environment (Entry Costs, Contract Enforcement Costs, Exit	Doing Business Survey by World Bank and SME250 database developed by Ayyagari, Beck and Demirguc	Regression-based simultaneous ANOVA approach	Variation in entry costs explains variation of 51.7% and credit information sharing explains 32% (p-value .000) of the variation in SME250, whereas contract enforcement costs and property registration costs have an

				Costs, Property Costs, Credit Information Index)	Kunt, 2003		insignificant effect.
5	2007	Van Stel, Storey & Thurik	Nascent and young entrepreneurs	Business regulations	Global Entrepreneurship Monitor and World Bank Doing Business Survey	Two equation model of regression	The condition of minimum capital required to start a business lowers the entrepreneurship rates across countries, as do labour market regulations. However the administrative considerations of starting a business—such as the time, the cost, or the number of procedures required—are unrelated to the formation rate of either nascent or young businesses.
6	2010	Poschke	Productivity	Entry regulations	Groningen Growth and Development Centre's Productivity Level Database and Djankov *et al* (2002)	Standard dynamic stochastic heterogeneous-firm model, Dixit-Stiglitz aggregator, first-order Markov process	The administrative entry cost can explain around one third of TFP differences. The productivity difference arises because entry costs reduce competition and the incentive to adopt more advanced technologies. The effects of entry costs are even larger when the labour market is not competitive.
7	2011	Aterido, Hallward-Driemeier & Pagés	Employment growth in firms	Business environment	WBES	OLS Regression	The coefficients on firm size categories indicate that employment growth declines monotonically with firm size. There is a positive effect of increased access to finance on the employment growth of medium and large firms and no significant effect among micro and small enterprises. Business regulations do not appear to affect the growth of larger firms. Corruption has adverse effects on medium-sized firms. Infrastructure bottlenecks negatively affect the growth of medium and large firms but positively affect the growth of small firms.
8	2015	Giroud & Rauh	Reallocation of business activity	State business taxation	U.S. Census Bureau's Longitudinal	Fix effect regression, difference-in-	Corporate entities reduce the number of establishments per state and the number of employees and amount of

					Business Database, Census of Manufactures and Annual Survey of Manufactures	difference estimation	capital per plant when state tax rates increase, and around half of these responses are due to reallocation of business activity to lower-tax states.
9	2015	De Jong & Van Witteloostuijn	Firm performance	Regulatory red tape	survey data of 530 Dutch private firms	two-step hierarchical regression method	Regulation cost, inconsistency and change limits sales turnover growth and regulation changes hamper market competition performance.

Impact of Tax Rate and Administration on Entrepreneurial Ecosystem

Sr. #	Year	Author	Dependent Variables	Independent Variables	Data	Methodology	Findings
1	2006	Hajkova, Nicoletti, Vartia & Yoo	FDI	Taxation and business environment	Marginal effective tax rate and the average effective tax rate (AETR) as measured by Yoo (2003)	Fixed effect regression, Transformed least square method	Focusing only on taxation in home and host countries and omitting other policies or diversion effects leads to a serious overestimation of tax elasticity and its relevance for policy. The effects of taxation on FDI are quantitatively much less relevant than the effects of other policies that contribute to make a location attractive to international investors, such as openness, labour costs and regulatory hurdles.
2	2007	Aterido, Hallward-Driemeier & Pagés	Employment growth	Investment climate	WBES of 102 developing countries for the period 2000-2006	OLS Regression	Micro and small firms have less access to formal finance, pay more in bribes than do the larger firms and face greater interruptions in infrastructure services. Larger firms spend significantly more time in dealing with officials and red tape. Restricted access to finance and burdensome business regulations reduce the employment growth of all firms, particularly micro and small firms. Corruption and poor infrastructure reduces employment growth by affecting the growth of medium sized and large firms.
3	2010	Johansson, Heady, Arnold, Brys & Vartia	Firm performance	Tax structure		Fixed effect regression	Corporate taxes are found to be most harmful for growth, followed by personal income taxes and then

							consumption taxes. Recurrent taxes on immovable property appear to be the best for growth. Practical tax reforms require a balance between the aims of growth, equity, simplicity and revenue.
4	2010	Kushnir, Mirmulstein & Ramalho	Density of MSME	Obstacles for MSME	MSME Country indicators, database by IFC	Graphs and tables of descriptive statistics	Electricity and access to finance are the two most-cited obstacles by businesses in developing countries. In addition, Competition from the informal sector and corruption among government officials has also been reported as significant challenges for firms.
5	2011	Da Rin, Di Giacomo & Sembenelli	New firm creation rate	Corporate taxation	Worldwide Corporate Tax Guide, Global Executive by Ernst & Young and OECD's STAN database	Within-group regression and GMM within-group regression	Corporate income tax has a significant negative effect on entry rates. The effect is concave and suggests that tax reductions affect entry rates only below a certain threshold tax level.
6	2014	Braunerhjelm & Eklund	New firm formation	Taxes and tax administrative burdens	World Bank Group Entrepreneurship Snapshots and World Bank Doing Business Survey	Pooled OLS regression, Random effect with time effects and Fixed effects model with year effects	The tax administration burden imposes a significant cost for new firms and reduces the rate at which new firms are formed. The elasticity of the tax administrative burden with respect to the entry rate is approximately −0.3.
7	2014	Reynolds & Rohlin	Quality of life and business environment	Location-based tax incentives	Federal Empowerment Zone Program for 1990 and 2000	Quality of life methodology, regression and differencing within geographic area	Tax incentives offered by the program notably enhance the quality of the business environment for firms in the area while modestly improving the quality of life for the individuals living there.

Impact of Control over Corruption on Entrepreneurial Ecosystem

Sr. #	Year	Author	Dependent Variables	Independent Variables	Data	Methodology	Findings
1	1998	Frynas	Investment in business	Political instability	Nigerian government documents and Shell reports	Critical analysis of official documents	Political instability does not hinder Shell from operating in Nigeria due to higher profits, dominance in market and first mover advantage. Also Shell

							is interconnected with state structures in Nigeria.
2	1993	Shleifer & Vishny	Determinants and outcomes	Corruption	Existing literature	Conceptual analysis of corruption	The structure of government institutions and the political process is an important determinant of the level of corruption. Weak governments that do not control their agencies experience very high corruption levels. The illegality of corruption and the need for secrecy make it much more costly than its sister activity, taxation. Defence and infrastructure offer better opportunities for secret corruption.
3	2003	Svensson	Firm level outcomes	Bribe payment who and how much	1998 Ugandan enterprise survey	OLS regression and Probit regression, robustness checked	Firms' ability to pay and firms' refusal power can explain a large part of the variation in bribes across graft-reporting firms. The results suggest that public officials act as price (bribe) discriminators and prices of public services are partly determined in order to extract bribes.
4	2004	Clarke & Xu	Corruption in industry	Characteristics of bribe takers and payers	World Bank Business environment survey 1999, World Bank economic indicators data, Kaufman *et al* Data on governance indicators	OLS regression and country fixed effect regression, robustness checked using instrumental variable	Bribe takers are more likely to take bribes in countries with greater constraints on utility capacity, lower levels of competition in the utility sector, and where utilities are state-owned. Bribe paying enterprises are more likely to pay bribes when they are more profitable and have greater overdue payment to utilities.
5	2007	Fisman & Svensson	Firm growth	Bribery payments and taxes	Ugandan Industrial Enterprise Survey 1998	OLS Regression, Industry-location averages used to avoid endogeneity	A 1% increase in the bribery rate is associated with a reduction in firm growth by 3%. The effect is about three times greater than that of taxation.
6	2007	Knack	Critique on corruption indicators and measures		Existing measures of corruption by World Bank, Transparency International,	Critical analysis of measures of corruption	The state capture and administrative corruption are different. Single source and single dimension indexes should be used as different sources to define and measure corruption differently

					BEEPS,		therefore aggregating from different sources is methodologically incorrect.
7	2007	González, López-Córdova & Valladares	Incidence of corruption	Regions	WBES	Descriptive statistics, graphs and OLS regression	African firms are three times as likely to be asked for bribes as are firms in Latin America. Graft is more prevalent in countries with excessive regulations and where democracy is weak. The incidence of graft in Africa would fall by approximately 85%if countries in the region had levels of democracy and regulation similar to those that exist in Latin America.
8	2009	Wu	Determinants of bribe	Firm size, licensing requirement, courts, local taxes	World Business Environment Survey	OLS Regression	Asian firms are more likely to bribe when faced with fierce market competition, corrupt court systems, convoluted licensing requirements, burdensome regulations, inefficient government service delivery and high taxes.
9	2010	De Rosa, Gooroochurn & Görg	Productivity	Corruption	EBRD and BEEPS for Central and Eastern Europe and the CIS	OLS Regression and robustness through instrumental variable	Bribing does not emerge as a second best option to achieve higher productivity by helping circumvent cumbersome bureaucratic requirements. The bribe tax is more harmful in non-EU countries. In countries where corruption is more prevalent and the legal framework is weaker, bribery is more harmful for firm-level productivity.
10	2013	Blagojevic & Damijan	Performance of firms	Ownership and corruption (informal payments and state capture)	BEEPS 2002-09 for 27 transition economies	Standard growth accounting model and ownership fixed effect regression	Domestic and foreign-owned private firms are more involved in both informal payments and state capture. Foreign-owned firms benefit more from corrupt practices as compared to domestic ones. State-owned firms experience the negative effects of involvement in corruption on the productivity growth.

Impact of Access to Finance on Entrepreneurial Ecosystem

Sr. #	Year	Author	Dependent Variables	Independent Variables	Data	Methodology	Findings
1	2002	Becchetti & Trovato	Growth of SMEs	Availability of External Finance	The Mediocredito database sample of more than 5,000 Italian manufacturing firms	OLS Regression	Growth is significantly affected not only by firm size and age, but also by state subsidies, export capacity and credit rationing. Small surviving firms have higher than average growth potential. This potential is constrained by the non-availability of favourable external finance and lack of access to foreign markets.
2	2002	Carpenter & Petersen	Firm growth	Internal finance	Panel from the annual Compustat tapes for the manufacturing sector from 1980-92	Fixed effect regression model	The growth of most small firms is constrained by internal finance, together with a small leverage effect. In contrast, the small fraction of firms making heavy use of new share issues exhibit growth rates far above what can be supported by internal finance.
3	2005	Beck, Demirguc-Kunt & Maksimovic	Firm growth	Access to finance, legal constraints, corruption, and the role of firm size	WBES	OLS Regression	Financial and institutional development weakens the constraining effects of financial, legal and corruption obstacles and small firms benefit the most. The effect of perception about courts on the firm growth is weak.
4	2006	Beck & Demirguc-Kunt	Firm growth	Access to finance and firm size	Empirical papers on access to finance and firm growth	Content analysis	Specific financing tools such as leasing and factoring are useful in facilitating greater access to finance even in the absence of well-developed institutions. A similar role is played by the system of credit information sharing and a more competitive banking structure
5	2008	Beck, Demirguc-Kunt, Laeven & Levine	Firm Growth	Firm size, financial development	U.S. Census of firms	OLS Regression	The distributional effect of financial development exerts a disproportionately positive effect on small firms.
6	2008	Musso & Schiavo	Firm survival and development	Financial constraints	Panel data from 1996–2004 on French	OLS Regression after calculating TFP	In the short run, the financial constraints are positively related to the productivity growth, however, in the

					manufacturing firms from EAE survey and the DIANE database		long run access to finance has a negative effect on the sales, capital stock and employment growth of firms.
7	2008	Ayyagari, Demirguc-Kunt & Maksimovic	Firm growth	Financing constraints	WBES 1999-2000	Country fixed effect regression, direct acyclic graph methodology and instrumental variable	Financial constraints significantly negatively affect the growth of firms and results are robust. Therefore, financial sector reforms should be the priority. The relaxed financing constraints are likely to be the most effective route to promote firm growth.
8	2008	Beck, Demirguc-Kunt & Maksimovic	Financing in large and small firms	Financial and institutional development	WBES	Fixed effect interval regression model	Small firms and firms in countries with poor institutions use less external finance, especially bank finance. Protection of property rights increases external financing of small firms significantly more than that of large firms, mainly due to its effect on bank finance. Larger firms more easily expand external financing when they are constrained than small firms.
9	2015	Ferrando & Martinez-Carrascal	Firm growth	Financing obstacles	Euro Area firms from WBES 1999-2000 and balance sheet data from AMADEUS Bureau van Dijk (BvD) database	GMM-SYSTEM estimator, Sargan test of over identifying restrictions	Being young increases the probability of facing a financial obstacle by 16%, while being small increases it by about 13%. Therefore reforms should focus on facilitating access to finance for small young firms. There is also sectoral divergence, with firms in the construction sector being more affected by these obstacles.
10	2016	Cowling, Liu & Zhang	Access to bank finance	Characteristics of SMEs	SME finance monitor surveys conducted in UK by BDRC Continental	Probit regression	Female entrepreneurs are less likely to apply for bank financing as compared to their male counterparts. The older firms with financial delinquency are denied credit more often. The credit provision to small firms has improved in the latter part of the global financial crisis.

Impact of Infrastructure on Entrepreneurial Ecosystem

Sr. #	Year	Author	Dependent Variables	Independent Variables	Data	Methodology	Findings
1	2006	Holl	Firm investment decision	Transport investment	Existing literature	Critical review of literature	Transport improvements can provide opportunities for logistic reorganization, market expansion and wider supplier access.
1	2007	Hallward-Driemeier & Aterido	Employment Growth in Africa	Access to Finance, Corruption and Infrastructure	32 Sub-Saharan countries from the WBES	OLS Regression	Employment growth is relatively concentrated in the smallest firms, with medium and large firms growing less rapidly. Unreliable infrastructure not only lowers the growth of large firms, it encourages the growth of micro-firms in Africa. Improved access to finance and public services is less beneficial in Africa, particular for micro-firms.
3	2008	Busse & Groizard	Growth	FDI, Regulations	Doing business survey	Regression, Generalized Method of Moments	The more regulated economies are less able to take advantage of the presence of multinational companies. Any attempts by government to attract capital in the form of FDI by offering special tax breaks are not likely to yield the expected beneficial effects if the regulatory quality is low.
4	2009	Escribano, Guasch & Pena	TFP	Infrastructure quality	World Bank Investment Climate Surveys from 1999 to 2005	Fixed effect regression model	Infrastructure quality has a low impact on TFP in high income African countries and a highly negative impact in low income countries. Poor-quality electricity provision affects mainly poor countries, whereas the problem of dealing with customs while importing or exporting affects mainly faster-growing countries.
5	2012	Datta	Firm performance	Access to Highway	WBES for India	Difference-in-difference estimation	Firms in cities affected by the Golden Quadrilateral highway project reduced their average stock of input inventories by between 6 and 12 days' worth of production. Firms in cities where road

							quality did not improve showed no significant changes. Firms on the improved highways reported decreased transportation obstacles to production, while firms in control cities reported no such change.
6	2012	Moyo	Firm Productivity	Power cuts	World Bank's Investment Climate Survey	OLS and Tobit regression models	Power outages have negative and significant effects on productivity of firms, particularly small firms.
7	2012	Grimm, Hartwig & Lay	Performance of Micro and small informal firms	Access to utilities	Micro dataset of informal firms in West-Africa	Cobb-Douglas production function	Access to different infrastructure services has no significant effect on firm performance when all sectors were kept in the model. However, a homogenous sample of tailors indicated a positive effect of access to electricity on performance.
8	2012	Banerjee, Duflo & Qian	Economic growth	Access to transportation infrastructure	Michigan China Data Center, Provincial Statistical Yearbooks of China	Fixed effect regression	Proximity to transportation networks have a moderate positive causal effect on per capita GDP levels across sectors, but no effect on per capita GDP growth. The results are consistent with factor mobility playing an important role in determining the economic benefits of infrastructure development.
9	2013	Sequeira	Firm performance	Access to a railway	Survey data of 900 firms in Southern Africa	Difference-in-difference model	In the short run, limited firm-level gains from access to the railway have been found. Extending the analysis to a longitudinal study remains an important area of future research.
10	2014	Scott, Darko, Lemma & Rud	Firm performance in Bangladesh, Nepal, Nigeria, Pakistan, Uganda and Tanzania	Electricity insecurity	WBES and MSME Country Indicators dataset by International Finance Corporation's	OLS regression	The impact of electricity insecurity on SMEs can be mitigated by ensuring that outages are planned and by facilitating access to alternative supplies of electricity, including generators and renewable energy.

Impact of Political Instability on Entrepreneurial Ecosystem

Sr. #	Year	Author	Dependent Variables	Independent Variables	Data	Methodology	Findings
1	2001	Feng	Private Investment	Political freedom, political instability and policy uncertainty	Private investment data compiled by Pfeffermann and Madarassy (1991), World Bank Economic Indicators	OLS Regression	Political freedom promotes private investment, through the channel of improving human capital formation. Political instability has a negative effect and policy uncertainty adversely affects private investment.
2	2007	De Haan	Economic growth	Political institutions	Existing studies on political instability and economic growth	Critical review of literature	The outcomes are sensitive to model specification, sample heterogeneity, measurement of political variables and the treatment of the time dimension.
3	2007	Guidolin & La Ferrara	Diamond production	Conflicts/war	financial data from Datastream and Bloomberg and indicators of political conflict from Lexis- Nexis and several Web sources	Augmented market model, event study approach	The findings show that the end of the conflict, as represented by the death of the rebel leader and by the official cease-fire, decreased the abnormal stock returns for mining companies holding concessions in the country. This effect is sizeable and statistically significant. The firms benefited from instability created by the civil war which constituted barrier to entry and reduced the bargaining power of government.
4	2012	Petracco & Schweiger	Firm performance	Armed conflict	BEEPS	Difference-in-differences estimation	Armed conflicts had a significant and negative impact on exports, sales and employment. Young firms experienced a scarring effect, which could lead them to closing down prematurely
5	2013	Camacho & Rodriguez	Firm exit	Armed conflicts	Colombian violence and plant-level data from the Colombian AMS	Fixed effect regression	One SD increase in the number of guerrilla and paramilitary attacks in a municipality increases the probability of plant exit by 5.5%. This effect is stronger for younger manufacturing plants, with a smaller number of workers and low levels of capital.
6	2013	Aisen & Veiga	Economic growth	Political	Penn World Table	System-GMM	Political instability adversely affects

				instability	Version 6.2, World Development Indicators, Polity IV Database and State Failure Task Force database	estimator	the growth by lowering the rates of productivity growth and, to a smaller degree, physical and human capital accumulation.
7	2013	Klapper, Richmond & Tran	Firm performance	Civil conflict	Census of all registered firms in Côte d'Ivoire for the years 1998–2003	Year, industry and firm size fixed effect regression model	The conflict led to an average 16–23% drop in the firm TFP and the decline is 5–10%larger for firms that are owned by or employing foreigners. Therefore, the firms have responded by hiring fewer foreign workers.

Impact of Workforce Education on Entrepreneurial Ecosystem

Sr. #	Year	Author	Dependent Variables	Independent Variables	Data	Methodology	Findings
1	2004	Bosma, van-Praag, Thurik, & de-Wit	Firm performance	Investment in human and social capital	Longitudinal data from 1991-97 from Dutch entrepreneurs through a questionnaire	OLS regression	The education level of entrepreneurs plays a significant role in the success of a new business. Entrepreneurs with a high education level and industrial experience are expected to survive in the market and earn higher profits.
2	2005	Alvarez & Lopez	Export Performance	Skill development of the employees	Annual National Industrial Survey of Chile for the period 1990-96	Probit regression	The findings suggested a statistically significant positive effect of skill development of employees on the possibility of starting to export and export performance of the firms.
3	2006	Oyelaran-Oyeyinka & Lal	Technology adoption	Learning new skills	Data from firms of Uganda, Nigeria, and India collected through semi-structure interviews	OLS regression	Informal on the job learning has been preferred by SMEs and it has statistically significant positive effect on the adoption of new technologies. Overseas training is a strong predictor of a firm's ability to adopt new technologies.
4	2008	Banker, Wattal, Liu & Ou	Firm performance	Education, R&D	financial statements and corporate governance data from Taiwan Economic Journal	Fama-Macbeth regression method	The education of employees and investment in R&D has a significant positive effect on the profitability of firms. Moreover, firms with an educated workforce and investing in R&D activities get a higher return on investment.

5	2010	Doms, Lewis & Robb	Creation and success of new businesses	Education and skill level of the local labour force	Kauffman Firm Survey, Decennial Census, Small Business Administration data	Fixed effect regression, Tobit regression	More educated entrepreneurs tend to be located in metropolitan areas with more educated workforces. Moreover, highly educated areas have above average entrepreneurship rates. The level of education of entrepreneurs is strongly related with positive business outcomes.

Impact of Competition with Informal Sector on Entrepreneurial Ecosystem

Sr. #	Year	Author	Dependent Variables	Independent Variables	Data	Methodology	Findings
1	2000	Schneider & Enste	Size, causes, and consequences of shadow economy		Previous literature	Critical review of existing literature	The currency demand, the physical input measure and the model approach can be used to measure the size and development of the shadow economy. An increasing burden of taxation and social security payments, combined with rising state regulatory activities and labour market restrictions are the major driving forces for the size and growth of the shadow economy.
2	2004	Maloney	Development	Informal economy	National Urban Employment Survey (NUES) Mexico	Analysis using descriptive statistics and previous literature	The informal sector in developing countries primarily is an unregulated micro-entrepreneurial sector and not a disadvantaged residual of segmented labour markets.
3	2005	Schneider	Economic growth	Shadow economy	World Bank economic database	Random effects GLS-regression	The average size of the shadow economy in 1999–2000 in developing countries was 41%, in transition countries 38% and in OECD countries 17%. If the shadow economy increases by 1%, the growth rate of the official GDP of developing countries decreases by 0.6%, while in developed and transition economies the shadow economy respectively increases by 0.8% and 1.0%.
4	2007	Ingram, Ramachandran	Profit maximization	Formal vs informal sector	WBES	Descriptive statistics, graphs	After controlling for firm-level, sector and country-specific effects, the

		& Desai				and correlation estimates	findings suggest formal registration of a firm is positively correlated with perceptions regarding the availability of electricity supply, access to finance and access to land and negatively correlated with the rate of taxation and corruption.
5	2017	Williams, Martinez-Perez, & Kedir	Firm Performance	Impact of starting as unregistered	WBES	Linear multi-level regression	Firm performance that started as unregistered has been significantly better than those firms who started upfront as registered firms.
6	2017	Williams & Kedir	Firm performance	Starting as unregistered	WBES for Turkey	Heckman selection model	Firm performance with experience of the informal economy is 13% higher than those with no experience.

CHAPTER 3 – DATA, MEASUREMENT AND METHODS

Initially, research on entrepreneurial ecosystems focused on the development of theoretical models of those ecosystems, which produced discursive and descriptive research. However, later the effects of different components of entrepreneurial ecosystems were tested using both qualitative and quantitative methods. The case studies on the effects of different components of the entrepreneurial ecosystems, including access to finance, corruption, the informal economy, entry regulations and political instability, etc. have mostly used qualitative methods to examine the issue of interest (Alvedalen and Boschma, 2017; Henrekson and Sanandaji, 2011; Spigel, 2017; Stam, 2015). On the other hand, a quantitative approach has also been used to estimate the effects of components of the entrepreneurial ecosystems on the level of entrepreneurial activity and performance of firms in different parts of the world (Acs et al., 2014; Aterido et al., 2011; Coluzzi et al., 2015; Stam, 2018). Most of these studies have estimated the linear relationship between components of the entrepreneurial ecosystem and entrepreneurial performance. However, the systematic nature of effect of the entrepreneurial ecosystems is yet missing in these empirical studies. Ignoring the interdependence of components of the entrepreneurial ecosystem is contradictory to the conceptualization of the entrepreneurial ecosystems approach.

In this chapter, the research and statistical methodology used in this thesis is explained. Moreover, different datasets and their limitations are critically evaluated, and selection of the World Bank Enterprise Survey (WBES) database for this study has been explained, along with measurement of variables. The research methodology adopted in this thesis is based on statistical techniques used in existing research on entrepreneurship in general and specifically from the entrepreneurial ecosystems perspective.

The details of how and why a particular quantitative approach is adopted, is explained in section 3.1. A discussion is carried out in section 3.2 of the different datasets available for the analysis of entrepreneurial ecosystems in LMICs. Moreover, the details of the World Bank Enterprise Survey (WBES) used in this study are explained in Section 3.2.1. The measurement of variables used in this study is explained in section 3.3, whereas in section 3.4 the statistical methods selected for data analysis are explained with respect to what, why and how of adopted statistical techniques.

3.1 Quantitative Methods for Measurement of Entrepreneurial Ecosystems

The choice of methodology is based on the ontological and epistemological assumptions about the reality to be studied. The ontological assumptions refer to the belief of the researcher about the reality (topic of research). The reality lying out there is objectively verifiable, or it is socially constructed and needs exploration of those social mechanisms to understand the reality as to how it came into existence. On the other hand, epistemological assumptions are about the nature of knowledge that exists about reality and who is the source for providing that knowledge. How reliable that source of knowledge is and how one possesses that knowledge. Thus, epistemology focuses on the nature of objectivity or subjectivity of the knowledge.

The concept of the entrepreneurial ecosystem has been discussed in such a way that it exists out there as a tangible reality and it is beyond the control of any single stakeholder. The objective of the study is to at first identify different significant components of the entrepreneurial ecosystem and then test the health of the entrepreneurial ecosystem using the magnitude and significance of their effects on the performance of firms operating within it. The existence of entrepreneurial ecosystems as an objective reality, independent of the interest of researchers, fits

into a positivist ontology. Moreover, the concept of entrepreneurial ecosystems is measurable and has been broken down into different components, as already discussed in Chapter 2. In addition, it is possible to measure the entrepreneurial ecosystem itself and its effects on the SMEs with some degree of confidence. Therefore, keeping in view these ontological assumptions about the entrepreneurial ecosystems, it can be argued that it is in line with the positivist ontology.

Since the existence of entrepreneurial ecosystem can be objectively measured, the job of the researcher is to find the right data, or data gathering tools or instruments, in an effort to find data closely depicting the reality. Moreover statements about the effects of individual components of entrepreneurial ecosystems, and their collective effect on the performance of SMEs, are empirically testable, and can be supported or rejected using appropriate statistical estimates. Also, the correlational and causal nature of the effect of the entrepreneurial ecosystem can be tested through suitable data. The purpose of this study is to estimate the health of entrepreneurial ecosystems of LMICs and identify the composition of the entrepreneurial ecosystem of Pakistan, and estimate its interactive effect on the performance of SMEs.

Thus, ontological and epistemological assumptions about the concept of entrepreneurial ecosystems in the context of this research lead to the use of the quantitative research design of positivism. The operational definitions of variable are provided and results produced are verifiable and can be replicated by anyone else in a similar context using a similar approach. The instruments for data collection in quantitative approach include questionnaires, observation and experiments, however, questionnaires are the most frequently used instrument. Therefore, to achieve neutrality and objectivity, questionnaire-based data has been used in this study.

3.2 Popular Datasets on Entrepreneurship

The most widely used datasets for predicting entrepreneurial activity at the local level and cross-country comparisons include: Adult Population Survey (APS) by Global Entrepreneurship Monitor (GEM), Business Environment and Enterprise Performance Survey (BEEPS) by the European Bank for Reconstruction and Development (EBRD) and the World Bank, the Global Entrepreneurship and Development Index (GEDI) provided by the Global Entrepreneurship and Development Institute, the Doing Business Survey by the World Bank, the World Bank Enterprise Survey (WBES) by the World Bank and Entrepreneurship at a Glance by the OECD under Entrepreneurship Indicators Program.

The choice of dataset is based on the scope and objectives of the study and the availability of data for the target population (LMICs and Pakistan in this case). The BEEP survey by the EBRD and the World Bank and Entrepreneurship at a Glance by the OECD are limited to a few countries only. The BEEP survey is conducted in 28 countries in East European and Central Asia only, whereas Entrepreneurship at a Glance was initiated in 2011 and provides information on the level of entrepreneurship in OECD member countries only. Therefore, these databases cannot be used to analyze LMICs. However, BEEPS is similar to WBES as it measures the firm level data on their business environment and performance. The BEEPS dataset has been used by different studies on European countries for examining the effects of different components of entrepreneurial ecosystems (Blagojević and Damijan, 2013; De Rosa et al., 2010; Petracco and Schweiger, 2012).

Most of the cross-country comparison studies examining the effect of entrepreneurship on economic growth have preferred macroeconomic indicators of entrepreneurship including, the

Global Entrepreneurship and Development Index, the Global Competitiveness Index by the WEF and the Corruption Perception Index by Transparency International (Acs et al., 2014; Acs et al., 2008; Audretsch and Belitski, 2017; Knack, 2007; Schneider, 2005). There are methodological issues with respect to the use of macroeconomic datasets in the context of this study. For example, the GEDI index is a calculated using data from GEM surveys, Global Competitiveness Index by the WEF, Doing Business Index by the World Bank and other data obtained from the UNO, the OECD and the Industrial Development Organization. The sources from which data for the GEDI is obtained are, mostly, macroeconomic measures and are composed of different variables and measures. Thus, a measure based on pooling of different other macroeconomic datasets ignores the microeconomic conditions. In addition to these methodological issues, there is no measure of the performance of firms to check the effect of different macroeconomic indicators.

On the other hand, the World Bank Doing Business Survey ranks countries with respect to the ease of doing business for SMEs in the country. However, the data is not based on the feedback or response of SMEs, rather it is based on a small sample of experts, mostly lawyers and management professionals, who are asked to rate the business environment of their country on different parameters related to regulations and the rule of law. The index is developed on the basis of subjective and objective opinions of this sub-sample of experts. It has been used in different studies but a lack of reliability and scientific rigour of this dataset makes it less suitable for empirical research. It has usually been used as supporting evidence in descriptive statistics only. Moreover, this ease of doing business rating also ignores the firm performance measurement. Therefore, this dataset does not fulfil the demands of our study.

In the literature, a number of studies have used firm level survey based data, collected by the World Bank, at the international level under the World Bank Enterprise Survey (WBES) project, to estimate the effects of components of the entrepreneurial ecosystems on entrepreneurial activity (Aterido et al., 2011; Ayyagari et al., 2014; Beck et al., 2008; Beck et al., 2005b; Coluzzi et al., 2015; Datta, 2012; Williams and Kedir, 2017a; Williams et al., 2017). This is the only firm-level survey-based database which provides information on components of entrepreneurial ecosystems and firm performance in all parts of the world in different years. The data on firm performance (sales growth, employment growth and labour productivity growth), and the perception of firms' on components of the entrepreneurial ecosystem (institutional framework and physical conditions) has been used in this study to estimate how firms perceive the institutional framework and physical conditions and how the entrepreneurial ecosystem affects the entrepreneurial performance. The details of the WBES database, and its data collection process and methods, are given in the next section.

3.2.1 The World Bank Enterprise Survey Data

The WBES database has been used in this study. It is a unique database because it provides firm-level responses on components of the entrepreneurial ecosystem, firm characteristics and performance of firms—annual sales growth, annual employment growth and annual labour productivity growth—for 135 countries around the world (Enterprise Survey, 2006-14). The enterprise surveys have been conducted using both a global and non-global methodology. For the global methodology, standardized questionnaires have been used for collecting data regarding the business environment from the owners and top managers of small, medium and large firms. The global methodology based survey data has been used in this study. The details specific to the data, including number of firms, countries and survey years are given Chapter 4 and 5. The

following sub-sections explain how the World Bank Enterprise Surveys have been conducted over the years.

Sampling Technique in WBES: The WBES followed a stratified random sampling approach for selecting the sample of firms. All non-agriculture private registered firms are included in the sampling frame. The stratification was done using size, activity and the geographical location of the firm. Stratification on the basis of size has divided the firms into small (5-19 employees), medium (20-99 employees) and large (100 or more employees) sized firms. The non-agricultural activity hubs of each country are used for stratification on the basis of geographical location. It is intended to keep similar industries from all countries to yield data suitable for cross country comparisons. Proportional allocation of the sample size for all strata was used to select representative samples from each country. The data can produce results with a 5% and 7.5% precision, and 90% confidence intervals. The non-response on items of the questionnaire has been dealt with in the sampling methodology, and up to 25% non-response on items in a stratum is deemed acceptable to derive valid results.

Data Collection and Quality of Data: The data collection teams and their supervisor were given training before starting the field work. The questionnaires were personally administered to enhance the response rate and quality of responses. The completed questionnaires were checked at four levels: first, immediately after interview to check for missing responses; secondly, by the field supervisor for the legibility of answers; thirdly, by the data entry operator; and lastly, by random checking of the entered data for any irregularities by the supervisor. The daily data entry reports were also used to identify outliers and cross verification from the respondent. For some countries a double blind review process was also adopted by entering the survey response of each firm twice without mentioning the name and then matching the responses to check for

mistakes. However, this approach could not be implemented in all countries due to time and cost factors for such a large survey. The quality control measures adopted in this survey suggest that data quality is ensured at the highest possible standard.

Pilot Testing: The preliminary version of the questionnaire was pilot tested by selecting a small, representative, sample and checking for wording, proper translation and understanding of the target population. The final version of the questionnaire was used after minor changes on the basis of results of pilot testing.

Ethical Considerations: The World Bank Enterprise Survey was widely publicized before it was officially launched. The government officials of the country also vouched for the survey to be administered by the World Bank group. Newspaper advertisements and launch parties with local business leaders were covered by the press to gain the support of the local industry. These tactics enhanced the rate of participation of firms in the survey. Once the survey was appropriately publicized and launched, the firms selected in the sample were sent emails and letters and later contacted via phone by the representatives of data collection teams for an interview appointment and participation in the survey.

The sampled firms were informed in writing that participation in this survey was voluntary, and every respondent had the right to withdraw at any stage; anonymity and confidentiality of their personal data was also ensured. Non-willing respondents were, however, replaced with other willing firms from the sampling frame. This substitution has improved the response rate and data availability.

Permission to use Database: The WBES database is publically available and online for the use of researchers upon submission of a research proposal with aims to the Enterprise Analysis Unit. After registration as an external user, access is provided to the database.

3.3 Measurement of Variables

The institutional framework covers both formal and informal institutions. The effect of formal institutions is estimated through government regulations and the taxation system, whereas informal institutions are measured through corruption perception. The subjective measure of government regulations is the percentage of firms in each province reporting government regulations as a significant obstacle in doing business. The objective measure of the effect of government regulations refer to the time spent by top management in meeting government regulations. The more time spent in meeting government regulations, and the higher percentage of owners reporting government regulations as an obstacle in doing business, indicates this component as a weak link in the entrepreneurial ecosystem.

The response of each firm on tax rates and administration as the most significant obstacle in doing business is used to calculate the percentage of respondents in a province where this is an obstacle in each survey year. This aggregated measure is then used for examining the role of the taxation system in the entrepreneurial ecosystem of LMICs. Similarly, corruption is measured by an owners/managers' perception of it as the most significant obstacle in doing business. The firm responses are aggregated at province level and used for determining the contribution of corruption in explaining the impact of the entrepreneurial ecosystem of LMICs.

The elements of physical conditions include access to finance, infrastructure, political stability, an educated workforce and the informal sector. Access to finance is measured as the percentage of working capital financing from banks by a firm, and the responses of firms on perception about access to finance are aggregated at province level. The objective measure of infrastructure is the number of power outages in a month. The higher number of power outages indicates poor infrastructure conditions. The subjective measure of infrastructure is the

percentage of respondents reporting infrastructure as the most significant obstacle in doing business.

Political stability is measured through responses on firms on security cost as percentage of sales and the percentage of firm owner/managers in a province indicating unstable political conditions as the most significant obstacle in doing business. The aggregated value of perception of owner/managers is used for analysis. The percentage of respondents in a province who selected the non-availability of an educated workforce as a significant obstacle in doing business was used as an indicator of the presence of an educated workforce. The effect of competition with the informal sector is measured using the number of years a firm has operated in the informal economy before registration. Moreover, the aggregated values of perception of owners/managers about competition with the informal sector are also used to measure the impact of informal sector. The detailed definitions and measurement of these indicators is given below in Table 3.1.

Table 3. 1: Definitions of indicators used as components of the entrepreneurial ecosystem

	Firm Performance
Annual sales growth	• Estimate of firm's sales growth over the past 3 years by WBES
Annual employment growth	• Estimate of firm's employment growth over the past 3 years by WBES
Annual labour productivity growth	• Estimate of firm's labour productivity growth over the past 3 years by WBES
	Institutional Framework
Government regulations	• The average number of hours spent in a week by the higher management in meeting government regulations. The higher time spent indicates higher

	regulatory burden on firms. • Percentage of owners/managers in a province reporting government regulations as the most significant obstacle in doing business for the firm.
Tax rate and administration	• Number of visits of tax officials. The higher number indicates the complexity of the taxation system. • Percentage of owners/managers in a province reporting tax rate and administration as the most significant obstacle in doing business for the firm.
Corruption	• Percentage of owners/managers in a province reporting corruption as the most significant obstacle in doing business for the firm.
	Physical Conditions
Access to finance	• Percentage of working capital financed through banks. Higher percentages shows ease in accessing financing from banks. • Percentage of owners/managers in a province reporting access to finance as the most significant obstacle in doing business for the firm.
Infrastructure	• Number of power outages in a month and value lost as percentage of sales due to power outages. The higher number of power outages and higher value lost due to power outages, shows poor infrastructure facilities. • Percentage of owners/managers in a province reporting infrastructure as the most significant obstacle in doing business for the firm.
Political instability	• Security cost as percentage of sales has been used to measure political instability, the higher percentage of security cost indicating more political instability in the country.

	• Percentage of owners/managers in a province reporting political instability as the most significant obstacle in doing business for the firm.
Non-availability of an Educated workforce	• Percentage of owners/managers in a province reporting non-availability of educated workforce as the most significant obstacle in doing business for the firm.
Competition with the informal sector	• Years operated before registration. The higher number represents the higher likelihood of firms preferring to operate in the informal economy. • Percentage of owners/managers in a province reporting competition with the informal sector as the most significant obstacle in doing business for the firm.
Firm Characteristics	
Firm characteristics	• Years of experience of top manager in the firm • Firms of small size (5-19 employees) and medium size (20-99 employees) • Exporters (selling in the foreign market) and non-exporter (selling in the domestic market) • Firm age (young, equal to or less than 5 years, and old, more than 5 years)

3.4 Statistical Methods of Analysis

Three econometric methods including multiple regression methods, propensity score matching (PSM) methods, cluster analysis and canonical discriminant analysis have been used in the analysis of the impact of entrepreneurial ecosystems on the performance of SMEs in LMICs.

The multiple regression method is used in chapter 4 for measurement of the impact of individual components of the entrepreneurial ecosystems on the performance of SMEs in

LMICs. These findings are important because it leads towards determining the factors which need immediate attention, or improvement, which will result in maximum benefit for SMEs. Further analysis of the effect of the most significant factor—corruption—is carried out using matching methods (so comparing like with like). Matching methods help in determining the effect of treatment on the treated by comparing them with a counterfactual group.

3.4.1 Multiple Regression Methods

A simple regression model which pools firms for all LMICs assumes that the intercept terms for those countries are all the same. It will thus ignore the differential effect of the ecosystem of each country on firm performance. However, the components of the entrepreneurial ecosystem differ according to country and therefore the response of firms can be drastically different. This variation in components of the entrepreneurial ecosystem across different countries is expected to significantly affect the regression estimates. Therefore, the intercept of the regression equation for each country is expected to be different so a country dummy variable is used to account for country difference, but the effect is absorbed.

The objective measures as well as perception based data on the components of the entrepreneurial ecosystem are included in the model. The regression equations estimating the effect of components of the entrepreneurial ecosystems on the performance of SMEs using country dummies can be specified as follows:

$$Sales\ growth_i = \alpha_i + \beta_i \boldsymbol{X}_i + \beta_i \boldsymbol{E}_i + \beta_i D_i + u_i \quad 3.1$$

$$Employment\ growth_i = \alpha_i + \beta_i \boldsymbol{X}_i + \beta_i \boldsymbol{E}_i + \beta_i D_i + u_i \quad 3.2$$

$$Labour\ Productivity\ growth_i = \alpha_i + \beta_i \boldsymbol{X}_i + \beta_i \boldsymbol{E}_i + \beta_i D_i + u_i \quad 3.3$$

In the above equations, *i* refers to firm, ***X*** is a vector for components of the institutional framework and, ***E*** is a vector for components of physical conditions as part of entrepreneurial ecosystem, *D* refers to firm size, age and industry dummy variables and *u* refers to the error term. The components of the institutional framework represented by a vector ***X*** include government regulations, tax rate and administration and control over corruption. The components of physical conditions represented by a vector ***E*** include access to finance, infrastructure, political instability, the non-availability of an educated workforce and competition with the informal sector.

3.4.2 Matching Methods

It is important to know whether policy interventions have been successful in terms of achievement of the desired outcomes. Policy interventions can be regarded as a treatment and are designed to improve outcomes, be it educational, health or firm performance.

The major challenge, however, in the evaluation of the impact of interventions is to find a comparable counterfactual group, to explain what the outcomes would have been had the intervention not been introduced. The developments in matching methods have enabled the estimation of counterfactual evidence. In this context, matching methods have been most frequently used by scholars and policymakers to implement and evaluate different policy projects.

Initially, matching methods were designed and used for randomized experimental studies only. In randomized experimental designs, it is assured that the treatment assignment is random and the only difference between the control group and experimental group is the treatment. Therefore, the outcomes of the control group have been used as counterfactual evidence. However, there are cases when random assignment to treatment is not possible, despite its

extraordinary value in estimation. For example, in the case of testing the causal link between smoking and lung cancer, random assignment to treatment is not possible. This limitation, however, stimulated the developments in matching methods and allowed its use in observational studies. The use of matching methods in observational studies is conditional on well-defined criteria for assignment of observations to the treatment and the control groups.

Propensity Score Matching (PSM)

Among the variety of matching methods for observation studies, PSM is now the most widely used method. PSM has been widely used in studies evaluating impacts in the labour market, such as, the effect of: training programmes on income, electoral reforms on corruption, R&D subsidies, school specialization on pupil performance and teachers' performance on students' achievements (Bradley et al., 2013; Dehejia and Wahba, 2002; Lavy, 2002; Moser, 2005; Persson et al., 2003; Smith and Todd, 2005).

In its simplest form, matching methods compare the outcomes of those individuals from the treated and control group which are similar on observable characteristics. It is easier to find similar individuals from treated and control groups if they differ on only one observable characteristic. However, if there are a number of covariates then selecting similar individuals becomes difficult using this simple method. However, the use of propensity scores in matching methods to find similar individuals from the treated and control groups has simplified this complexity. The propensity score is defined as the probability of an individual receiving treatment from a group of treated and control individuals, conditional on the set of observable characteristics.

$$p(Z) = P(D = 1|Z) \qquad 3.4$$

The dependent binary variable *Z* refers to corruption, where *D=1* for the treated and *D=0* for the absence of treatment. Similar units on the basis of propensity scores are selected from the treated and control groups to compare outcomes. Statistically, the impact of treatment denoted by δ_i on a respondent i is the difference between the outcome in the presence and absence of treatment:

$$\delta_i = Y_{1i} - Y_{0i} \qquad 3.5$$

Here Y_{1i} refers to the outcome of the i^{th} observation in the treated group and Y_{0i} refers to the outcome of i^{th} observation in the control group. The outcome *Y* is written as follows:

$$Y = (1 - D)Y_0 + DY_1 \qquad 3.6$$

Where *D* represents the treatment status. Thus, the observed outcome for a treated group will be:

$$Y = (1 - 1)Y_0 + 1.Y_1 = 0.Y_0 + 1.Y_1 = Y_1 \qquad 3.7$$

Therefore, in case of treated observations the observed outcome will be Y_1, and Y_0 will be the counterfactual evidence, whereas for the control group observations the outcome will be Y_0, and Y_1 will be the counterfactual evidence.

Usually the evaluation of the effect of treatment requires the average effect of treatment on all the participants, which is obtained by estimating the average treatment effect on the treated (ATT). The effect of treatment on one treated individual is written as follows:

$$ATT = E(Y_1 - Y_0|D = 1) \qquad 3.8$$

However, the average effect of treatment on all the treated individuals is expressed as the difference in the averages. The higher average value of this difference indicates the level of effect of the treatment on the treated. Therefore, the equation for average treatment effect on treated (ATT) can be written as:

$$ATT = EY_1(Y_1 - Y_0|D = 1) - EY_0(Y_1 - Y_0|D = 1) \qquad 3.9$$

The application of PSM, after treatment assignment, can be divided into three steps: Firstly, propensity scores are estimated by including all observable characteristics in the model and choosing an appropriate matching algorithm. Secondly, the relevant assumptions of hidden bias, balancing, and common support and overlap are tested, and thirdly, the robustness of the results are tested.

Propensity Scores Estimation

The probit model and the logit model are the two most widely acknowledged methods for estimating propensity scores, with no advantage of one over the other (Rosenbaum and Rubin, 1983a). In this study, the probit model has been used to estimate propensity scores.[1]

The model specification to estimate propensity scores is extremely important, because missing any variable significantly related to the outcome, or treatment assignment, will produce biased results. The vectors $\boldsymbol{X}$ and $\boldsymbol{E}$ mentioned in equation 3.1 have been used for estimating the propensity scores.

The Matching Algorithm

After estimating propensity scores using the appropriate model by including all observable characteristics the next step is to choose a suitable matching algorithm. Different matching algorithms use propensity scores differently to match the outcomes of treated and controlled units. The nearest neighbour matching algorithm is one of the most used and straight forward. The most similar units from the control group are matched with units from the treated group with closest propensity score i.e. those who have the most similar observable characteristics.

[1]In Stata 14, the latest version of psmatch2 routine by (Leuven and Sianesi, 2014) has been used for implementing PSM.

Nearest neighbour matching can be implemented using both 'with replacement' and 'without replacement' of units. If the 'without replacement' option is used then only one unit from the control group can be compared with only one unit in the treated group. If there are few observations in the control group, or there is less overlap in the propensity score values, then 'without replacement' will result in biased outcome, because units in the treated group will be matched with relatively poor matches from the control group (Dehejia and Wahba, 2002). On the other hand, if the 'with replacement' approach is used then one unit from the control group can be used for comparison with many units in the treated group, provided the propensity scores are close. This over representation of a unit from the control group can potentially result in a sampling error, however, the benefit of getting the closest, and the most similar matches, outweighs such drawbacks. Therefore, 'with replacement' matching has been used in this study.[2]

Assumptions for PSM

Before interpreting the matching estimates, it is important to ensure that basic assumptions of this approach are satisfied, and results are, therefore, not biased. The assumptions of hidden bias, balanced samples, common support and the overlap condition should be tested for unbiased estimation of ATT.

Hidden Bias

This assumption is satisfied when all the observable covariates are included in the estimation of the propensity scores, and the estimates are robust for any unobserved confounder. Rosenbaum bounds are a sensitivity analysis test for measuring whether hidden bias is a problem in the estimation of ATT when the nearest neighbour matching algorithm has been used

[2]Stata is the most frequently and reliably used statistical program for using PSM method and psmatch2 routine developed by (Leuven and Sianesi, 2014) is the most advanced form of program written for this purpose. The latest version of psmatch2 program has been used for the analysis. The options of nearest neighbour matching, with replacement and common support have been used.

(Rosenbaum, 2002).[3] The assumption behind Rosenbaum bounds is that after controlling for the covariates, the outcome will be independent of treatment status:

$$(Y_1, Y_0) \perp D|Z \qquad 3.10$$

Rosenbaum bounds estimate Gamma, Γ, value which is an odds ratio, and used as a sensitivity parameter. It measures the degree to which random assignment of treatment has been followed. The odds ratio of receiving treatment for two units similar on covariates differs by value of Γ. For Γ=2, if the two units are matched on observed covariate, it indicates that the likelihood of receiving treatment is double for one unit over the other.

The sensitivity analysis for non-binary variables uses the Wilcoxon sign rank test and the Hodges-Lehmann point estimate for the sign rank test. In social sciences, for any value of Γ up to 2, if the value of statistical significance of the upper bound of the Wilcoxon sign rank test reaches above 0.05, or the confidence interval of Hodges-Lehmann point estimate includes zero, the hidden bias assumption is considered to have been violated (Rosenbaum, 2002).

Balancing Property

The balancing property ensures the quality of matching. The balancing assumption is based on whether or not the treatment assignment is independent after including observable characteristics in the model. If the propensity scores obtained using observable covariates are adequately balanced in the treated and the control groups then the balancing property is satisfied.[4]

$$D \perp \boldsymbol{Z}|p(\boldsymbol{Z}) \qquad 3.11$$

Here $\boldsymbol{Z}$ represents the set of covariates and equation 3.11 shows that after calculation of $p(\boldsymbol{Z})$ through specification of a probit or a logit model, there is no other variable that needs to be

[3]The rbounds routine written by Gangl (2004) has been used to implement Rosenbaum bounds to test the presence of hidden bias.

[4]In psmatch2 program there is command of pstest for testing the balancing property through t-test, percentage bias and shows graphically. This command has been used to test the balancing property. The biasness level of less than 15% is considered acceptable for observational studies in social sciences domain.

included to enhance the estimation. If, after matching, the balancing test shows that differences between the treated and control groups have been eliminated, or become statistically insignificant, then the matching estimates are considered unbiased. However, if the differences are not eliminated then either model specified for propensity score estimation needs refinement, or some other matching method should be used.

Common Support and Overlap Condition

In order to get the ATT units, there should be a positive probability of getting at least one comparable unit from the control group as a counterfactual evidence for each unit in the treated group.

$$0 < P(D = 1|\boldsymbol{Z}) < 1 \qquad 3.12$$

This means that for every value of $\boldsymbol{Z}$, the probability of receiving treatment lies between 0 and 1 and the same applies for not having received the treatment.

If there are some units in the treated group for which there is no close match available in the control group then the counterfactual evidence for such units cannot be established. This condition is called the common support condition.[5] The use of this condition in the matching algorithm ensures that the effect of treatment on the treated has been measured using only those units for which close matches were available in the control group. The units in the treated group with no matching units in the control group are considered as off the common support region. The treatment assignment is attributed as strongly ignorable when the conditions of common support and overlap are satisfied (Rosenbaum and Rubin, 1983b).

[5]The commands of psgraph and kernel density graph of propensity scores both before and after matching have been used from psmatch2 program.

Testing for Robustness

The robustness of the matching estimates is checked by implementing alternative matching algorithms. If the results remain consistent, then they can be considered robust with respect to any relevant matching method. In the data analysis, other matching algorithms including K-nearest neighbour matching (k=10) and kernel matching have been used to check the robustness of the results.

3.5 Statistical Methods of Analysis in Chapter 5

In chapter 5 cluster analysis and canonical discriminant analysis are used to identify 'entrepreneurial ecosystems' through patterns in the response of firms on components of their entrepreneurial ecosystem. The firms are grouped through cluster analysis and later these groups are used to determine statistically significantly different entrepreneurial ecosystems operating in Pakistan. What these econometric methods are, why and how they have been used in this study, is explained in following two sub-sections.

3.5.1 Cluster Analysis

Cluster analysis helps in picking out the natural trends in the data. It groups like with like on the basis of selected attributes. The grouping of firms with similar perceptions about the components of the entrepreneurial ecosystem will help in identifying different ecosystems existing in Pakistan. These entrepreneurial ecosystems will then be used for assessing their differential effect on firm performance operating within those clusters.

A wide range of clustering techniques and procedures has been developed over the last four decades. These are divided into two major groups, named hierarchical clustering methods and disjoint clustering methods (Li et al., 2015). Other than statistical differences, the major

difference between these two methods is that in hierarchical clustering the decision about the optimal number of groups can be made after employing the relevant clustering approach, whereas in disjoint clustering methods the number of groups is to be decided beforehand. Moreover, the hierarchical cluster analysis ensures minimum intra-group variations and maximum inter-group variation (Everitt et al., 2011; Kaufman and Rousseeuw, 2008).

Given that our objective is to identify the patterns existing in the responses of the firms about components of the entrepreneurial ecosystem of Pakistan, and so to determine the optimal number of groups (i.e. ecosystems), it is impossible to decide this in advance. Therefore, hierarchical clustering methods have been adopted for the classification of the data. This method is further classified into agglomerative and divisive methods on the basis of the way to make groups. The agglomerative methods start by considering each firm as a separate group then gradually making larger groups of similar firms, and ending with all the firms in one main group. Alternatively, the divisive methods starts from treating all firms in one main group and then keeps on refining the groups by excluding firms with dissimilar characteristics, and ends with each firm being in a separate group. Agglomerative methods have been more commonly used in recent research studies, and are used for this chapter.

The response of the firms on the components of the entrepreneurial ecosystem including government regulations, tax rates, corruption, access to finance, infrastructure, political instability, competition with informal sector, the non-availability of an educated workforce, and electricity supply have been used as covariates to determine the clusters in the data. The next step is to decide the similarity or dissimilarity measures, so that closely related firms are clustered. These measures vary for continuous, categorical and mixed data.

Since our data on the components of the entrepreneurial ecosystems is categorical in nature, one similarity measure from a number of methods can be used. Those methods include the Matching method, the Jaccard method, the Russell method and the DICE method. How these similarity measure work can be explained through a simple example. Table 3.2, below, represents the binary responses of two firms *i* and *j* on a covariate of interest. The rows represent a certain set of characteristics being present or absent (1,0) in firm *i*. Similarly, the columns represent the presence or absence (1,0) of a certain set of characteristics in firm *j*. The cell value '*a*' indicates the presence of some characteristic in both firms *i* and *j*. The cell values '*b*' and '*c*' indicate the characteristic being present in either firm *i* or *j*. The cell value '*d*' indicates that this characteristic is not common in both *i* and *j*.

Table 3. 2: A 2x2 response table

	Firm *j*	
Firm *i*	1	0
1	a	b
0	c	d

The Russell method calculates the distance between firm *i* and *j* by taking the proportion of cases in which both traits were present, as shown in equation 3.13

$$\frac{1}{a+b+c+d} \qquad 3.13$$

The Jaccard method is similar to the Russell method but it excludes the cases in which both firms have dissimilar characteristics like '*d*'. The calculation in the Jaccard method is shown in equation 3.14.

$$\frac{a}{a+b+c} \qquad 3.14$$

The matching method is another variation on the Jaccard method. It includes both totally matched (*a*) and totally unmatched (*d*) cases in calculating the distance. The calculation according to the matching method is given below in equation 3.15.

$$\frac{a+d}{a+b+c+d} \qquad 3.15$$

The DICE coefficient is the final method which is also closely related to the Jaccard method, except for assigning more weight to the mutually existing characteristics. The calculation of the DICE coefficient is given in equation 3.16:

$$\frac{2a}{2a+b+c} \qquad 3.16$$

The matching method is the most commonly used similarity measure for categorical data (Finch, 2005; Murtagh and Legendre, 2014). It results in the smallest distances among the firms and refined clustering of data by considering both similar and dissimilar attributes of the firms. Therefore, Ward's linkage algorithm with the matching method as similarity measure is adopted in this study for classification of the firms.[6]

The use of hierarchical clustering using Ward's linkage algorithm and the matching method as a similarity measure begins by considering each firm as a separate cluster, and in subsequent stages each firm with similar characteristics is made part of another cluster (Everitt et al., 2011). This process ends when all the firms become part of one cluster. The decision on the meaningfulness of the number of clusters is made on the basis of: (1) homogeneity within the cluster; (2) heterogeneity between the clusters; and (3) a balanced distribution of firms in the clusters. Moreover, dendrogram is used to give a structural view of how firms are part of

[6]The Stata 14 version has been used to implement the hierarchical clustering methods using Ward's linkages among the agglomerative methods. The selection of an appropriate set of covariates is the first step in the implementation of a routine.

different clusters and lower down the dendogram how different clusters merge to form bigger clusters of similar firms.

The sensitivity of the cluster analysis was tested by using different versions of similarity measures for categorical data including the matching method, the Jaccard method and the Russell method. The results were not significantly different, however, the outcome of the matching methods were more similar in terms of homogeneity within the group and heterogeneity between them.

3.5.2 Discriminant Analysis

Determining the differences between groups in data has been increasingly recognized as an important technique. Different selection parameters are employed to find patterns in the data on the basis of covariates. Researchers inspired by the seminal work of Fisher (1936) on discriminant analysis, initiated the work in this direction by starting from two group classification models. Rao (1948) extended the two-group classification approach of Fisher to multiple group classification. Others refined the idea of Fisher in the 1940s and introduced important extensions of this concept (Huberty and Olejnik, 2006; Kendall, 1957; Mclachlan, 2004; Tatsuoka, 1969; Tatsuoka and Tiedeman, 1954; Webb and Copsey, 2011; William and Lohnes, 1962).

The early application of discriminant analysis was limited to the field of medicine and biology, however, later methodological developments made it suitable for use in business, education and psychology (Rencher, 2002). Discriminant analysis is a multivariate inferential statistical technique that has been traditionally used for classification of observations from unknown groups to a set of groups decided in advance (Klecka, 1980). It has been used in studies to find whether the pre-decided groups in the data are statistically significantly different from

each other or not. This technique organizes data in the best way to minimize within group differences and maximize between group variations.

The three forms of discriminant analysis technique include linear discriminant analysis, canonical discriminant analysis (CDA) and quadratic discriminant analysis. CDA is the most general approach. CDA uses different combinations of the covariates to find the minimum variation within group and the maximum variation between the groups (Friedman, 1989). On the other hand, linear discriminant analysis uses distance between centroids of the groups, in place of using within group and between group variations. Quadratic discriminant analysis is the most complex technique. It uses quadratic methods to find groups with minimum misclassification (Han et al., 2012).

CDA is used in this chapter as it is the most relevant to the objective of finding whether the five groups of firms on the basis of their response on components of the entrepreneurial ecosystem in Pakistan are significantly different from each other. Minimum within group differentiation and the maximum between groups differentiation will ensure that the components of the entrepreneurial ecosystem with similar effects are grouped in one entrepreneurial ecosystem. It is important to see whether the identified entrepreneurial ecosystems are significantly different from each other or not. Therefore, CDA will also ensure the identification of only statistically significantly different entrepreneurial ecosystems in Pakistan.

The five groups identified by the cluster analysis were used to find the entrepreneurial ecosystems existing within Pakistan. These five groups are then used in the CDA to create a scatter matrix within and between the groups by reducing the mean difference within the groups. These between group matrices (S_b) and within group matrices (S_w) are then used for generating eigen values as follows:

$$S_W^{-1} S_B \boldsymbol{w} = j\boldsymbol{w} \quad 3.17$$

In equation 3.17 the multiplication of the inverse of the within group scatter matrix, S_w^{-1} by the between group scatter matrix, S_B ensures that firms within one group are similar to each and dissimilar to the firms in other groups. Here $\boldsymbol{W}$ is an eigenvector used for the weighted combination of a within and between groups scatter matrix, and j indicates that variation is maximized for between group differences and minimized for within group differences.

The outcome of the CDA produces four discriminant functions on the basis of combinations of the components of the entrepreneurial ecosystem. These discriminant functions are statistically significantly different from each other. The discriminant score for each discriminant function can be calculated using the following equation:

$$D_{xi} = \pm d_{1i} af_i \pm d_{2i} reg_i \pm d_{3i} ifras_i \pm d_{4i} corr_i \pm d_{5i} pol_i \pm d_{6i} inf_i \pm d_{7i} wk_i \pm d_{8i} tax_i \pm d_{9i} elec_i \quad 3.18$$

Where D_{xi} is the discriminant score of each firm and the d_{1i}, $d_{2i}...d_{9i}$ are the discriminant coefficients (also called factor loadings) of the covariates in each discriminant function.

The definitions and measurements of access to finance (af), government regulations (reg), infrastructure (infras), corruption (corr), political instability (pol), practice of informal sector (inf), the non-availaility of an educated workforce (wk), tax rate and administration (tax), and electricity (elec) are explained in Table 3.1.

Finally, the factor loadings will be used to determine which component contributes significantly to which discriminant function. According to Comrey and Lee (1992), McLachlan (2004) and Tabachnick and Fidell (2007) factor loading of more than 0.4 indicates the statistically significant contribution of a factor to its functions. Therefore, this criterion will be used to determine the entrepreneurial ecosystem components contributing significantly to a

discriminant function. Since these discriminant functions are composed of different combinations of institutional and physical conditions, these can be called entrepreneurial ecosystems.

The factor loadings of components of entrepreneurial ecosystems are then used as weights to calculate a discriminant score for each firm. These discriminant scores are the sum of the products of factor loadings with the observational values. This interactive and interdependent index, based on components of institutional framework conditions and physical conditions, shows the entrepreneurial ecosystem of Pakistan. We then apply regression technique, to estimate the effect of the entrepreneurial ecosystem (based on index value for each firm) on the performance of SMEs.

3.6 Summary

The entrepreneurial ecosystems approach is deemed fit with the ontological and epistemological assumptions of positivist philosophy. Thus, quantitative research design following positivist approach has been adopted in this thesis. The data on components of the entrepreneurial ecosystems is obtained from the World Bank Enterprise Survey (WBES) database. It provides firm level response on components of the entrepreneurial ecosystem of LMICs.

We have used a variety of statistical techniques including multiple regression methods and matching methods for estimation of the weakest link in the entrepreneurial ecosystem of LMICs. Moreover, cluster analysis is used to find the natural pattern existing in the response of firms on components of the entrepreneurial ecosystem of Pakistan. Later, canonical discriminant analysis has been used to find the composition of the entrepreneurial ecosystem of Pakistan, and to develop an index based on the interactive and interdependent effect of the components of the entrepreneurial ecosystem.

CHAPTER 4 - ENTREPRENEURIAL ECOSYSTEMS AND THE PERFORMANCE OF SMES IN LOW-MIDDLE INCOME COUNTRIES

4.1 Introduction

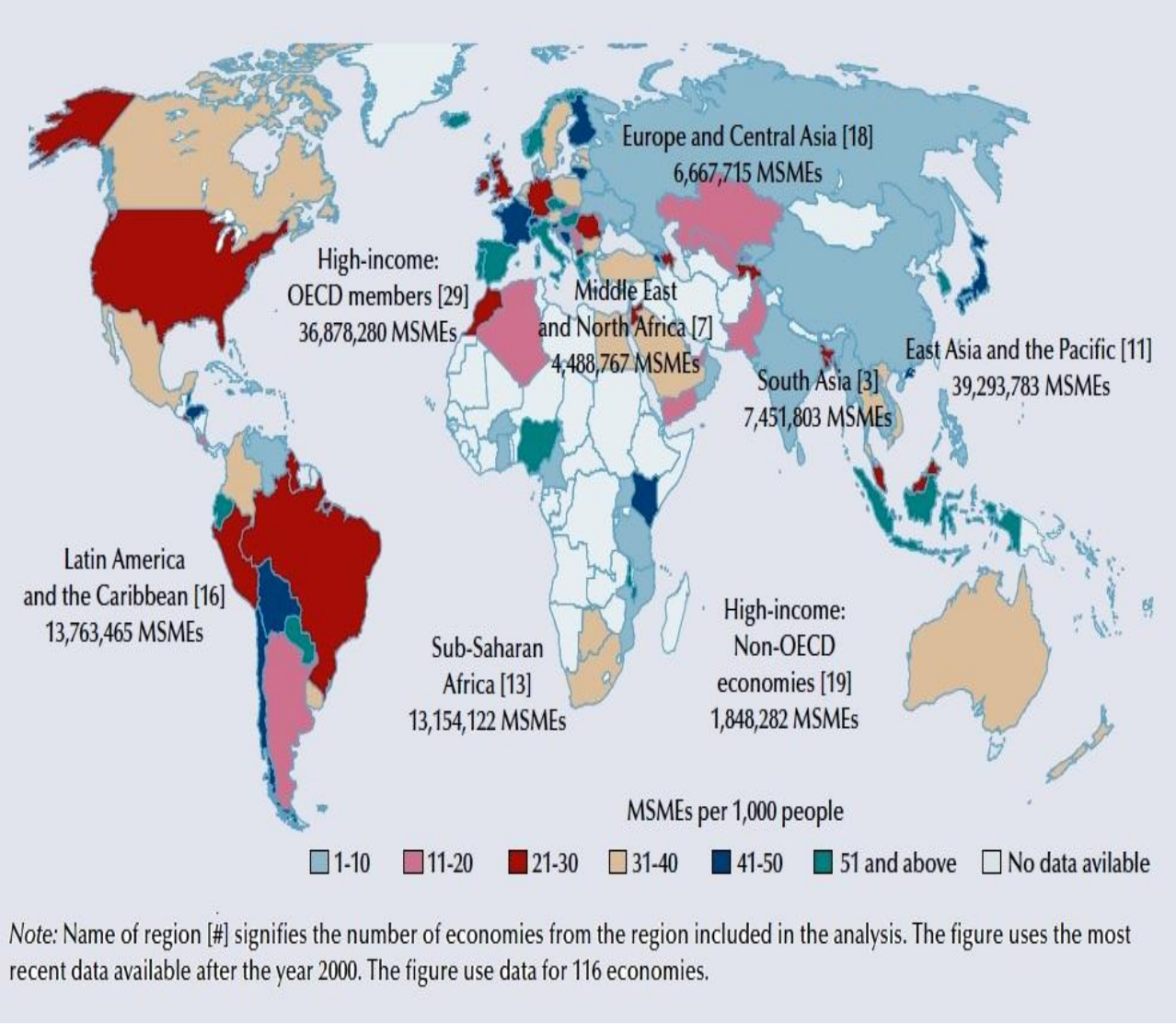
Entrepreneurship has been considered as a mechanism for channelling economic development and a significant amount of research has been conducted in the past decade on its role in national, regional and industrial growth. There is now a consensus amongst researchers and practitioners of development economics that a thriving private business sector is indispensable for the sustainability and economic growth of any country. The literature suggests that entrepreneurship has played a substantial role in the economic growth of Malaysia, India, Singapore, Korea, Thailand and China (Bruton et al., 2008). Moreover, the progress of these emerging markets has slowed down the economic growth of the developed economies and made it more uncertain for policymakers as to which 'region' can drive growth in the future (Valliere and Peterson, 2009).

In this unpredictable and dynamic global landscape international organizations, including the World Bank, the Organization for Economic Co-operation and Development, the World Economic Forum and the United Nations Economic and Social Council, as well as numerous international stakeholders, have acknowledged the role of entrepreneurship in economic growth. Entrepreneurship is now central in public policy formulation and implementation (Kelley et al., 2012).

Researchers and policymakers are striving to develop a supportive framework for promoting entrepreneurial activity. The majority of entrepreneurs start with a small business, with few starting with medium sized businesses, and eventually progress to the next level. Therefore, SMEs are considered stepping stone for entrepreneurs.

As shown in Figure 4.1, SMEs exist in huge numbers across the globe. Moreover, as discussed in Chapter 2, they contribute significantly to employment growth, income generation, social welfare, innovation and economic development. SMEs are considered as vital change agents in the market due to their flexibility and innovative practices.

Figure 4. 1: SME density across the World



Note: Name of region [#] signifies the number of economies from the region included in the analysis. The figure uses the most recent data available after the year 2000. The figure use data for 116 economies.

Source: Adopted from Kushnir et al. *(2010)*

SMEs in developing countries gain a labour cost advantage over large firms by using semi-skilled labour (Liedholm and Mead, 1987; Schmitz, 1995). This labour intensive nature of SMEs is an extremely lucrative benefit for developing countries with high unemployment levels, because it can immediately generate employment opportunities. In addition, large firms usually exist in metropolitan urban areas while SMEs benefit from the market niches in rural areas and suburban areas, especially in developing countries. Therefore, SMEs play a vital role in filling the employment gap in rural areas.

Inspite of the importance of SMEs, the majority of them either exit from the market within a decade or remain small. It is argued that this entry-exit process ensures that only competitive businesses survive. Nevertheless, these high exit rates pose questions not only with respect to the contributions of SMEs but also towards the policy interventions and multi-billion US dollar aid allocated for their improvement. Therefore, it can be inferred that not all SMEs contribute significantly in an economy but only those which grow and perform better (Bruton et al., 2008; Mason and Brown, 2014). This is why the analysis of the performance of SMEs is a key factor.

Different measures of performance of SMEs were explained in chapter 2 and shown in Figure 2.1. In this thesis, annual sales growth, annual employment growth and annual labour productivity growth have been used to measure the performance of SMEs. The performance analysis of SMEs will help in identifying those factors that impede, or facilitate, growth in entrepreneurial activity. Such an understanding will help governments and donor agencies to better understand the cross-country patterns and propose better SME support programmes. Therefore, the long-term sustainable growth objective of developing countries can thus be achieved not simply by all SMEs but by a higher proportion of the high performing SMEs.

The role of entrepreneurial ecosystems is important in ensuring the growth of SMEs through a supportive environment. As discussed in chapter 2, most of the previous research from an entrepreneurial ecosystems perspective has been carried out in high income (developed) countries while low and low-middle income countries have been ignored (Fosteret al., 2013). The business environment has always been dynamic and changing in every part of the world. The risks associated with change are manageable in developed countries, because these changes are usually quite foreseeable and these countries are adaptable. However, in LMICs these risks are augmented by poor access to finance, burdensome regulations, widespread corruption, poor infrastructure and political instability.

Nevertheless, SME activity is increasing in LMICs. It is believed that the dynamics of the business environment in LMICs are entirely different from those in the developed world. The underdeveloped institutions of these LMICs have made their entrepreneurial ecosystems a constraint for firm performance, rather than making it supportive for firms of different sizes and ages.

The measurement of the entrepreneurial ecosystem of LMICs is aimed at an assessment of the health of its individual components. According to a recent study by Taich et al. (2016), the identification of the weakest and strongest in the entrepreneurial ecosystem is important as a guide for policymakers, for instance, in deciding where to start their work for improvements in overall entrepreneurial ecosystem. Therefore, it is important to use a bottom-up approach to understand the existing entrepreneurial ecosystem before starting any reforms.

4.2 Research Questions

Therefore, the general aim of this chapter is to explain how components of the entrepreneurial ecosystem of LMICs affect the performance of SMEs using data from WBES. The main research questions for this chapter are:

- How the institutional framework and physical conditions affect the performance of firms of different sizes and ages?
- How can the components of the entrepreneurial ecosystem be ranked to find the weak links in entrepreneurial ecosystem of LMICs?
- Given the importance of corruption, what are its effects on the performance of SMEs?

The main contributions of this chapter are: firstly, this study is an addition to the relatively scarce literature on the analysis of entrepreneurial ecosystems of LMICs. Moreover, none of the existing studies has empirically examined the effect of all components of the entrepreneurial ecosystem on firm performance in LMICs. The components of the entrepreneurial ecosystem are also ranked with respect to their statistical significance and the magnitude of their effects. Secondly, the findings will provide a basis for policymakers, development agencies and researchers to better understand the entrepreneurial ecosystem of LMICs in order to promote entrepreneurship. The ranking of components of the entrepreneurial ecosystem on the basis of their magnitude of effects on SMEs, will help in finding weak links and setting priorities for gradually improving the components of the entrepreneurial ecosystem.

4.3 The Data and Descriptive Analysis

The data for 44 LMICs listed by the World Bank on the basis of their gross national income per capita was obtained from the WBES database for the period 2006-14. The Egyptian Arab Republic, Morocco and the Syrian Arab Republic were dropped due to their non-global survey methodology. In each survey round, the sample is selected randomly. Panel data is available for only a few developed countries and transition economies, but not for the LMICs group. Therefore, in this study pooled cross sectional survey data for 41 LMICs has been used. There are 22,267 SMEs in the final. The details regarding sample distribution are given in Table 4.1.

The performance of SMEs has been measured using annual sales growth, annual employment growth and annual labour productivity growth, in comparison to their sales and employment three years before. Data in the form of objective and subjective measurement of components of the institutional framework and physical conditions forming the entrepreneurial ecosystems is available in the database. The components of the institutional framework investigated here are government regulations, the taxation system and corruption, whereas access to finance, infrastructure, political stability, informal sector, and availability of an educated workforce are used as determinants of physical conditions.

The subjective, perception-based, data on components of the entrepreneurial ecosystems has been geographically aggregated to the province level, excluding the response of an individual firm, within each country. This provincial level aggregation has enabled the assessment of the impact of the entrepreneurial ecosystem on the firms operating within the province. The measurement of firm performance indicators and components of the entrepreneurial ecosystem are explained in Chapter 3, Table 3.4.

Table 4. 1: Descriptive Statistics of SMEs in Low-Middle Income Countries (2006-14)

Variables		Frequency	Percent
Firm Size	Small(<20)	12,380	55.6
	Medium(20-99)	9,887	44.4
Sector	Services Sector	8940	40.15
	Manufacturing Sector	13327	59.85
Legal Form	Sole Proprietorship	5,791	26.03
	Share Holding Company	1,064	4.78
	Partnership	11,464	51.53
	Limited Partnership	2,306	10.37
	Other	1,621	7.29
Ownership	Domestic	20,928	94.01
	Foreign	1,334	5.99
Exporter	Non-exporter	20,679	93.09
	Exporter	1,535	6.91
Firm Age	(1-5 years) Young firms	8031	36.07
	(more than 5 years) Old Firms	14236	63.93
Survey Year	2006	2,357	10.59
	2007	3,430	15.4
	2008	780	3.5
	2009	4,561	20.48
	2010	1,374	6.17
	2011	409	1.84
	2012	154	0.69
	2013	3,002	13.48
	2014	6,200	27.84

Means and standard deviations (SD) of the firm performance indicators for the LMICs for the period 2006-14 are given below in Table 4.2. These countries present an interesting mix with firms in some countries exhibiting average annual sales growth as high as 26% in Swaziland and as low as -7% in Uzbekistan and India. The firms in Bhutan and Timor-Leste showed the highest increase in employment growth by 14%, whereas Uzbekistan, Ukraine, Philippines, Kyrgyz Republic and Lao PDR showed an increase of less than 1%. The average annual labour productivity growth has increased by 19% in Congo and decreased in 14 countries, including India, Paraguay, Yemen, Uzbekistan, Kosovo and Mauritania.

Table 4. 2: Country wise summary statistics of performance of firms

		Sales Growth		Employment Growth		Labour Productivity Growth	
Country	N	**Mean**	**S.D**	**Mean**	**S.D**	**Mean**	**S.D**
Armenia	339	15.58	26.10	5.06	15.57	11.41	25.46
Bhutan	194	16.15	37.28	14.13	25.16	3.12	40.22
Bolivia	426	7.43	26.06	4.88	16.05	3.01	26.09
Cabo Verde	59	1.02	57.29	3.07	16.82	-0.92	56.26
Cameroon	248	15.35	23.94	2.97	15.70	12.49	24.89
Congo	38	25.21	35.58	7.03	15.80	19.36	37.95
Côte d'Ivoire	264	18.11	30.84	11.47	24.59	7.88	34.64
Djibouti	54	3.80	16.22	6.39	12.53	-1.23	19.67
El Salvador	555	5.63	23.28	2.31	15.46	3.30	24.38
Georgia	357	17.24	33.21	7.63	20.90	11.54	32.55
Ghana	823	9.79	25.57	6.12	16.22	3.97	27.96
Guatemala	595	2.37	23.22	0.62	18.54	2.01	24.73
Guyana	85	6.02	18.19	5.90	13.51	0.35	18.87
Honduras	450	5.16	30.61	2.05	14.59	3.08	31.75
India	6,200	-6.52	14.43	3.93	9.55	-10.35	15.69
Indonesia	889	3.46	28.06	5.38	21.72	-1.25	31.21
Kosovo	338	1.67	18.15	6.12	12.98	-4.09	20.69
Kyrgyz Republic	291	4.77	21.61	0.27	14.11	4.47	21.91
Lao PDR	442	6.94	30.85	0.10	18.94	6.59	30.18
Lesotho	84	12.07	40.73	11.35	27.90	3.54	42.77
Mauritania	186	4.55	11.86	8.26	9.90	-3.59	13.14
Micronesia	48	2.00	43.77	6.84	21.29	-2.34	43.98
Moldova	473	5.22	25.18	2.00	13.35	3.51	25.08
Mongolia	523	14.48	19.15	6.52	15.19	8.65	20.03
Nicaragua	545	3.29	28.27	3.77	14.48	-0.10	29.37
Nigeria	1,592	12.57	12.23	11.01	10.01	1.77	14.53
Pakistan	705	-0.69	16.34	2.11	7.71	-2.51	16.93
Paraguay	495	-4.56	25.25	5.86	16.91	-9.44	26.72
Philippines	725	8.80	30.03	-0.68	17.39	9.37	31.41
Samoa	63	5.53	34.97	7.42	18.94	-0.82	36.62
Senegal	385	7.89	9.67	8.63	11.36	-0.52	12.64
Sri Lanka	409	10.87	20.76	2.21	13.84	8.93	22.35
Swaziland	174	25.68	13.29	7.96	9.48	18.60	14.83
Timor-Leste	70	19.51	31.78	14.03	31.91	14.09	34.86
Ukraine	665	2.96	27.97	-1.15	16.28	4.30	26.46
Uzbekistan	430	-6.61	39.31	-2.61	19.51	-4.13	38.77
Vanuatu	69	17.78	25.71	12.57	20.26	5.05	23.85
Vietnam	508	14.19	29.27	6.63	22.16	8.10	30.21
West Bank and Gaza	197	6.29	17.60	6.39	14.39	0.21	19.88
Yemen	441	-3.23	25.43	2.35	15.46	-5.45	25.33
Zambia	833	13.16	26.38	5.27	14.18	8.50	27.85

The summary statistics of objective and subjective measures of the entrepreneurial ecosystem of LMICs are given in Table 4.3. The mean values for access to finance and infrastructure are highest with respect to other components, whereas the non-availability of an educated workforce as a problem is reported by the lowest percentage of firms in the sample. Power outages are an important infrastructural shortcoming reported by the firms. The maximum value of power outages in a month is 240 which can be converted to 10 power outages per day if 24 working days are assumed in a month.

Table 4. 3: Summary statistics for all SMEs in LMICs

	Mean	**S.D**	**Min**	**Max**
Annual sales growth (%)	3.60	24.33	-99.90	99.98
Annual employment growth (%)	4.49	15.04	-100.00	100.00
Annual labour productivity growth (%)	-0.56	25.11	-99.89	99.98
Government regulations	10.71	7.44	0.00	70.00
Tax rate and administration	9.30	9.10	0.00	52.46
Corruption	13.17	10.85	0.00	75.61
Access to finance	16.23	11.97	0.00	66.67
Infrastructure	23.35	20.53	0.00	93.26
Political instability	6.42	9.28	0.00	85.00
Non-availability of an educated workforce	4.41	4.76	0.00	31.58
Competition with informal sector	11.83	10.08	0.00	50.00
Time spent in meeting government regulations	6.22	10.93	0.00	92.00
Number of visits for meeting tax officials	1.87	3.46	0.00	85.00
Security cost as percentage of sales	1.45	3.87	0.00	99.10
Year operated before registration	0.81	4.34	0.00	31.00
Working capital financing from bank	12.92	25.04	0.00	100.00
Number of power outages in a month	10.04	17.51	0.00	240.00
Value lost due to power outages	3.28	7.33	0.00	95.00
Years of experience of top manager	15.62	10.15	0.00	40.00
Total number of permanent employees	22.85	20.45	0.00	99.00

In Table 4.4, the summary statistics of components of the entrepreneurial ecosystem are further divided with respect to the size and age of firms. There is a substantial difference in firms of different sizes and ages with respect to the most significant component of the entrepreneurial

ecosystem. The negative effects of access to finance were reported by 23% of small firms as compared to only 15% of medium sized firms. Similarly, infrastructural problems are reported by 35% of small firms, which is much higher than the figure reported by medium sized firms (25%). Also, there is a difference in the response of young and older firms in terms of recognizing any component as the most significant. These variations in responses of firms by different size and age suggest the need for further analysis, which we undertake in the regression analysis in the next section.

Table 4. 4: The importance of different components of the entrepreneurial ecosystem as reported by firms of different sizes and ages

Variables	Small firms	Medium sized firms	Young firms	Old firms
Government regulations	10.57	13.84	10.93	12.61
Tax rate and administration	9.04	11.81	8.95	10.99
Corruption	13.70	17.05	12.84	16.52
Access to finance	22.99	15.13	2.14	18.26
Infrastructure	34.73	25.49	38.39	26.37
Political Instability	6.78	6.97	6.22	7.23
Non-availability of an Educated Workforce	3.64	5.86	4.52	4.67
Competition with informal Sector	12.94	14.04	11.95	14.27

Note: Young firms are those less than or equal to 5 years of age, others are considered as old.

4.4 A Statistical Analysis of the Effect of Institutional Framework and Physical Conditions on Firm Performance

In this section, the research questions have been answered using the results of multiple regression methods and matching methods, and our findings are compared with those in the existing literature. The results of the multiple regression models are used to explain the effects of components of the entrepreneurial ecosystem (institutional framework and physical conditions) on the performance of SMEs in LMICs. Section 4.5 ranks those components based on their quantitative and statistical significance to allow us to discern which matter most for firms of

different sizes and ages. This identification of the weakest and the strongest links in the entrepreneurial ecosystem will help policymakers to decide the starting point for improvements in the entrepreneurial ecosystem of LMICs. According to the existing literature, the effect of corruption (the weakest link) on the performance of SMEs has been tested using matching methods, and results are explained in section 4.6.

We start the analysis of the effects of elements of institutional framework and physical conditions by examining a correlation matrix of all the covariates. The aim is to check for collinearity among the predictors used in regression analysis. The results reported in Table 4.5 show that a few variables are correlated but there is no issue of widespread bivariate collinearity among the predictors. Moreover, robust standard errors are used in regression estimation to avoid the problem of heteroscedasticity, rendering the regression estimates free of multi-collinearity and heteroskedasticity issues.

The values of the R^2 reported in Tables 4.6 and 4.7, range from 6% to 15%. These values of the R^2 are relatively low, however, it has been ascertained in the literature that in spite of this, the theoretically argued relationship between predictors and response variables can be significant and reveal interesting findings. Thus, a meaningful relationship can possibly exist even when value of R^2 is low. Moreover, the values of the F-tests reported in Table 4.6 and 4.7 show the goodness of fit of our models. Therefore, the results of the multiple regression analysis generate interesting findings about the health of the entrepreneurial ecosystem of LMICs.

Table 4. 5: Correlation matrix of predictors used in regression estimation

		AF	Reg	Inf	Corr	CIF	Pol	Tax	WFE	BankF	Treg	TaxA	InfExp	SC	Elec	TMExp	size	age
Access to finance	AF	1																
Government regulations	Reg	-0.178	1															
Infrastructure	Inf	-0.132	-0.439**	1														
Corruption as	Corr	-0.338*	0.040	-0.263	1													
Competition with informal sector	CIF	-0.068	0.123	-0.467**	-0.011	1												
Political instability	Pol	-0.022	-0.080	-0.333*	-0.001	0.097	1											
Taxation system	Tax	-0.143	0.071	-0.156	0.016	-0.158	-0.187	1										
Workforce education	WFE	-0.074	0.113	-0.158	0.013	0.133	-0.021	0.100	1									
Working Capital Bank Financing (%)	BankF	-0.094	0.131	-0.077	0.120	0.015	-0.080	0.078	0.044	1								
Time spent in meeting govt regulations (hours)	TReg	-0.012	0.024	-0.105	0.001	0.113	0.106	-0.066	0.106	-0.009	1							
Number of visits for meeting tax officials	TaxA	0.060	-0.031	0.082	-0.065	-0.092	0.032	-0.026	-0.016	-0.019	0.048	1						
Years operated without registration	InfExp	0.051	-0.006	-0.045	-0.030	0.018	0.010	0.023	0.014	-0.024	0.012	-0.008	1					
Security Cost (% of sales)	SC	0.000	-0.031	0.014	0.022	-0.008	0.029	-0.039	0.007	-0.008	0.066	0.040	0.000	1				
Number of power outages in a month	Elect	-0.106	-0.009	0.411**	0.080	-0.336*	-0.109	-0.107	-0.196	0.067	-0.078	0.083	-0.036	-0.006	1			
Experience of top manager (years)	TMExp	-0.035	-0.022	-0.086	0.071	0.086	0.110	-0.028	0.033	0.017	0.076	-0.012	0.098	0.012	-0.037	1		
Firm size	Size	-0.076	0.118	-0.140	0.103	0.048	-0.024	0.089	0.082	0.075	0.040	0.005	0.011	-0.006	-0.023	0.035	1	
Age of firm	Age	-0.080	0.083	-0.142	0.130	0.054	0.044	0.073	0.014	0.069	0.019	-0.030	0.112	0.004	-0.027	0.359*	0.119	1

*** Significant at 1%, ** significant at 5% and * significant at 10%

4.4.1 The Effect of Institutional Framework on Firm Performance

The effect of the institutional framework arises through both formal and informal institutions. The elements of formal institutions are government regulations and the taxation system, whereas corruption is used as an indicator of informal institutions. The measurement of these variables is explained in Chapter 3, Table 3.4.

It can be seen from Tables 4.6 and 4.7 that government regulations in LMICs have a statistically significant negative effect on the performance of firms of all sizes and ages. However, the magnitude of these effects on performance of medium sized firms is large relative to firms in the other size groups. A marginal increase in government regulations is expected to decrease the sales growth and labour productivity growth of medium sized firms by 0.37% and 0.25% respectively. On the other hand, the age based classification shows that the magnitude of the negative effect of government regulations is substantially higher for young firms when compared with older firms. A marginal increase in government regulations is expected to decrease the sales growth, employment growth and labour productivity growth of young firms by 0.45%, 0.19% and 0.27%, respectively. The higher magnitude of effect on young firms could be because it takes time and money to understand and follow government regulations. Moreover, in the early years, firms are closely monitored by the regulators, whereas later on they are either not closely observed, or they understand the requirements and follow them easily.

Compliance with government regulations is difficult and probably costly for all SMEs. Since the sampling frame for this study consisted of only registered firms that have to spend time in meeting government regulations, compliance is not just a cost for the firms but it also opens different business opportunities as well. It can be seen from results in Table 4.6 that time spent in

meeting government regulations has a statistically significant positive effect on performance of SMEs.

However, spending time in meeting government regulations has proved relatively more productive for medium sized and young firms. It can be inferred that an additional ten hours per week spent in meeting government regulations are expected to increase the sales growth and labour productivity growth of medium sized firms by 1.02% and 0.75% and labour productivity growth of young firms by 1.13%. Thus, compliance of government regulations is expected to create new business opportunities. This positive effect confirms the argument of Zinnes (2009) that compliance of government regulations is expected to create more business opportunities for firms because only firms complying with government regulations are considered eligible for government's financial support, training and development and business opportunity incentives. The findings of this study are in line with findings of other studies mentioned in literature, such as the work by De Jong and Van Witteloostuijn (2015), Griffith et al. (2010), and Carter et al. (2009).

The results reported in Tables 4.6 and 4.7 show that tax rates and administration has a statistically significant negative effect on the performance of medium sized and young firms only. A marginal increase in the tax rate is expected to decrease the sales growth and labour productivity growth of medium sized firms by 0.18% and 0.15% and young firms by 0.19% and 0.12%, respectively. Johansson et al. (2010) found similar results for the effect of corporate tax rate on the investment and productivity of medium sized firms.

Table 4. 6: A multiple regression model for the effect of components of the entrepreneurial ecosystems on performance of SMEs

	Sales Growth			Employment Growth			Labour Productivity Growth		
	All firms	Small firms	Medium firms	All firms	Small firms	Medium firms	All firms	Small firms	Medium firms
Government regulations	-0.235***	-0.124**	-0.366***	-0.117***	-0.107**	-0.113**	-0.123**	-0.031	-0.248***
	(0.040)	(0.055)	(0.059)	(0.026)	(0.036)	(0.036)	(0.042)	(0.058)	(0.062)
Tax rate and administration	-0.088**	-0.002	-0.182***	-0.006	0.021	-0.021	-0.077**	-0.017	-0.154***
	(0.032)	(0.046)	(0.046)	(0.021)	(0.030)	(0.029)	(0.034)	(0.049)	(0.048)
Corruption	-0.207***	-0.174***	-0.234***	-0.118***	-0.061**	-0.169***	-0.097**	-0.125**	-0.069*
	(0.029)	(0.042)	(0.042)	(0.019)	(0.027)	(0.026)	(0.031)	(0.044)	(0.044)
Access to finance	-0.187***	-0.103**	-0.288***	-0.024	0.011	-0.055*	-0.161***	-0.112**	-0.233***
	(0.033)	(0.046)	(0.048)	(0.021)	(0.030)	(0.030)	(0.035)	(0.049)	(0.050)
Infrastructure	-0.088***	-0.017	-0.184***	-0.031	-0.006	-0.050	-0.056	-0.014	-0.127**
	(0.034)	(0.045)	(0.053)	(0.022)	(0.029)	(0.033)	(0.036)	(0.047)	(0.056)
Political instability	-0.242***	-0.240***	-0.235***	-0.134***	-0.144***	-0.104**	-0.113**	-0.106**	-0.127**
	(0.038)	(0.051)	(0.058)	(0.024)	(0.033)	(0.036)	(0.040)	(0.054)	(0.061)
Non-availability of an educated workforce	-0.130**	-0.050	-0.223**	-0.070*	-0.028	-0.128**	-0.077	-0.038	-0.116
	(0.059)	(0.081)	(0.088)	(0.038)	(0.053)	(0.054)	(0.062)	(0.086)	(0.092)
Competition with informal sector	-0.154***	-0.083*	-0.231***	-0.073***	-0.046	-0.078**	-0.075**	-0.038	-0.137**
	(0.035)	(0.048)	(0.051)	(0.022)	(0.031)	(0.031)	(0.037)	(0.051)	(0.053)
Working capital bank financing (%)	-0.005	-0.001	-0.006	0.001	0.007	-0.002	-0.005	-0.009	-0.002
	(0.007)	(0.010)	(0.009)	(0.004)	(0.007)	(0.005)	(0.007)	(0.011)	(0.009)
Time spent in meeting govt regulations (hours)	0.080***	0.063**	0.102***	0.020**	0.007	0.034**	0.066***	0.061**	0.075***
	(0.015)	(0.021)	(0.022)	(0.010)	(0.014)	(0.014)	(0.016)	(0.022)	(0.023)
Number of visits for meeting tax officials	0.024	-0.027	0.103	-0.002	0.053	-0.072*	0.040	-0.033	0.150**
	(0.046)	(0.063)	(0.069)	(0.030)	(0.041)	(0.042)	(0.049)	(0.067)	(0.072)
Years operated without registration	0.056	0.080	0.049	-0.046**	-0.029	-0.049*	0.089**	0.103*	0.083*
	(0.036)	(0.055)	(0.048)	(0.023)	(0.036)	(0.030)	(0.038)	(0.058)	(0.050)
Security cost (% of sales)	-0.207***	-0.211***	-0.194**	-0.067**	-0.121***	0.010	-0.146***	-0.107*	-0.191**
	(0.040)	(0.052)	(0.063)	(0.026)	(0.034)	(0.039)	(0.042)	(0.055)	(0.066)
Number of power outages in a month	-0.019*	-0.020	-0.019	-0.012*	-0.013	-0.010	-0.008	-0.010	-0.006
	0.011	0.015	0.016	0.007	0.010	0.010	0.012	0.016	0.017
Old firms (age above 5 years)	-3.729***	-3.503***	-3.829***	-3.374***	-3.127***	-3.630***	-0.807**	-0.952*	-0.459
	(0.357)	(0.480)	(0.540)	(0.228)	(0.312)	(0.333)	(0.376)	(0.508)	(0.566)
Constant	21.221***	15.766	28.751***	13.281***	10.741***	16.922***	8.678**	6.176	12.017**
	(2.669)	(3.708)	(3.903)	(1.703)	(2.407)	(2.408)	(2.810)	(3.922)	(4.090)
F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.130	0.124	0.146	0.074	0.088	0.079	0.095	0.083	0.113
Observations	22267	12380	9887	22267	12380	9887	22267	12380	9887

*** Significant at 1%, ** significant at 5% and * significant at 10%, Robust standard errors are in parenthesis
Dummy variable for firm age is used with young firms as reference category. Dummy variable for country is also used but the output of country dummies is absorbed.

Table 4. 7: A multiple regression model for the effect of components of the entrepreneurial ecosystems on the performance of young and old SMEs

	Sales Growth		**Employment Growth**		**Labour Productivity Growth**	
	Young firms	Old firms	Young firms	Old firms	Young firms	Old firms
Government regulations	-0.455***	-0.125**	-0.191***	-0.086**	-0.265***	-0.048
	(0.069)	(0.049)	(0.046)	(0.030)	(0.073)	(0.052)
Tax rate and administration	-0.194***	-0.042	-0.071*	0.003	-0.119*	-0.044
	(0.060)	(0.039)	(0.040)	(0.024)	(0.063)	(0.040)
Corruption	-0.326***	-0.143***	-0.211***	-0.074***	-0.115**	-0.081**
	(0.052)	(0.036)	(0.035)	(0.022)	(0.056)	(0.037)
Access to finance	-0.325***	-0.124**	-0.116**	0.011	-0.198**	-0.140***
	(0.060)	(0.040)	(0.041)	(0.024)	(0.064)	(0.042)
Infrastructure	-0.223***	-0.037	-0.099**	-0.010	-0.113*	-0.032
	(0.062)	(0.040)	(0.042)	(0.025)	(0.066)	(0.042)
Political instability	-0.276***	-0.243***	-0.121**	-0.149***	-0.148**	-0.109**
	(0.067)	(0.046)	(0.046)	(0.028)	(0.072)	(0.048)
Non-availability of an educated workforce	-0.310**	-0.053	-0.142**	-0.038	-0.178*	-0.038
	(0.099)	(0.074)	(0.067)	(0.045)	(0.105)	(0.078)
Competition with informal sector	-0.286***	-0.093**	-0.114**	-0.063**	-0.155**	-0.030
	(0.062)	(0.042)	(0.042)	(0.025)	(0.067)	(0.044)
Working capital bank financing (%)	0.015	-0.010	0.015*	-0.003	0.002	-0.007
	(0.013)	(0.008)	(0.009)	(0.005)	(0.013)	(0.008)
Time spent in meeting govt regulations (hours)	0.078**	0.081***	-0.027	0.042***	0.113***	0.045**
	(0.028)	(0.018)	(0.019)	(0.011)	(0.030)	(0.019)
Number of visits for meeting tax officials	-0.036	0.085*	0.016	-0.016	-0.012	0.094
	(0.071)	(0.062)	(0.048)	(0.038)	(0.076)	(0.064)
Years operated without registration	0.471	0.066**	0.670**	-0.038*	-0.231	0.096**
	(0.359)	(0.036)	(0.243)	(0.022)	(0.383)	(0.038)
Security Cost (% of sales)	-0.174**	-0.218***	-0.043	-0.075**	-0.121	-0.155**
	(0.070)	(0.048)	(0.048)	(0.030)	(0.075)	(0.051)
Number of power outages in a month	-0.036**	-0.010	-0.006	-0.010	-0.030	0.001
	0.019	0.014	0.013	0.008	0.020	0.014
Medium sized firms	0.996*	1.501***	2.388***	1.784***	-1.543**	-0.093
	(0.577)	(0.389)	(0.391)	(0.238)	(0.615)	(0.408)
Constant	36.643***	10.366***	20.146***	7.307***	16.455***	3.834
	(4.834)	(3.196)	(3.277)	(1.953)	(5.154)	(3.348)
F-test	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.138	0.110	0.067	0.057	0.092	0.099
Observations	8031	14236	8031	14236	8031	14236

*** Significant at 1%, ** significant at 5% and * significant at 10%, Robust standard errors are in parenthesis
Dummy variable for firm size is used with small firms as a reference category. Dummy variable for country is also used but output of country dummies is absorbed. Young firm have age less than 5 years, others are old.

Thus, it can be inferred that formal institutions in LMICs have statistically significantly negative effects on the performance of SMEs. However, the magnitude of these effects is relatively higher for medium sized and young firms. Since the magnitude of effects is substantially higher for medium sized firms and young firms, this should be kept in mind when introducing any institutional reforms for SMEs.

As discussed in Chapter 2, effective institutions reduce transaction costs for business and provide an enabling environment to existing and new ventures (Fritsch and Storey, 2014; Williams and Vorley, 2015). However, it is important for policymakers to look at both formal and informal institutional framework conditions to foster entrepreneurship. The results reported in Tables 4.6 and 4.7 show that corruption as an indicator of informal institutions has a statistically significant negative effect on the performance of SMEs in LMICs. However, just like formal institutions, the medium sized and young firms will benefit more from a decrease in corruption.

The estimated effects indicate that a unit decrease in corruption perception is expected to improve the sales growth and employment growth of medium sized firms by 0.23% and 0.17%, and young firms by 0.33% and 0.21%, respectively. Wu (2009) suggested that corrupt officials choose targets on the basis of their ability to pay bribes. Medium sized firms have greater capacity to pay bribes than small firms, which may explain why the magnitude of the effect is larger for these firms. Also, the amount and number of bribes to be paid is linked to networking with the relevant officials (Blagojević and Damijan, 2013; De Rosa et al., 2010), and old firms are expected to be relatively better connected than young firms. Therefore, it can be argued on the basis of these findings that, experience of firms in the market improves their understanding of the market dynamics and ties with relevant government officials. The maturity of a firm

enhances its ability to either negotiate the external challenges or adapt to the external environment.

4.4.2 The Effect of Physical Conditions on Firm Performance

The elements of physical conditions include access to finance, infrastructure, political stability, an educated workforce and the informal sector. The detailed definitions and measurement of these indicators is given in Chapter 3, Table 3.4. The results in Tables 4.6 and 4.7 show that a lack of access to finance has a statistically significant negative effect on the performance of all types of SMEs. However, the magnitude of these negative effects is larger for medium sized and young firms. A marginal increase in the difficulty in obtaining bank financing is expected to decrease sales growth and labour productivity growth by 0.28% and 0.23% for medium sized firms and 0.32% and 0.19% for young firms. These results are similar to the findings of the studies discussed in the literature by Becket al. (2005b), Oliveira and Fortunato (2006), Aterido et al. (2007), and Ayyagari et al. (2008).

According to Djankov et al. (2002b), small firms use informal sources, including friends and family members, to fulfil their financial requirements and avoid external financing. Since, the financial needs of medium sized firms are relatively higher than small firms and beyond the capacity of informal sources only, the performance of medium sized firms is more severely affected when external formal financing is either costly, or difficult to obtain. Moreover, it can be argued that the experience of a firm in the market saves it from the financial obstacles. The history of survival and success of old firms is used by the banks to lend money. It can be argued on the basis of findings that bank financing is costly for firms, and an increase in difficulty in borrowing is expected to have a negative effect on firm performance. Therefore, improvements

in financial markets to make financing cheaper and easier to obtain are expected to decrease the financial worries of all SMEs.

Just like access to finance, infrastructure has a statistically significant negative effect on the performance of medium sized and young firms. It can be seen in Tables 4.6 and 4.7 that a unit increase in infrastructural problems is expected to decrease sales growth and labour productivity growth by 0.18% and 0.13% for medium sized firms and 0.22% and 0.11% for young firms. These findings are consistent with the studies of Scott et al. (2014), Moyo (2012) and Banerjee et al. (2012).

However, the insignificant effect of infrastructure on performance of small and old firms seems counter-intuitive. It can be argued that the use and dependence of medium sized and young firms on the infrastructural facilities is relatively high, so their performance is negatively affected by poor quality of infrastructure. The investment in infrastructural support is non-developmental for business. If the resources allocated to these infrastructural inefficiencies were used for training and development of employees, labour productivity could have been improved. On the other hand, an old firms' adaptability to the external environment minimizes the effect of these external infrastructural problems and the narrow scope of business of small firms allows them to operate with the available infrastructure. The development of both small and old firms however, depends on quality of infrastructure.

The effect of political instability has been found to be statistically significantly negative and high in magnitude for performance of firms of all sizes and ages. A marginal increase in political instability is expected to decrease the sales growth, employment growth and labour productivity growth of all firms by 0.24%, 0.13% and 0.11%, respectively. The similar level of effect on productivity was found in studies by Klapper et al. (2013), Petracco and Schweiger

(2012), Cerra and Saxena (2008) and Ayyagari et al. (2008). It can be inferred on the basis of these findings that political instability increases the risk and uncertainty for SMEs. The hesitation in further investment, or a safety first attitude because of inconsistent government policies, can possibly be the reasons for a decrease in performance of firms.

Similarly, a one percent increase in security cost as percentage of sales is expected to decrease sales growth, employment growth and labour productivity growth of all SMEs by 0.21%, 0.07% and 0.15%, respectively. The cost incurred in protecting the business under conditions of insecurity is another non-productive investment for entrepreneurs, especially for owners of small firms. Collier and Duponchel (2013) found a similar negative effect of conflicts and violence on revenue growth of firms in Sierra Leone. The findings are opposite to those by Petracco and Schweiger (2012) who suggested that employment growth of small and medium and young and old firms remained unaffected by the conflicts in Georgia. However, that study was specific to the context of the Georgia-Russia conflict over South Ossetia. Therefore, they might not be comparable with other regions with a different type and intensity of security problems.

The non-availability of an educated workforce has a statistically significant negative effect on the performance of medium and young firms only. The estimates reported in Tables 4.6 and 4.7 show that non-availability of an educated workforce reduces sales growth, employment growth and labour productivity growth. Therefore, a marginal improvement in the availability of an educated workforce is expected to increase the sales growth of medium sized firm by 0.22% and young firms by 0.31%. The findings of a study by Doms et al. (2010) showed the positive effects of an educated workforce on firms' revenues and profitability. Also Banker et al. (2008) found that an educated workforce had a positive effect on the performance of IT firms in Taiwan.

The performance of both small and old firms is expected to remain unaffected by the non-availability of an educated workforce. The insignificant effect on the performance of small firms indicates their low demand for skilled and educated labour. On the other hand, medium sized firms are involved in relatively more complex technology and operations, therefore, the non-availability of an educated workforce can significantly negatively affect their performance. Moreover, it is a challenge for young firms to attract skilled labour, whereas mature firms are better able to attract and retain skilled workers by offering better terms and conditions. The findings of studies by Galindo-Rueda and Haskel (2005) and Collier et al. (2011) suggest that investment in human capital by firms and governments has statistically significant positive effects on firm performance and the overall economy; and will not only improve the rate of survival of firms, but will also improve their profitability and productivity.

An increase in informal businesses takes away market share from formally registered businesses. Therefore, an increase in competition with the informal sector is expected to negatively affect the performance of existing firms. The results reported in Table 4.6 show a statistically significant negative effect of competition with the informal sector on the performance of SMEs. However, the magnitude of the negative effect is relatively higher for medium sized and young firms. It can be estimated that a marginal increase in competition with the informal sector will decrease sales growth and labour productivity growth of medium sized firms by 0.23% and 0.14% (see Table 4.6) and young firms by 0.29% and 0.16% (see Table 4.7), respectively. These findings are in line with studies mentioned in the literature (Maloney, 2004; Williams and Kedir, 2017a).

However, the informal sector has its cost and benefits. It gives valuable experience to new entrepreneurs, with a relatively low cost of compliance, but it also increases competition

with the formal economy. It can be seen in the results in Tables 4.6 and 4.7 that firms enjoy positive externalities from experience in the informal sector. A one year increase in the experience of firms in the informal economy is expected to increase the labour productivity growth of small firms by 0.10% and medium sized firms by 0.08% and employment growth of young firms by 0.67%. The positive effect of operating in the informal economy before formal registration could be the reason why a substantial number of firms in LMICs choose to remain informal. Williams et al. (2017) also suggested a similar positive effect of experience in the informal market.

It can be inferred that firms in LMICs initially operate in the informal sector and, after gaining useful experience, register in formal economy. Moreover, young registered firms are negatively affected by the competition from firms in informal sector. Thus, it can be concluded that the informal sector has both positive and negative effects on the performance of SMEs. It provides important market experience and understanding to the firms looking towards registration in the formal economy, but at the same time these informal firms take advantage of their low compliance costs and significantly negatively affect the performance of registered young and medium sized firms.

4.5 Weak Links in Entrepreneurial Ecosystems of LMICs

After the analysis of the effects of elements of the institutional framework and physical conditions in the earlier section, this section explains which components are the weakest links in the entrepreneurial ecosystem of LMICs. Both the institutional framework and physical conditions are equally important for the success of an entrepreneurial ecosystem. However, when it comes to setting priorities about what needs to be corrected immediately with most effect, then identification of weaker links in the system become more important. No study in the literature

has used all of the components of the entrepreneurial ecosystem in one model to test their effect on the performance of SMEs in LMICs. Also, no study has ranked the entrepreneurial ecosystem components in terms of their effectiveness in enhancing the performance of firms of different sizes and ages.

The results in Tables 4.6 and 4.7 are used to perform a comparative analysis of the effects of different components of the entrepreneurial ecosystem; all of which have a negative effect on the performance of SMEs. Therefore, the entrepreneurial ecosystem of LMICs can be considered as a constraint on the performance of firms. However, the top three components are selected on the basis of the level of statistical significance and the magnitude of their effect on the performance of firms of different sizes and ages. This ranking suggests that corruption, government regulations and political instability are the most important components for the performance of SMEs in LMICs. Government regulation and corruption are part of the institutional framework and political instability is an element of physical conditions.

The inefficient functioning of formal institutions and widespread corruption negatively affects entrepreneurial activity in a region (Vorley and Williams, 2016), and the poor condition of institutions in LMICs has been reported by a number of studies in the literature (Blagojević and Damijan, 2013; De Jong and Van Witteloostuijn, 2015; Fisman and Svensson, 2007; Wu, 2009). Political instability is another important hindrance to success for SMEs. Uncertainty in political conditions results in inconsistent policies which weakens the institutions. The study by Klapper et al. (2013) suggested that political instability negatively affected the size of firms. Similarly, the studies by Cerra and Saxena (2008), Camacho and Rodriguez (2013) and Collier and Duponchel (2013) have found negative effects of different kinds of political instability (e.g. terrorist activities, conflict between two countries, civil war, government changes etc.) on firm

performance. Therefore, it can be concluded that performance of SMEs in LMICs can improve significantly if improvements in control over corruption, government regulation and political instability are ensured.

However, analysis of the entrepreneurial ecosystem of LMICs shows that corruption is the most significant problem for firms of all sizes and ages. The problems in institutional frameworks may be the reason why firms get involved in corruption to ensure survival and growth in the market; weak institutions compel entrepreneurs to engage in corrupt practices for survival in the market. The response of entrepreneurs to deal with corruption varies from using different strategies to avoid corruption or accepting it as a cultural aspect and so become perpetrators of corruption. Therefore, it is important to introduce reforms to improve the performance of formal institutions; however, it is equally important to improve the interplay of formal and informal institutions (Ahlstrom and Bruton, 2002; Tonoyan et al., 2010). Thus, corruption can be regarded as the weakest link in entrepreneurial ecosystem of LMICs and an improvement in control over corruption should be the first priority of LMICs in order to make their entrepreneurial ecosystem conducive for the performance of SMEs.

4.6 Further Analysis of the Effects of Corruption on Firm Performance

This section is aimed at investigating the effect of levels of corruption on the performance of SMEs in more depth. The effect of corruption on firm performance has been investigated by studies cited in Chapter 2, but no study has compared the performance of SMEs in the least corrupt and the most corrupt LMICs as determined by the perception of business owners/managers. Therefore, using propensity score matching we examine the effect of corruption on firm performance, which is a methodological contribution of this study. Firm

performance in the most corrupt countries is expected to be substantially lower than firm performance in the least corrupt countries.

The perception of owners/managers of the firms regarding the effect of corruption on doing business is aggregated to province level for each country. The data is divided into 4 quartiles with respect to levels of corruption. The level of corruption in the 1st quartile ranges from 0.58% to 5.04% and in the 4th quartile it ranges from 18.84% to 39.22%. As shown in Table 4.8, firms in the 1st quartile belong to the least corrupt countries and this is considered as a control group, whereas firms in 4th quartile are from the most corrupt countries and considered as the treated group, with 'high doses' of corruption assumed as the treatment. There are 5,481 firms from 14 LMICs in the treated group and 9,006 firms from 10 LMICs in control group. It is expected that higher 'doses' of corruption (treatment) would substantially reduce the performance of treated firms as compared to counterfactual firms (similar firms operating in the least corrupt countries).

The summary statistics in the treated and control groups with respect to the covariates used in the propensity score estimation are given in Table 4.9. The mean values of covariates are balanced between the treated and control groups, except the percentage of working capital financing from bank. Therefore, firms in treated and control groups are expected to be similar on the basis of all other characteristics.

The methodology has been explained in section 3.2 of Chapter 3. The process begins with using appropriate covariates to estimate propensity scores, via a probit model. These propensity scores are used for testing the important assumptions, including the balancing property, hidden bias and overlap and common support, before estimating the Average Treatment Effect on

Treated (ATT). These diagnostics ensure that the ATT estimates are unbiased and indicate only the effect of treatment on treated units.

Table 4. 8: The percentage of firms reporting corruption as an obstacle to firm performance: Treated vs Control group countries

Control Group			Treated Group		
Country	**Number of firms (5481)**	**Percentage of corruption**	**Country**	**Number of firms (9006)**	**Percentage of corruption**
Georgia	173	0.58	India	6200	18.84
Lao PDR	288	0.69	Yemen	441	22.22
Uzbekistan	170	1.18	Vanuatu	69	23.19
Côte d'Ivoire	264	2.27	Lesotho	84	23.81
Armenia	160	2.50	Moldova	234	24.36
Ghana	823	2.55	Swaziland	174	25.29
Senegal	385	3.12	Guatemala	595	25.71
Mauritania	186	3.23	Honduras	450	28.89
Vietnam	508	3.35	El Salvador	555	29.37
Sri Lanka	409	3.91	Kosovo	204	39.22
Micronesia	48	4.17			
Nigeria	1592	4.21			
West Bank and Gaza	197	4.57			
Mongolia	278	5.04			

Table 4. 9: Summary statistics of SMEs in Treated and Control group

	Control group				Treated group			
	Mean	S.D	Min	Max	Mean	S.D	Min	Max
Percentage of working capital financing from bank	6.48	18.11	0	100	20.26	29.77	0	100
Averagely weekly hours spent by senior management in meeting government regulations	5.30	8.46	0	90	4.49	9.03	0	90
Average no of visit for meetings with tax officials	2.44	4.07	0	85	1.90	3.72	0	85
Year operated before registration	1.01	4.96	0	31	0.57	3.14	0	31
Security cost as percentage of sales	1.43	3.61	0	85.7	1.37	3.83	0	66.65
No of power outages in a month	10.25	12.74	0	240	14.26	22.08	0	100
Value lost due to power outage (% of sales)	4.88	8.57	0	95	2.81	6.55	0	80
Years of experience of top manager	14.12	9.06	1	40	15.10	10.06	1	40
Total no of permanent employees	18.09	18.05	1	99	26.38	21.21	0	98

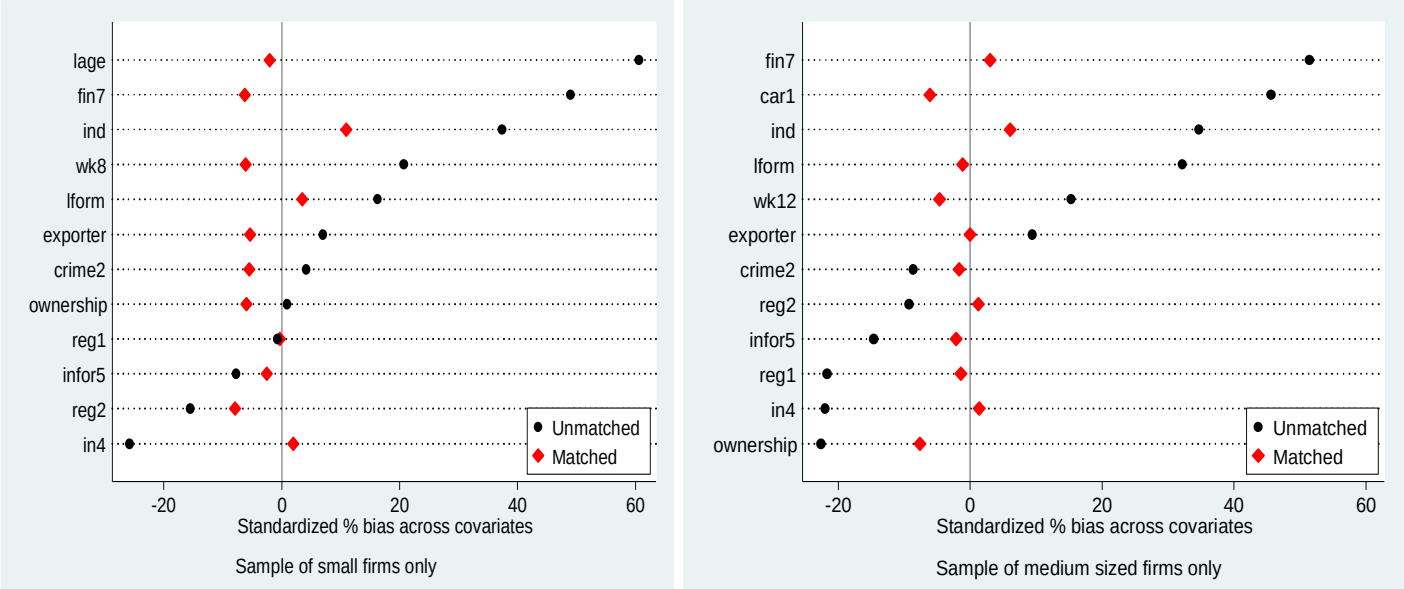
The balancing property is tested through propensity scores (Dehejia and Wahba, 2002; Diprete and Gangl, 2004). The low values of bias for the matched samples shows that treatment assignment is unbiased and the procedure for matching methods will be able to balance the samples on the covariates. The results of propensity scores are reported in Table 4.10. The low value of the percentage of bias in the matched treatment assignment shows that we have a balanced sample. Figure 4.2 confirms this finding. Thus, it can be inferred that assignment to treatment using propensity scores is independent of the outcome. Thus, the balancing property is satisfied and matching estimates on the basis of treatment assignment will be unbiased.

Table 4. 10: A Probit model for propensity scores estimation and biasness in matched and unmatched samples (all firms and small and medium sized firms), separately

	All firms			**Small firms**			**Medium firms**		
		Percentage Bias			Percentage Bias			Percentage Bias	
		UM	M		UM	M		UM	M
Time spent in meeting government regulations	-0.001 (0.001)	-9.3	-3.4	0.005** (0.002)	-0.7	-0.3	-0.007*** (0.002)	-21.7	-1.4
Number of visits of tax officials	-0.015*** (0.003)	-13.7	-1.6	-0.016*** (0.004)	-15.5	-7.9	-0.004 (0.004)	-9.2	1.3
Security cost as percentage of sales	0.003 (0.003)	-1.5	-3.5	0.011*** (0.004)	4.2	-5.5	-0.006 (0.005)	-8.6	-1.7
Working capital financing from bank	0.012*** (0.001)	56.0	-2.5	0.013*** (0.001)	49.0	-6.3	0.009*** (0.001)	51.4	3.0
Years operated before registration	-0.040*** (0.003)	-10.8	-1.8	-0.042*** (0.005)	-7.7	-2.5	-0.047*** (0.005)	-14.6	-2.1
Value lostdue to power outages	-0.021*** (0.002)	-19.8	1.6	-0.020*** (0.002)	-25.8	1.9	-0.023*** (0.003)	-22.0	1.4
Experience of top manager	-0.013*** (0.001)	10.3	-5.4	-0.009*** (0.002)	20.7	-6.2	0.002** (0.001)	16.7	-4.1
Age of firm	0.661*** (0.020)	62.3	-0.9	0.635*** (0.027)	60.6	-2.1	0.030*** (0.002)	45.6	-6.1
Exporter	0.071 (0.050)	14.4	0.0	0.114 (0.090)	7.0	-5.4	0.016 (0.059)	9.4	0.0
Ownership	-0.147*** (0.056)	-7.8	-1.6	0.251*** (0.086)	0.9	-1.0	-0.396*** (0.073)	-22.6	-2.6
Legal form	0.088*** (0.008)	22.1	3.6	0.080*** (0.012)	16.3	3.5	0.089*** (0.011)	32.2	-1.1
Constant	-2.176*** (0.073)			-1.765*** (0.071)			-0.399*** (0.062)		
Observations	14478			7904			6575		
log likelihood	-8117.77			-4709.36			-3334.85		

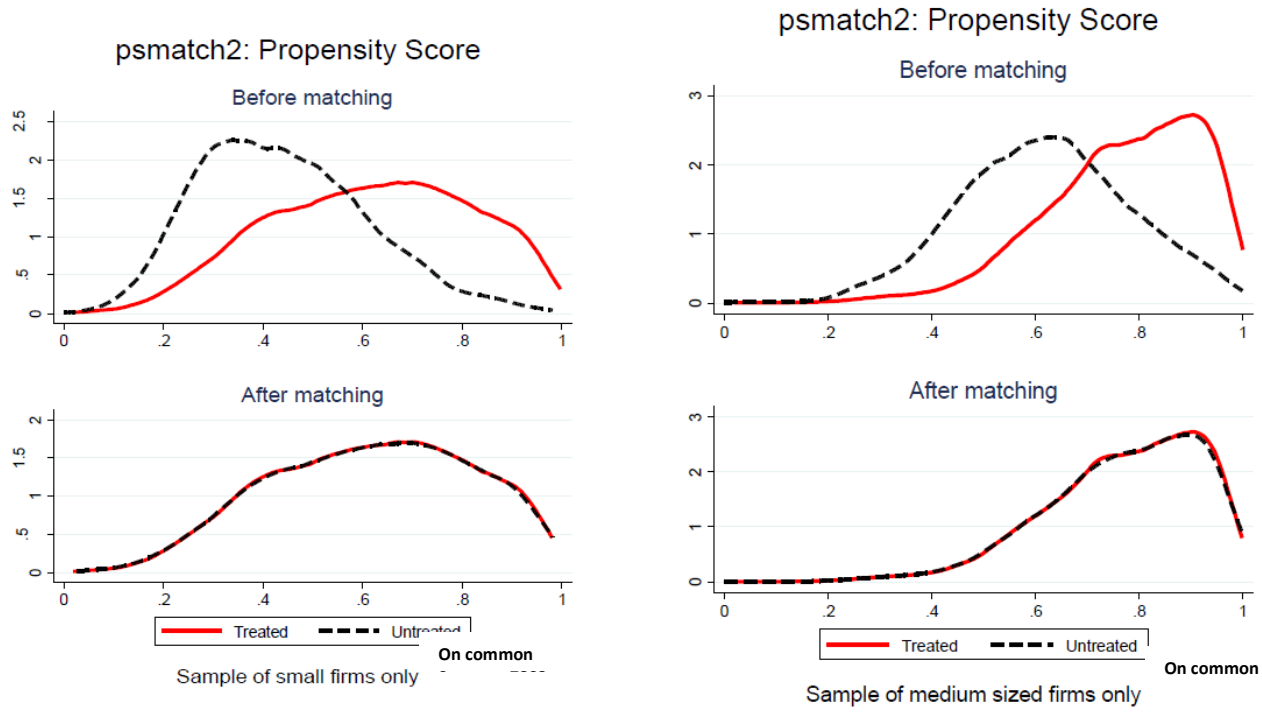
*** Significant at 1%, ** significant at 5% and * significant at 10%, Standard errors are in parenthesis
UM= % of bias in unmatched samples, M=% of biasness in matched samples

Figure 4. 2: Balancing property of matched and unmatched samples of small and medium sized firms



Testing for the common support and overlap conditions is another important assumption with respect to matching methods. This assumption tests the positive probability of getting at least one comparable firm from the control group as counterfactual evidence for each firm in the treated group. The firms in the treated group which have no closely comparable counterfactual evidence in the control group are deemed off the common support region and are excluded from estimates of the ATT. Figure 4.3 shows that matched samples for both small and medium sized firms exhibit sufficient overlap for finding counterfactual evidence for the firms in the treated group. Thus, the common support and overlap conditions are satisfied.

Figure 4. 3: Testing the Overlap and common support condition before and after matching of small and medium sized firms



Hidden bias is another important assumption to check before estimating the ATT. It confirms that all important covariates are included in the model for estimation of the propensity scores, and the estimates are robust with respect to unobserved heterogeneity. Gamma ***Γ*** is the odds ratio of receiving treatment for two firms similar in terms of covariates. According to Rosenbaum (2002), a ***Γ*** value below 2 is an acceptable range. The value of Γ=2, for two firms comparable on observed covariates, indicates that the likelihood of receiving treatment is double for one firm over the other. The results of the Rosenbaum bounds tests in the form of Gamma ratio ***Γ*** are given in Table 4.11. If the value is zero between the lower and upper bounds of Hodges-Lehman point estimates, for any gamma ***Γ*** value up to 2, it shows the existence of hidden bias in treatment assignment. It can be inferred on the basis of the ***Γ*** values given in Table

4.11 that the estimates for sales growth and labour productivity growth are free of any hidden bias. However, in the case of employment growth there is a chance of hidden bias in treatment assignment. Therefore, the results of ATT in terms of employment growth should be interpreted with caution.

Table 4. 11: Hidden Bias estimation using Rosenbaum bounds (rbounds)

	Sales Growth		Employment Growth		Labour Productivity Growth	
Gamma (*Γ*)	$\hat{t}$+	$\hat{t}$-	$\hat{t}$+	$\hat{t}$-	$\hat{t}$+	$\hat{t}$-
1	-13.945	-13.945	-1.987	-1.987	-11.731	-11.731
1.1	-14.999	-12.888	-2.703	-1.247	-12.938	-10.528
1.2	-15.960	-11.920	-3.307	-0.595	-14.042	-9.427
1.3	-16.843	-11.024	-3.838	0.000	-15.060	-8.416
1.4	-17.667	-10.189	-4.414	0.190	-16.006	-7.479
1.5	-18.436	-9.406	-4.876	0.794	-16.892	-6.606
1.6	-19.160	-8.671	-5.414	1.263	-17.722	-5.789
1.7	-19.843	-7.974	-5.793	1.722	-18.507	-5.018
1.8	-20.494	-7.315	-6.200	2.157	-19.249	-4.293
1.9	-21.113	-6.688	-6.662	2.564	-19.954	-3.604
2	-21.703	-6.089	-6.960	2.941	-20.625	-2.948

* gamma= log odds of differential assignment due to unobserved factors

$\hat{t}$+= upper bound Hodges-Lehmann point estimate

$\hat{t}$-= lower bound Hodges-Lehmann point estimate

The matching estimates have met all the required diagnostics (balanced samples, overlap and common support and hidden bias) for the results to be unbiased. Therefore, results of the ATT presented in Table 4.12 are unbiased estimates of the effect of treatment on the treated firms. The results show that firm performance in highly corrupt countries has been significantly lower than that for similar firms in the least corrupt countries. The difference in performance is quantitatively much higher with respect to sales growth and labour productivity whereas the effect on employment growth is statistically significant but with a lower order of magnitude.

The sales growth of firms in the treated group is 14% lower than sales growth of similar firms in the least corrupt countries. Similarly, after controlling for all other differences, labour productivity growth of firms in the most corrupt countries is 12% lower than firms in least corrupt countries. Therefore, control over corruption is expected to substantially improve the performance of SMEs in LMICs. Corruption does, therefore, negatively affect entrepreneurial aspirations which results in undermining the contribution of entrepreneurship in the economy. Moreover, corruption engenders mistrust among entrepreneurs with respect to government procedures. They tend to avoid legal procedures whenever possible because of assuming them as means of corruption. Therefore, governments in LMICs need to look into the reasons of wide-spread corruption for controlling its effect on entrepreneurial activity.

The effect of corruption with respect to size and the age of firms has also been examined. The results show that the effect of corruption is higher in magnitude for medium sized firms in comparison to small firms. The sales growth of medium sized firms in the treated group is 17% lower than similar firms in the control group, whereas the difference in performance of small firms was 13%. Similarly, there is a 14% difference in labour productivity growth of medium sized firms in the most corrupt and least corrupt countries.

Thus, corruption affects the performance of medium sized firms to a greater extent. According to McChesney (1987), rent seeking government agents look for the bribe payment capacity of firms before making a demand, therefore, the relatively greater capacity of the medium sized firms makes them preferred target. Moreover, Kushnir et al. (2010) found that the majority of small firms in LMICs prefer to work in the informal economy, therefore, medium sized firms are comparatively more attractive for corrupt officials, and are victims of higher level of corruption.

The analysis has further examined the role of a firm's age with respect to performance. The results of ATT in Table 4.12 show that sales growth and labour productivity growth of both young and old firms have been equally, negatively, affected by the level of corruption in a country. The sales growth of young firms in the treated group is expected to be 15% lower than similar firms in the control group. The results of the analysis of age based sub-samples are not substantially different from the outcomes for all firms. The market experience of a firm can be a source of competitive advantage but it cannot save the firm from the negative effects of widespread corruption.

The different levels of effect of corruption on small, medium, young and old firms are expected to result in different responses amongst entrepreneurs. The findings of a study by Henrekson and Sanandaji (2011) suggested that entrepreneurs abide, evade or alter the institutional requirements. They are not only the recipients of institutional reforms but also perpetrators. Some entrepreneurs tend to hide a part of their business activity to avoid corrupt officials; others curtail their growth plans; whereas some become perpetrators of corruption and use it as a way forward to pursue their entrepreneurial ambitions under the conditions of pervasive corruption.

It can be concluded that besides other problems, corruption is the most significant component of the entrepreneurial ecosystem of LMICs that substantially negatively affects the performance of SMEs. Moreover, it can be argued on the basis of widespread corruption in LMICs that corruption is an inescapable reality for entrepreneurs in LMICs. It has become part of everyday life of entrepreneurs and they cannot fully avoid it. The asymmetry in formal and informal institutions has made room for corruption and it became a fact of life and the survival of entrepreneurs depends on engaging in it.

Table 4. 12: Average treatment effect on treated for sample of all firms, small firms, medium sized firms, young firms and old firms

		All firms			Small firms			Medium sized firms		
		Treated	**Control**	**Difference**	**Treated**	**Control**	**Difference**	**Treated**	**Control**	**Difference**
Sales Growth	Unmatched	-3.198	12.178	-15.376 (0.357)	-2.962	11.651	-14.614 (0.476)	-3.405	13.263	-16.668 (0.568)
	ATT	-3.196	10.594	-13.789 (0.733)	-2.968	9.611	-12.579 (0.882)	-3.394	12.460	-15.854 (1.233)
Employment Growth	Unmatched	3.611	7.592	-3.981 (0.234)	2.667	7.649	-4.981 (0.319)	4.441	7.414	-2.973 (0.364)
	ATT	3.612	5.762	-2.150 (0.490)	2.669	4.815	-2.146 (0.601)	4.451	5.619	-1.169 (0.795)
Labour Productivity Growth	Unmatched	-6.669	5.083	-11.752 (0.379)	-5.465	4.428	-9.893 (0.507)	-7.728	6.434	-14.163 (0.599)
	ATT	-6.668	5.071	-11.739 (0.781)	-5.473	4.703	-10.176 (0.945)	-7.726	7.562	-15.287 (1.282)
On common support		14477					7893			6568
Off common support		1					11			7

		Young firms			Old firms		
Annual Sales Growth	Unmatched	-0.484	14.321	-14.805 (0.587)	-4.239	9.703	-13.942 (0.474)
	ATT	-0.481	14.047	-14.528 (0.986)	-4.236	9.039	-13.275 (0.952)
Annual Employment Growth	Unmatched	5.632	10.265	-4.634 (0.408)	2.836	4.504	-1.668 (0.294)
	ATT	5.651	9.709	-4.058 (0.706)	2.837	3.961	-1.124 (0.608)
Annual Labour Productivity Growth	Unmatched	-5.791	4.765	-10.556 (0.633)	-7.007	5.450	-12.457 (0.501)
	ATT	-5.807	5.299	-11.106 (1.049)	-7.004	5.514	-12.519 (1.003)
On common support		5425				9044	
Off common support		7				2	

Standard Errors are in parenthesis.

Nearest neighbour matching algorithm has been used. The results are robust for multiple neighbour (k=10) matching and kernel matching.

Therefore, improvement in control over corruption is expected to make the entrepreneurial ecosystem supportive for business activity and positively affect firm performance. Education could be used as one of the policy tools to improve the awareness of entrepreneurs about legal practices, so that they could challenge the corrupt practices of government officials. Moreover, education has the potential to change the perception of entrepreneurs about formal institutions and might therefore be expected to bring about a cultural shift.

4.7 Conclusion

In this chapter, the entrepreneurial ecosystem of LMICs has been analysed for: (i) its effect on the performance of SMEs; (ii) ranking the components of the entrepreneurial ecosystem with respect to magnitude of effect on small, medium, young and old firms to identify the weak links; (iii) investigating the effect of corruption on performance of firms of different sizes and ages in least corrupt and most corrupt LMICs. Inferences have been drawn using the results based on multiple regression methods and PSM methods.

This study contributes by measuring the effect of all components of the entrepreneurial ecosystem of LMICs in one model. As mentioned in the literature review, earlier studies have used only one or few components and omitted others, which affected the quality of estimation. Therefore, the findings of this study are more efficient and accurate. The results of regression models show that all components of the entrepreneurial ecosystem of LMICs negatively affect firm performance. However, the magnitude of these negative effects is different for firms of different sizes and ages. It has also been found that the elements of both the institutional framework and the physical conditions faced by firms have relatively higher negative effect on medium sized and young firms.

Moreover, this study also contributes to the body of knowledge by ranking the components with respect to their magnitude of effect on firm performance. Corruption, government regulations and political instability have been found to be the most constraining components of the entrepreneurial ecosystem. Nevertheless, with respect to magnitude of effect, corruption stands out as the most significant problem for all dimensions of performance and for small, medium, young and old firms.

The effect of corruption on the performance of SMEs has been analysed further by using PSM methods. Use of matching methods for analysing the effect of corruption has been a methodological contribution of this study, as it has not been applied by any study in the relevant literature so far. The results of matching methods show that corruption has a significant and substantially higher negative effect on the sales growth and labour productivity growth of SMEs. Therefore, institutional improvements for control over corruption in LMICs can significantly improve firm performance.

This chapter has empirically tested the effect of individual components of the entrepreneurial ecosystem on the performance of SMEs in LMICs. The formal and informal institutions and physical conditions vary drastically across geographically dispersed LMICs, therefore, measurement of entrepreneurial ecosystem as whole cannot be done in existing circumstances. However, in next chapter the entrepreneurial ecosystem of Pakistan will be examined as a whole and interactive effect of components of institutional framework and physical conditions on the performance of SMEs will be investigated. This will be a unique study of its kind and expected to provide guidance not only to policymakers in Pakistan but also to other countries having similar institutional framework and physical conditions and facing similar problems in entrepreneurial activity.

CHAPTER 5 – THE EFFECT OF ENTREPRENEURIAL ECOSYSTEMS ON PERFORMANCE OF SMES IN PAKISTAN

5.1 Introduction

Over seven decades, Pakistan has faced many ups and downs in terms of politics, security, culture and economics, however, the present challenges are new and demand immediate attention by the government. There is an urgent need to change the way economic progress has been conceptualized—previous policies have been reactive with a high reliance on foreign aid (Husain, 2009; Qayyum et al., 2008). This approach has not helped Pakistan to realize its true potential. In the modern era, economic growth cannot be sustained with a group of well-conceived short sighted projects and reactive policies.

The new global economic order is based on entrepreneurship and innovation (Auerswald, 2015; Mason and Brown, 2014). The most recent regional examples of the successful implementation of entrepreneurship and innovation are China, Malaysia and Turkey (Bruton et al., 2008). The promotion of entrepreneurship and innovation-based reforms has significantly improved the economic outlook of these countries.

In the modern age, entrepreneurship has been considered synonymous with economic growth and the private sector is considered indispensable, as discussed in Chapter 2. Entrepreneurship and innovation-led economic growth require the development of markets, engaging youth, creating employment opportunities and improving governance (Auerswald et al., 2012; Stam, 2014; Wong et al., 2005). Therefore, to meet the demands of 21st century challenges, government and business should collaborate to not only cater for the situation at hand but also to create economic conditions for managing the needs of the future.

The current economic and social challenges faced by Pakistan can only be managed if the private sector is provided with a supportive entrepreneurial ecosystem. The objective of any policy to promote entrepreneurship should not only be to create entrepreneurs in those areas where they do not already exist, but also to ensure that the regions with an entrepreneurial disposition should be provided with a supportive environment to engage them in entrepreneurial activities (Cavallo et al., 2018; Chemin, 2010; Haque, 2007).

The objective of any new strategy to improve investment and growth in the private sector should be to create such an ecosystem which encourages competition, through entry of new SMEs with innovative products and services. This entrepreneurial ecosystem should challenge the status quo of existing large scale firms. Such an entrepreneurial ecosystem will help in rebuilding the trust of the business community and general public with the government.[7] The creation of such a supportive entrepreneurial ecosystem requires the removal of the barriers to entrepreneurship and innovation in the market. This, in turn, will generate opportunities for the growing population with a higher percentage of young people. Entrepreneurship has the potential to ensure investment in those activities which can ensure long-term employment opportunities for this growing population. Thus, entrepreneurs should be supported in increasing their investment in growth oriented businesses.

The entrepreneurial ecosystem not only encourages growth of existing businesses, but also disrupts the status quo through creative destruction. This creative destruction process requires a supportive business environment, which is not under the strict control of the government, but rather government interventions are needed to facilitate economic activity (Feld,

[7]According to Qayyum *et al*, 2008, it is believed by entrepreneurs in Pakistan that the government tries to take hold of business activity rather than being a facilitator. Therefore, the business community lacks trust in the government's intentions.

2012). Moreover, the entrepreneurial ecosystem protects the incumbents from anti-competitive activities by promoting innovation and diversification.

A study on the diagnostics of growth of the private business sector in Pakistan has been undertaken by a team of researchers from the Pakistan Institute of Development Economics and the National University of Science and Technology. The findings of this study showed that poor governance and poor functioning of the institutions are the main obstacles to the economic growth of Pakistan (Qayyum et al., 2008). Entrepreneurship in Pakistan is suffering seriously at the hands of government regulations, legislation and policies (Qayyum et al., 2008). This has never allowed a Schumpeterian kind of entrepreneurship—with the ability to innovate and disrupt the market—to evolve in Pakistan, with the ability to innovate and disrupt the market.

The entrepreneurial ecosystems perspective supports the use of an 'invisible hand model' and allows entrepreneurial activity to be self-regulatory and competitive. On the contrary, the government in Pakistan has tight control over business activity and the path to success of businesses lies in the hands of government. As a result, entrepreneurs try to establish good connections with key government officials to obtain favourable treatment. Therefore, it can be argued that the institutional framework and physical conditions, which form the entrepreneurial ecosystem of Pakistan, are not supportive for the entrepreneurs.

Moreover, the policies of the government regarding the private sector have largely emphasized the performance of large scale industries, and small scale firms have usually been ignored (Ghani et al., 2011; Hussain, 2004; Qayyum et al., 2008). However, SMEs dominate in the economy, not only in terms of the number of businesses, but also in terms of their socio-economic contributions. Small scale industry with potential for growth, which reflects the true

spirit of entrepreneurship, has largely been operating in the informal economy because, it is claimed, of the government's preference for large scale industry (Husain, 2009; Hussain, 2004).

In Pakistan, the proportion of small firms is highest but their growth rate in comparison to medium sized firms and large firms is very low. The performance of small firms stagnates at a certain point and most of them fail to grow, or sometimes survive, after that stage (Aterido et al., 2011; Ghani et al., 2011). It is extremely difficult for the owners of small firms to fulfil the requirements of formal financial institutions and obtain funding for expansion and development.

Entrepreneurs usually start their small scale businesses with their own financing, because banks and other formal financial institutions provide funding for established businesses based on evidence of their success, to avoid the risk of default. Moreover, the regulatory burden and wide-spread corruption also hinders the growth and expansion of small firms. A number of studies have pointed out that government regulation, access to finance and rent seeking behaviour of government servants are the main reasons behind the problem (Aterido et al., 2011; Beck et al., 2008; Carpenter and Petersen, 2002; Ghani et al., 2011; Smallbone et al., 2010).

Therefore, it is interesting to investigate how the entrepreneurial ecosystem is constructed in Pakistan and how elements of the institutional framework and physical conditions vary in their impact on SME performance. Moreover, since the entrepreneurial ecosystem of developed and developing countries is different, therefore the identification and measurement of entrepreneurial ecosystem of Pakistan is expected to improve our understanding about the entrepreneurial ecosystem of LMICs.

5.2 Research Questions

This study intends to identify the composition of entrepreneurial ecosystem in Pakistan, and then test the interactive effect of components of this entrepreneurial ecosystem on the performance of SMEs. Thus, identification of the entrepreneurial ecosystem at a national level is the objective of this study. It is debatable as to why the national level has been chosen as the boundary for the entrepreneurial ecosystem in Pakistan. Regional boundaries are almost always arbitrary and likely to vary within and between different regions. However, measurement of the national level entrepreneurial ecosystem is suitable in the context of Pakistan as it follows the federal governmental system and much business activity is guided through policies at the national level. Moreover, since empirical research on the entrepreneurial ecosystems is in its early developmental phase, work focussing on all levels of aggregation can make valuable contributions.

The main questions to be investigated in this chapter are:

- How can we measure the entrepreneurial ecosystem in Pakistan?
- What is the composition of the entrepreneurial ecosystem of Pakistan and how do different components vary in terms of their role in forming the entrepreneurial ecosystem of Pakistan?
- How does the entrepreneurial ecosystem of Pakistan as a whole affect the performance of firms?

The contributions of this chapter include: (i) the identification of the entrepreneurial ecosystem existing in Pakistan using a bottom-up approach. This is the first study to measure entrepreneurial ecosystem of any LMIC. Previous studies of LMICs have simply tested the

impact of a small number of individual components and ignored the effect of the entrepreneurial ecosystems as a whole on the performance of SMEs; (ii) the findings provide guidelines to policymakers in Pakistan and other developing countries with a similar institutional framework and physical conditions. These findings can be used by other similar LMICs to understand their entrepreneurial ecosystems and apply a similar bottom-up approach to make their entrepreneurial ecosystems more encouraging for entrepreneurs; (iii) the findings will also extend the scarce literature based on the entrepreneurial ecosystems of developing countries. This advancement in literature will help to improve our understanding of the entrepreneurial ecosystems approach.

5.3 Descriptive Analysis

The WBES database has been used for obtaining data about the components of the entrepreneurial ecosystem and firm performance (Enterprise Survey, 2006-14). The details about how the WBES has been conducted and how the quality of the data is ensured was explained in Chapter 3. The descriptive statistics given in Table 5.1 show the distribution of a sample of 2,049 SMEs of Pakistan surveyed in years 2007 and 2013. Most SMEs in Pakistan serve the local and national market with only 8% selling in the international market. Moreover, only 3.5% are owned by foreigners, the rest are domestically owned. It can be argued that foreign investment usually takes the form of joint ventures or collaborations with large domestic firms. As a result, there is a very low percentage of foreign owned SMEs in the sample. There is, however, a balanced distribution of firms in the sample with respect to age and size of the firms.

Table 5. 1: Descriptive Statistics of SMEs in Pakistan as per WBES database for years 2007 and 2013

Variables		Frequency	Percent
Firm Size	Small(<20)	1259	61.4
	Medium(20-99)	790	38.56
Sector	Services Sector	310	15.13
	Manufacturing Sector	1739	84.87
Ownership	Domestic	1977	96.49
	Foreign	72	3.51
Geographical Market	Local	1210	59.05
	National	673	32.85
	International	166	8.10
Firm Age	Young (up to 5 Years)	881	43
	Old (more than 5 Years)	1168	57
Year of Survey	2007	1078	52.61
	2013	971	47.39

The summary statistics by size and age of firms are given in Table 5.2. The sales growth of small firms is higher as compared to medium sized firms, with figures being 15% and 8%, respectively. Bank financing has been 4% on average for the medium sized firms, which is not that encouraging, however, it is relatively higher than small firms with 1% financing from the banks. The higher mean values for number of power outages in a month and value lost due to power outages indicates the worst conditions of energy shortage. Moreover, the top managers of SMEs have on average 17 years of experience.

Table 5. 2: Summary statistics of SMEs by size and age

	Small firms				Medium firms				Young firms				Old firms			
	Mean	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
Sales growth (%)	15.08	39.39	-100	100	7.76	40.53	-99.00	100	10.85	39.96	-99	100	13.31	39.99	-100	100
Employment growth (%)	12.29	28.18	-87.88	100	12.91	29.46	-87.50	100	14.42	30.17	-87.88	100	11.10	27.41	-86.67	100
Labour productivity growth (%)	27.10	12.68	-98.92	100	29.51	46.40	-99.49	100	20.36	38.33	-99.49	100	29.80	22.70	-98.80	100
Working capital bank financing (%)	1.43	11.87	0	100	4.04	15.27	0	100	2.45	14.28	0	100	2.43	12.60	0	100
Time spent in meeting government regulations	2.01	6.94	0	100	3.46	9.46	0	100	2.05	7.15	0	60	2.96	8.62	0	100
Average no of visits for meetings tax officials	1.33	3.15	0	40	2.20	6.83	0	100	1.49	4.24	0	50	1.80	5.38	0	100
No of power outages in a month	78.68	88.11	5	160	83.91	91.67	10	169	79.99	89.61	9	165	81.23	89.47	5	169
Value lost due to power outage (% of sales)	18.33	18.47	0	90	19.29	17.70	0	90	18.90	18.56	0	90	18.55	17.88	0	90
Years of experience of top manager	17.85	12.08	2	38	17.96	11.63	8	35	13.19	9.88	5	35	21.44	12.08	9	38

The summary statistics of firm performance with respect to city and province are shown in Table 5.3. There are variations in firm performance across different cities of Pakistan. The firms in Islamabad have exhibited better performance than other cities. On the contrary, firms in Peshawar city, which is part of Khyber-Pakhtunkhwa province, have recorded the worst performance in these years. Apart from other reasons related to the entrepreneurial ecosystem, this poor performance of firms in Khyber-Pakhtunkhwa could be due to the war-like situation in this province. In this province, the Pakistan military is continuously engaged in operations against rebel groups, including the Taliban.

Table 5. 3: Summary statistics of performance of SMEs with respect to city and province

		Sales growth (%)				**Employment growth (%)**				**Labour productivity growth (%)**			
		Mean	**S.D**	**Min**	**Max**	**Mean**	**S.D**	**Min**	**Max**	**Mean**	**S.D**	**Min**	**Max**
Cities	Karachi	14.86	38.53	-100	100	13.97	30.50	-87.50	100	17.09	38.65	-98.69	100
	Lahore	14.14	47.88	-99	100	6.15	24.02	-87.88	100	15.73	36.18	-99.49	100
	Sialkot	3.18	38.79	-97.60	100	7.53	33.14	-80.00	100	14.21	39.58	-97.60	100
	Faisalabad	14.47	28.12	-93.89	100	13.98	30.45	-86.67	100	13.97	20.51	-93.29	100
	Gujranwala	9.03	37.32	-92.65	100	7.53	25.86	-79.80	100	6.69	24.88	-95.59	100
	Islamabad	13.61	35.17	-88.97	100	18.09	30.36	-85.11	100	20.43	45.82	-96.37	100
	Hyderabad	14.98	45.34	-92.65	100	15.33	22.04	-20.00	100	14.04	23.36	-91.65	100
	Quetta	17.21	37.80	-90	100	18.44	31.20	-36.36	100	15.13	34.77	-96.	100
	Peshawar	-2.46	32.09	-97.89	100	17.60	27.69	-60.00	100	-9.26	31.43	-98.31	100
	Multan	14.20	50.57	-90	100	10.66	22.95	-28.57	100	12.91	23.32	-90	100
Provinces	Punjab	14.42	41.76	-99	100	9.16	28.04	-87.88	100	16.32	36.96	-99.49	100
	Sind	14.90	40.41	-100	100	14.33	28.45	-87.5	100	19.18	32.86	-98.69	100
	KPK	-2.46	32.09	-97.89	100	17.60	27.69	-60	100	-9.26	29.43	-98.31	100
	Baluchistan	17.21	37.80	-90	100	18.44	31.20	-36.36	100	15.13	27.77	-96	100

These descriptive statistics indicate the need for further analysis of the reasons for variations in firm performance of different regions. Moreover, if there is similarity in the perception of firms about the entrepreneurial ecosystem then how does that perception affect their performance? Therefore, in the next section a detailed analysis has been carried out to find out the answers to the research questions mentioned in section 5.2.

5.4 Statistical Analysis

In Chapter 4, the entrepreneurial ecosystem of LMICs was analysed to assess the effect of the institutional framework and the physical conditions on the performance of SMEs across countries. The data limitations allowed for the analysis of the effect of individual components only. However, we were able to rank the components with respect to the magnitude of their effects on SME performance, as well as their statistical significance. Corruption was identified as the weakest link in the entrepreneurial ecosystem of LMICs and matching methods were used to further estimate the effect of corruption on the performance of least corrupt and most corrupt LMICs.

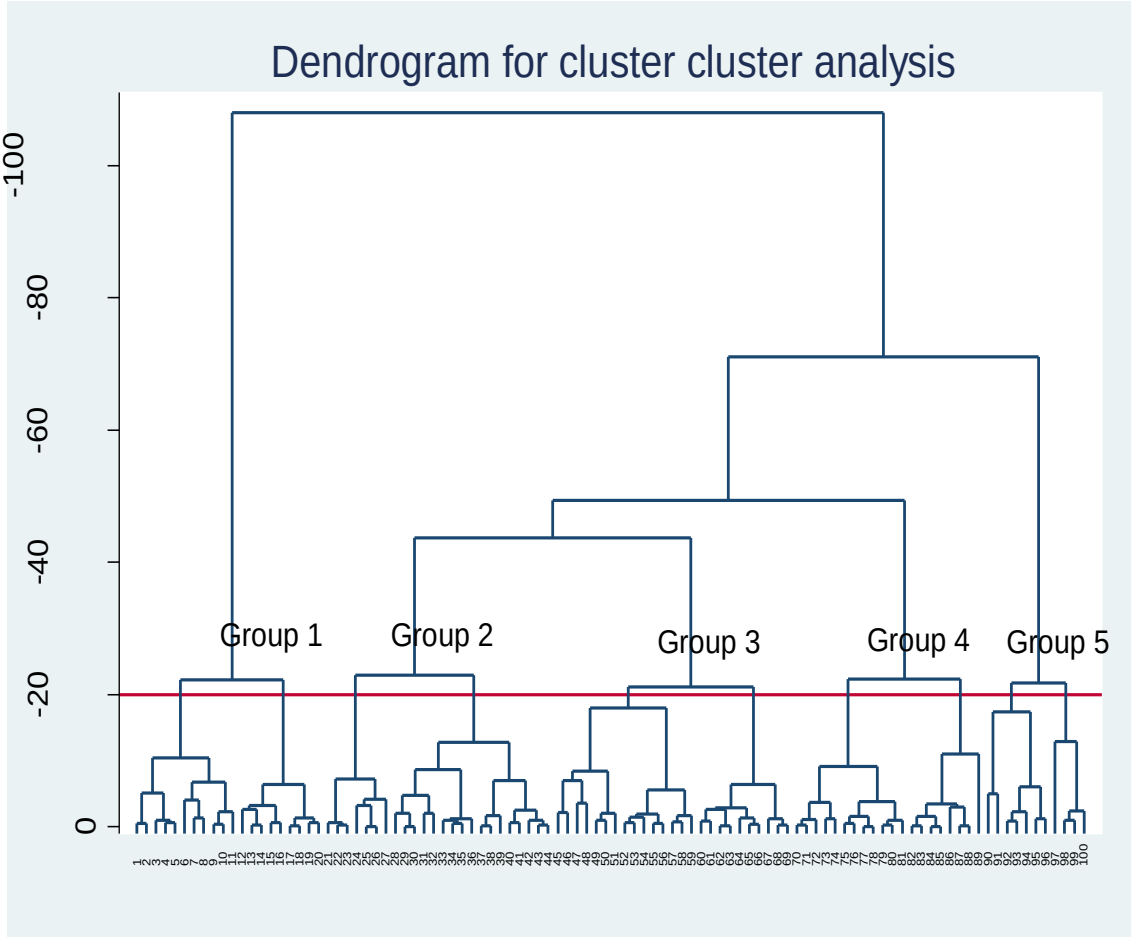
In this chapter, the analysis focuses on Pakistan. We assess the significance and relative contributions of different components of the institutional framework and physical conditions, and investigate their interaction effects. This approach facilitates an in-depth analysis the composition of the entrepreneurial ecosystem of Pakistan. Here, the entrepreneurial ecosystem of Pakistan has been measured as a set of interdependent components. Moreover, the effect of the entrepreneurial ecosystem as a whole on the performance of SMEs is also explained and discussed in detail in the following sections.

5.4.1 Step 1- The Identification of the Entrepreneurial Ecosystem of Pakistan

The identification of the entrepreneurial ecosystem of Pakistan is undertaken by using cluster analysis and Canonical Discriminant Analysis (CDA). In cluster analysis, the hierarchical clustering approach is used to find naturally existing groups of firms on the basis of their responses on the elements of the institutional framework and the physical conditions in Pakistan. The hierarchical clustering method assumes each firm is a separate cluster in the first stage and then groups similar firms in different clusters and, ultimately, ends at all the firms grouped in one cluster. The optimal number of meaningful clusters of firms in this chapter is decided on the

basis of the dendrogram. The dendrogram in Figure 5.1 shows that a balanced distribution of firms can be achieved if data is divided into five groups. It is not possible using Stata 14 to properly display all 2,049 firms in the dendrogram to exhibit the clustering process, therefore, the grouping process of the last 100 groups is shown in Figure 5.1.It can be inferred from the dendrogram that five is the optimal number of clusters, in so far as the clusters look balanced but different from each other on the basis of each firm's response on the components of the entrepreneurial ecosystem of Pakistan.

Figure 5. 1: A Dendrogram of a cluster Analysis of the components of the entrepreneurial ecosystems of Pakistan



The distribution of firms in the five clusters is shown in Table 5.4. It can be seen that all clusters are well balanced with respect to the number of firms in each cluster. The sample characteristics of five clusters identified through the cluster analysis are given in Table 5.5. It can be inferred that firms are evenly distributed across five clusters on the basis of these firm-level characteristics. Thus, clusters are well balanced and expected to provide unbiased estimates for further analysis.

Table 5. 4: Distribution of firms in groups identified by the Cluster Analysis

Clusters	Frequency	Percentage
1	349	17.03
2	411	20.06
3	430	20.99
4	324	15.81
5	535	26.11

Table 5. 5: Characteristics of groups identified through cluster analysis

		Cluster 1		**Cluster 2**		**Cluster 3**		**Cluster 4**		**Cluster 5**	
Variables		**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**
Firm Size	Small(<20)	192	55.01	245	59.61	265	61.63	204	62.96	353	65.98
	Medium(20-99)	157	44.99	166	40.39	165	38.37	120	37.04	182	34.02
Sector	Manufacturing	312	89.4	334	81.27	363	84.42	253	78.09	477	89.16
	Services	37	10.6	77	18.73	67	15.58	71	21.91	58	10.84
Ownership	Domestic	341	97.71	397	96.59	416	96.74	309	95.37	514	96.07
	Foreign	8	2.29	14	3.41	14	3.26	15	4.63	21	3.93
Firm Age	Young (≥5 years)	138	39.54	183	44.53	189	43.95	129	39.81	242	45.23
	Old(<5 years)	211	60.46	228	55.47	241	56.05	195	60.19	293	54.77

These clusters are further explained in Table 5.6 with respect to the response of firms on components of the entrepreneurial ecosystem of Pakistan. The comparison of clusters shows the inter-cluster heterogeneity and intra-cluster homogeneity. The firms in all clusters

are highly critical of all three elements of the institutional framework (government regulations, taxation system and corruption), and of the infrastructure and political instability among the physical conditions. However, inter-cluster comparison shows that firms in cluster 1 are the most critical and firms in cluster 5 are the least critical of components of the entrepreneurial ecosystem of Pakistan. Since these clusters are balanced and homogenous within, and heterogeneous between, these will be used in our canonical discriminant analysis to identify the composition of the entrepreneurial ecosystem functional in Pakistan with respect to the contribution and significance of each component.

Table 5. 6: Mean values of city level aggregates of firms' response on components of the entrepreneurial ecosystem with respect to clusters identified using the Cluster Analysis

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Government regulations	50.24	44.69	37.57	39.35	33.35
Tax rates and administration	50.08	48.06	49.35	45.73	43.70
Corruption	69.16	66.19	63.71	65.52	54.40
Access to finance	23.07	20.10	18.30	16.40	14.25
Infrastructure	46.72	40.65	37.18	41.11	33.19
Electricity	77.97	78.57	78.67	64.71	81.45
Political instability	51.52	47.73	51.06	45.74	34.86
The non-availability of an educated workforce	19.85	16.03	10.75	11.86	10.92
Competition with informal sector	19.31	16.00	16.97	15.36	14.38
Observations	349	411	430	324	535

5.4.2 Step 2-Further Measurement of the Entrepreneurial Ecosystem of Pakistan

Building on the above, Canonical Discriminant Analysis is used to investigate whether these groups are statistically significantly different from each other. The results of CDA reported in Table 5.7 show that four functions generated on the basis of groups identified through the cluster analysis are statistically significantly different from each other. The coefficients of the canonical correlations for the four functions are 0.385, 0.318, 0.269 and 0.136 respectively. Moreover, the Eigen values and the proportion of variance explained by these functions indicate that all four functions contribute statistically significantly in explaining the variations

in data. The F-test statistics are significant at a 5% level of error; therefore, it can be inferred that all these four functions are statistically significant and differences in the groups cannot be explained truly if any one of them is ignored.

Table 5. 7: Canonical discriminant analysis of clusters identified through the Cluster Analysis

Function	Canonical Correlation	Eigen value	Variance Proportion	Probability>F
1	0.385	0.174	0.454	0.000
2	0.318	0.113	0.294	0.000
3	0.269	0.078	0.203	0.000
4	0.136	0.019	0.049	0.000

The contribution of components of the entrepreneurial ecosystem in explaining each of these distinct discriminant functions is explained through their factor loadings given in Table 5.8. The factor loadings show the contribution of each covariate in the discriminant function (Mclachlan, 2004; Rencher, 2002). The sign of each covariate is considered while interpreting their individual contributions, however, when ranking the covariate with respect to magnitude of contribution, then only their absolute value is used. Thus, the absolute value of each component shows its contribution in explaining variations in the entrepreneurial ecosystem.

The factor loadings are just like beta weights in regression (Huberty and Olejnik, 2006; Rencher and Christensen, 2012) and indicate the relative contribution of each variable in the classification of a discriminant function (Mclachlan, 2004). The higher the value of factor loading, the higher will be the magnitude of contribution of any component to the discriminant function. Since the functions given in Table 5.8 have been generated using groups identified through the cluster analysis, and clusters were decided on the basis of responses of firms on components of the entrepreneurial ecosystem, the discriminant

functions indicate the entrepreneurial ecosystems of Pakistan. Thus, the composition of entrepreneurial ecosystem of Pakistan can be decided on the basis of factor loadings.

Table 5. 8: Standardized canonical discriminant function coefficients

Covariates	function1	function2	function3	function4
Government regulations	-0.688	-0.159	1.094	2.424
Tax rates and administration	0.016	-0.095	-0.235	-0.745
Corruption	0.055	-0.026	-0.168	-0.351
Access to finance	0.035	-0.062	0.052	-0.075
Infrastructure	0.054	-0.203	-0.223	-1.454
Political instability	-0.289	0.080	-0.965	0.636
The non-availability of an educated workforce	-0.177	-0.157	-0.044	-1.013
Competition with informal sector	0.085	-0.068	-0.144	-0.617
Electricity	0.580	-0.831	-0.257	-0.056

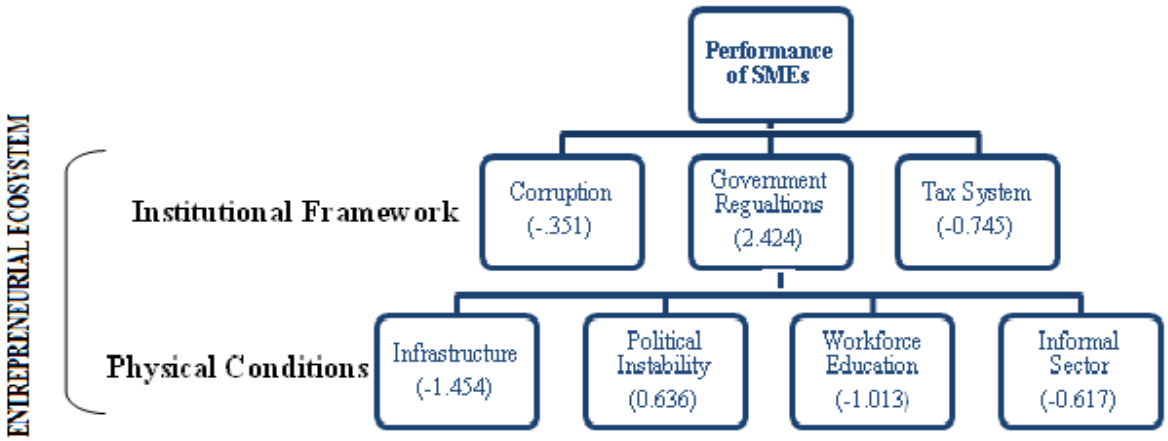
According to Comrey and Lee (1992), McLachlan (2004) and Tabachnick and Fidell (2007) factor loading of more than 0.4 indicates the statistically significant contribution of a factor to its functions. Therefore, using this criterion, it can be inferred that seven out of nine components of the entrepreneurial ecosystem of Pakistan are contributing statistically significantly in explaining discriminant function 4. It can be inferred on the basis of factor loadings in Table 5.8 that function 4 represents the composition of the entrepreneurial ecosystem of Pakistan, which is a combination of both the institutional framework and the physical conditions. However, access to finance with factor loading -0.075 and electricity with factor loading of -0.056 are the least important factors in this entrepreneurial ecosystem.

Out of the institutional framework conditions, government regulations are contributing positively to the entrepreneurial ecosystem of Pakistan. In contrast, the taxation system and corruption (informal institutions) contribute negatively to the entrepreneurial ecosystem. Taxation with a factor loading of -0.745 is the weakest factor in the institutional framework conditions. Thus, improving the taxation system should be the priority for policymakers. Moreover, corruption as an indicator of informal institutions is also feeding

negatively to the entrepreneurial ecosystem of Pakistan. Thus, as found in Chapter 3, corruption is a significant problem in the entrepreneurial ecosystem of Pakistan, just like other LMICs. An improvement in control over corruption is expected to make the entrepreneurial ecosystem more encouraging for entrepreneurs in Pakistan.

On the other hand, all components of physical conditions, except political instability, contribute negatively to the entrepreneurial ecosystem. Infrastructural conditions with a factor loading of -1.454 and the non-availability of an educated workforce with a factor loading of -1.013 are the weakest components in the physical conditions part of the entrepreneurial ecosystem of Pakistan. On the basis of the negative signs of most of the components and the negative aggregate values of factor loadings of the components, it can be argued that most of the components of the entrepreneurial ecosystem of Pakistan are negatively affecting the system. The composition of the entrepreneurial ecosystem of Pakistan with respect to relative contribution of each element of the institutional framework and the physical conditions is shown in Figure 5.2.

Figure 5. 2: The weighted contribution of the components of the entrepreneurial ecosystem of Pakistan



The entrepreneurial ecosystem of Pakistan is identified by using the natural patterns existing in the responses of the firms on the components of the institutional framework and physical conditions. The next section explains how this entrepreneurial ecosystem in Pakistan as a whole affects the performance of incumbent SMEs.

5.4.3 Step 3-The Effect of the Entrepreneurial Ecosystem on Firm Performance

Most of the research on entrepreneurial ecosystems involved theoretical contributions of different models designed to model such systems. These models have theoretically established the links of different components (Feld, 2012; Isenberg, 2011; Stam, 2014; Stangler and Bell-Masterson, 2015) but little effort has been directed at quantitative measurement of how these components lead towards the analysis of existing entrepreneurial ecosystems. According to Cavallo et al. (2018), several studies have tried to empirically investigate the entrepreneurial ecosystems, yet little is agreed upon. The systematic and interactive nature of this concept makes it challenging to measure. It is debatable which methods can best measure this interdependent nature of components of entrepreneurial ecosystem (Acs et al., 2014; Spigel, 2017; Stam and Bosma, 2015).

Taich et al. (2016) used factor analysis to measure the entrepreneurial ecosystem model developed by Bell-Masterson and Stangler (2015) and empirically evaluated which components contribute to the measurement of the entrepreneurial ecosystem. On the basis of findings from a factor analysis, the entrepreneurial ecosystem was measured and its effect as a system was tested through regression analysis. The use of factor analysis was justified on the basis of the argument that the composition of entrepreneurial ecosystems can vary across different regions. Moreover, the bottom-up approach also supports the identification of existing entrepreneurial ecosystem before estimating its effect on the entrepreneurial activity. A similar approach has been used in this study to first identify the composition of the entrepreneurial ecosystem of Pakistan, and then measure its interactive effect on performance

of SMEs. Cluster analysis and CDA are used following the bottom-up approach to find the configuration of the existing entrepreneurial ecosystem of Pakistan.

However, similar to other linear estimation techniques like regression, there are two important limitations of using CDA. Firstly, the stability of the values of the discriminant function coefficients depends on the number of covariates in the model and sample size. Large sample sizes and fewer variables are more likely to produce stable coefficient estimates. Thus, a sample of 100 observations with 2 covariates is expected to produce more stable estimates, as compared to the same sample size with 20 covariates. In consequence, larger datasets are expected to produce more stable estimates. The ratio of sample size to covariates in this study is large enough to produce reliable estimates.

Secondly, the magnitude of the contribution of covariates may change substantially if some covariates are excluded, or more variables are added in the model. It can be inferred that the importance of each variable in this case is relative to the model specified. A change in a model is expected to change the contribution and relative importance of covariates. However, this limitation is an advantage in this case when we want to measure an entrepreneurial ecosystem as an interaction of elements of the institutional framework and physical conditions. We want the contributions of components (covariates) to change with a change in the set of components. This reflects that components of the entrepreneurial ecosystem are dependent on each other and a change in one component will affect the whole system. Thus, CDA can be used to measure the interactive nature of mutual effect of components of the entrepreneurial ecosystem on each other.

It can thus be inferred that factor loadings in CDA show a multivariate context, as the interactive effect of components rather than producing univariate index. Thus, factor loadings estimated through CDA show the contribution of each individual component to the entrepreneurial ecosystem in the presence of other components. Therefore, systematic nature

of the effect of components of the entrepreneurial ecosystem of Pakistan is justified by using the factor loadings to make a multiplicative and additive index rather than just using simple regression methods.

The factor loadings given in Table 5.8 show the relative vitality of each component in the entrepreneurial ecosystem and are used like beta weights in a multiple regression (Huberty and Olejnik, 2006; Rencher and Christensen, 2012). These factor loadings are used to calculate discriminant scores for each firm in dataset. After using the factor loadings of statistically significant contributors in function 4 which represents the entrepreneurial ecosystem of Pakistan, equation 3.20 can be written as follows.

$$D_i = 2.424 * reg_i - 0.745 * tax_i - 0.351 * corr_i - 1.454 * infras_i + 0.636 * pol_i - 0.617 * inf_i - 1.013 * wk_i \quad 5.1$$

Here *Di* is the discriminant score of each firm after taking into account the weighted effect of each component of the entrepreneurial ecosystem. The weighted effect of each component of the entrepreneurial ecosystem is dependent on the model specification. Therefore, the addition or removal of any component from the model may change the weighted effect of components. Thus, it can be inferred that the weighted effect of each component is estimated taking into account the effect of other components included in the model. Hence, interactive nature of the effect is used to estimate these factor loadings.

The discriminant scores are the sum of products of discriminant coefficients with the observational values. Therefore, discriminant scores computed using the factor loadings (with signs) will result in an index value for each firm with respect to its response on components of entrepreneurial ecosystem. These index values represent the collective effect of the institutional and physical conditions for each firm. The index thus generated in this way would show the interactive effect of components of the entrepreneurial ecosystem of Pakistan

for each firm and this can be further used for estimating the effect of the entrepreneurial ecosystem as a whole on the performance of incumbent firms.

The regression estimates, based on these index values, reported in Table 5.9, show the interactive and interdependent nature of effect of the entrepreneurial ecosystem of Pakistan on the performance of firms. Robust standard errors are estimated to account for the problems of heteroscedasticity. The statistically significant value of the F-test shows the goodness of fit of the model. The values of the R^2 are low, however the statistically significant negative effect of the entrepreneurial ecosystem on the performance of firms in Pakistan is worth interpreting because of the theoretical link between the entrepreneurial ecosystem and firm performance.

Table 5.9 shows that the health of the entrepreneurial ecosystem of Pakistan is not in a good state, and it constrains the performance of firms of different sizes and ages. The magnitude of the effect is relatively higher on sales growth and labour productivity growth. A further 1% deterioration in the health of the entrepreneurial ecosystem of Pakistan as a whole is expected to decrease the sales growth and labour productivity growth of all SMEs by 0.25% and 0.47%, respectively. However, medium sized firms will be relatively more severely affected by this marginal decline in the health of the entrepreneurial ecosystem of Pakistan as their sales growth will decrease by 0.30% and labour productivity growth by 0.74%. Similarly, the comparison of young and old firms shows that sales growth and employment growth young firms is relatively more highly negative affected by the poor health of the existing entrepreneurial ecosystem of Pakistan. As reported in Table 5.9, a marginal decline in the health of the entrepreneurial ecosystem of Pakistan will result in 0.44% decrease in sales growth and 0.78% decrease in employment growth of young firms.

Table 5. 9: Estimation of the effect of the health of the entrepreneurial ecosystem of Pakistan on the performance SMEs

	Sales growth			Employment growth			Labour productivity growth		
	All firms	Small firms	Medium firms	All firms	Small firms	Medium firms	All firms	Small firms	Medium firms
Entrepreneurial Ecosystem of Pakistan	-0.25***	-0.21***	-0.30***	-0.01*	-0.02*	-0.06**	-0.47**	-0.70***	-0.74*
	(0.06)	(0.07)	(0.09)	(0.04)	(0.05)	(0.07)	(0.44)	(0.37)	(0.64)
Constant	8.63***	11.98***	3.76***	12.74***	12.06***	13.72***	12.55***	5.37***	6.58***
	(1.21)	(1.55)	(1.91)	(0.84)	(1.24)	(1.45)	(1.67)	(1.41)	(2.31)
R^2	0.10	0.08	0.14	0.08	0.04	0.07	0.12	0.01	0.09
F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	2049	1259	790	2049	1259	790	2049	1259	790

	Young firms	Old firms	Young firms	Old firms	Young firms	Old firms
Entrepreneurial Ecosystem of Pakistan	-0.44***	-0.13*	-0.038*	-0.01	-0.78*	-0.50**
	(0.10)	(0.07)	(0.06)	(0.04)	(0.68)	(0.37)
Constant	4.39***	11.39***	14.97***	11.11**	9.67**	7.08***
	(1.89)	(1.57)	(1.55)	(1.20)	(2.58)	(10.35)
R^2	0.12	0.09	0.05	0.07	0.03	0.10
F-test	0.000	0.000	0.000	0.000	0.000	0.000
Observations	881	1168	881	1168	881	1168

*** Significant at 1%, ** significant at 5% and * significant at 10%, Robust standard errors are in parenthesis
Young firm have age less than 5 years, others are old

Thus, the systematic effect of elements of the institutional framework and physical conditions shows that the health of entrepreneurial ecosystem of Pakistan is in poor state and it has a statistically significant negative effect on firm performance. The component parts are negatively poised in both the institutional framework and the physical conditions. Thus, immediate attention is required for improvements in individual components and entrepreneurial ecosystem as a whole for making it encouraging and supportive for the performance of incumbent firms.

5.5 Conclusion

In this chapter, the composition of the entrepreneurial ecosystem of Pakistan has been identified by using data from WBES database. The scope of the chapter was limited to the measurement of the entrepreneurial ecosystem of Pakistan as an interactive set of components and estimation of the interactive effect of the entrepreneurial ecosystem of Pakistan as a whole on the performance of SMEs. The analysis of how and why different components of the entrepreneurial ecosystem affect each other, and how feedback loop works, will be considered in future research when such data is available.

The cluster analysis, CDA and regression analysis were used to find answers to the research questions. The interactive nature of existence of the entrepreneurial ecosystem has been examined though the cluster analysis and canonical discriminant analysis. This is the first study of its kind to measure the entrepreneurial ecosystem of any LMIC and estimate its effect as a system on the performance of SMEs within it. The identification of composition of existing entrepreneurial ecosystem of Pakistan is based on the bottom-up approach widely recommended in the literature. This approach helps in the diagnosis of the health of the existing system before introducing any reforms.

The interdependent composition of the entrepreneurial ecosystem of Pakistan shows that taxation system is statistically the most significantly negative component among the institutional framework conditions. An improvement in the tax rate and administration is expected to have a significantly positive effect on the entrepreneurial ecosystem of Pakistan. Moreover, factor loadings of components of physical conditions show that infrastructure has the highest negative contribution to the entrepreneurial ecosystem of Pakistan. This approach of looking at the interdependent effect of components of the entrepreneurial ecosystem of Pakistan has also helped in determining the health of existing entrepreneurial ecosystem. The

overall assessment shows the weak health of the system and its negative effect on the entrepreneurial performance.

Later, an index was been developed to estimate the interactive effect of elements of the institutional framework and physical conditions on the performance of SMEs. The findings show that the existing entrepreneurial ecosystem of Pakistan is a constraint on the performance of SMEs. It is important to mention here that this type of research should not be used to rank the entrepreneurial ecosystems of different geographical distributions. The entrepreneurial ecosystem effective in one region cannot necessarily be equally effective in another region with different regional characteristics. Therefore, these comparisons and rankings will narrow down the wider focus of this approach and possibly sabotage the early working development of looking at the bottom-up approach.

Moreover, the theoretical underpinnings of this approach allows for different entrepreneurial ecosystems with their own merits and demerits to nurture and establish at different places (Cortright and Mayer, 2004; Taich et al., 2016). The policymakers can use findings of this research while deciding their preferences for improvements in the entrepreneurial ecosystem of Pakistan. The specific policy recommendations for both entrepreneurs and policymakers are given in the next chapter.

CHAPTER 6 - CONCLUSIONS AND POLICY RECOMMENDATIONS

The entrepreneurial ecosystems approach has gained in popularity with academics and practitioners alike in the last decade. The research into entrepreneurial ecosystems has been very diverse. Initially, research on entrepreneurial ecosystems lacked a central focus. Thus, some authors focused on increasing the extent of entrepreneurship through larger numbers of entrepreneurs, firms, self-employment or even employment opportunities. Others authors tried to match specific types to firms with different ecosystems. Whilst all of these objectives are important and provide some direction for economic policy, their reliance on a very limited number of input measures provides little guidance as to the impact such ecosystems have on output. At the other end of the spectrum, lies research that has taken an all-encompassing approach. Unfortunately, the multiplicity of components considered in this line of research meant that it was very difficult to extract the salient features that policymakers should have been giving their attention to.

Where policies were in place they tended to be geared towards providing more funds for research and development, often at universities, providing funds for start-ups and improving the proportion of skilled workers in the workforce. However, these are all inputs into the entrepreneurial ecosystem and the missing part is the connectivity of institutions, entrepreneurs and these physical conditions. In this thesis, empirical analyses were conducted to measure the impact of components of the entrepreneurial ecosystem of Low-Middle Income Countries on the performance of SMEs. The work also explores the entrepreneurial ecosystem of Pakistan, followed by an estimation of its impact on firm performance. From a theoretical perspective, this approach is still relatively under-researched meaning that the measurement of the components of the entrepreneurial ecosystems is somewhat unclear (Stam, 2015; Stam and Bosma, 2015). This study is a step in the direction of expanding this

approach, specifically in terms of the measurement of entrepreneurial ecosystems in LMIC with specific focus on Pakistan.

Following a quantitative research methodology, the broader framework of entrepreneurial ecosystems is first divided into input and output measures. The output of an entrepreneurial ecosystem is measured in terms of its effect on various facets of the performance of SMEs—annual sales growth, employment growth and labour productivity growth. The institutional framework and physical conditions are inputs in the system and expected to affect the output of entrepreneurial ecosystem. These input and output indicators are measured using the World Bank Enterprise Survey data, which provides quantitative data on firm performance and firm level perceptions of components of the entrepreneurial ecosystem.

A bottom-up approach has been adopted to understand the entrepreneurial ecosystem, because it is important to understand how the existing entrepreneurial ecosystem is functioning before suggesting what it should be. It will help policymakers including funding agencies, chambers of commerce and local governments, as well as entrepreneurs, to analyse their entrepreneurial ecosystem. It will then help them to decide what should be the common strategy to improve the weak links in the system. The use of bottom-up approach has enabled us to paint a picture of the entrepreneurial ecosystem of LMICs in general and Pakistan in particular.

The particular emphasis of the two empirical studies was finding the individual and collaborative effect of components of the entrepreneurial ecosystem on the performance of young and old SMEs. With some exceptions, the findings have largely been consistent with the literature, and a detailed explanation has been given in the data analysis section of the relevant chapters. The empirical analysis undertaken in this thesis is one of its significant

contributions because previous literature on entrepreneurial ecosystems is more theoretical in nature. Moreover, none of the studies has yet measured the entrepreneurial ecosystem in LMICs, although a few attempts have been made for developed countries, which present different opportunities and challenges to the entrepreneurs. Also, the institutional frameworks and physical conditions are entirely different in developed countries.

Thus, currently it is unknown as to how a LMIC should improve its entrepreneurial ecosystem? What should be the immediate concern for a LMIC to improve its entrepreneurial ecosystem? The answer to the later question is in the bottlenecks approach. From a public policy point of view, the bottlenecks in the entrepreneurial ecosystem affect the efficiency of the system. The first aim of policymaking should be to improve the weakest component in the system. The improvement in the entrepreneurial ecosystem also depends on the number of bottlenecks existing in it. The largest improvement in entrepreneurial ecosystem is expected if there exists only one weak component and it is subsequently corrected.

The analysis in Chapter 4, of the effect of components of the entrepreneurial ecosystem, of LMICs on firm performance has enabled us to understand the health of their ecosystems, which is found to be a constraint on the performance of their SMEs. Corruption as an indicator of informal institutions has been found to have the largest negative effect. Other than corruption, unstable political conditions and cumbersome regulatory procedures are the most significant problems for firms of all sizes and ages in LMICs.

Moreover, the demands of small, medium, young and old firms have also been found to be different from each other. Thus, a policy of ‘one size fits all’ is not going to be effective. Therefore, policymakers should develop separate policies, using the bottom-up approach, for the progress of each of these categories of firms. Moreover, the studies in the literature have also mentioned the poor state of the institutional framework and physical

conditions as a common characteristic of all the LMICs. Therefore, aid given by the development agencies and efforts for the improvement in the performance of SMEs should be centred on institutional development rather than giving short-term benefits to different sectors. Procedural efficiency should be improved to provide quick solutions for regulatory issues related to the entrepreneurs. Moreover, the lending terms and conditions of banks should be favourable for SMEs, especially small firms, if the objective of sustainable growth and expansion is to be achieved.

However, only the components-based analysis of the entrepreneurial ecosystem of LMICs had been possible because of significant variations in the institutional framework and physical conditions as well as limited data available for this large group of countries. Therefore, a holistic view of the entrepreneurial ecosystem has been obtained through analysis of data for Pakistan. The use of cluster analysis and canonical discriminant analysis has enabled us to identify the composition of the entrepreneurial ecosystem of Pakistan. The weighted effect of components of the entrepreneurial ecosystem was used to account for the relative importance of each component, and an index was developed for estimating the systematic and interactive effect of the entrepreneurial ecosystem on the performance of firms. The inclusion, or exclusion, of any components is expected to change relative contribution of other components because of the interdependence of components of the entrepreneurial ecosystem.

The identification and measurement of systematic collective effects of the entrepreneurial ecosystem on entrepreneurial performance has been a new contribution in the scarce literature on entrepreneurial ecosystems of developing countries. The findings show that the poor health of the entrepreneurial ecosystem of Pakistan is a constraint on the performance of SMEs. There is an urgent need to take corrective actions for improvements in the entrepreneurial ecosystem for subsequent improvement in the performance of SMEs.

However, it can be concluded that after identification of the ways to measure entrepreneurial ecosystems, policymakers would be able to compare their entrepreneurial ecosystems with comparable similar countries. Also, they can identify the strong and weak points in their system and look for the opportunities that can be availed if the weak links are improved.

There are a few points of discussion on the basis of this research. At first, the entrepreneurial ecosystems are a complicated mix and can vary from region to region and time to time. The connection of entrepreneurs and institutional frameworks and physical conditions is important. The research in this direction is in an early phase of development, yet it promises to contribute significantly to the development of regional economic policies in the future. Beyond this, the stakeholders of the ecosystems domain should focus on the availability of more sophisticated data, which is expected to better explain the connectivity in different layers of an entrepreneurial ecosystem framework.

These components of the entrepreneurial ecosystem are not a definite set. We believe that these components measure the health of any entrepreneurial ecosystem of LMICs. We also understand that some components like connectivity of entrepreneurs, and research and development by universities might have been missed in this composition, nonetheless quantitative research in this direction has merely started and this study will pave the way to develop a causal relationship. However, the evaluation of entrepreneurial ecosystems using this approach gives some basic guidance about where it stands and what potential actions are expected to take it into the right direction.

The rest of the chapter has been structured as follows. Section 6.1, explains the policy recommendations for LMICs and Pakistan and section 6.2 explains future research directions on the basis of the findings of these empirical studies.

6.1 Policy Recommendations

The best possible data available on components of entrepreneurial ecosystems in LMICs has been used in this study. However, these findings are just guidelines on the roadmap towards the strong and weak points in the entrepreneurial ecosystems of these countries. After assessment of the health of the components of the entrepreneurial ecosystem of LMICs, different courses of action are suggested for both entrepreneurs and policymakers.

We understand that radical improvements in the entrepreneurial ecosystems are not pragmatic. Therefore, gradual improvements in the existing institutional framework and physical conditions are suggested. However, these recommendations are starting points for the debate about working on the bottlenecks in the existing entrepreneurial ecosystems. Policymakers should set a time frame for themselves and prioritize different improvements in the entrepreneurial ecosystem for making it encouraging for entry, survival and growth of SMEs.

The specific policy recommendations, with respect to improvements in institutional framework and physical conditions, are given below for both entrepreneur and policymakers in LMICs and Pakistan:

6.1.1 Institutional Framework

Improvements in the institutional framework can significantly improve the ease in doing business for entrepreneurs. There is need to improve and synchronise both formal and informal institutions of LMICs for making the entrepreneurial ecosystem supportive for entry, survival and growth of entrepreneurs. How policymakers and entrepreneurs can contribute in their own domain, to achieve the goal of a supportive entrepreneurial ecosystem, has been explained below?

What can Policymakers do?

Policymakers are important stakeholders in the entrepreneurial ecosystems approach. They are responsible for reforms in formal institutions and synchronization in formal and informal institutions. Therefore, the following ways are suggested for policymakers to improve the institutional framework in the entrepreneurial ecosystems of LMICs and Pakistan.

- Government regulations in LMICs in general and Pakistan in particular are discouraging entrepreneurs from entering the market as formal businesses. Therefore, a reduction in the cost of business registration (a non-productive investment for business) and regulatory burdens for starting a business venture is recommended for ensuring a supportive entrepreneurial ecosystem. In addition, work on capacity building of government servants to create and implement business supportive policies. Such reforms will make it easy for entrepreneurs to comply government regulations.
- Allow competitive market forces to follow self-regulatory mechanism for ascertaining the survival of only productive entrepreneurs. The government should use invisible hand model to control anti-competitive practices and let competition in the market and awareness of customers to decide which companies remain in the market and which ones leave.
- Control over corruption should be the first priority of policymakers in LMICs. Substantial improvements in the performance of SMEs are expected as a result of a decrease in corruption, and this is expected to be disproportionately beneficial for young and medium sized firms. Government regulations are used by public officials for rent seeking. Thus, improvements in the regulatory environment will have a dual effect. It will not only make it easier for entrepreneurs to start business, but will also reduce the opportunities for corruption by public servants.

- Taxation system of LMICS is highly complicated and it is difficult to truly understand and comply with the requirements. Thus, policymakers should not only make it more simple but also spread awareness about how to comply with taxation requirement. Moreover, tax incentives should be provided to the firms investing in education programs and promoting entrepreneurial events at different levels. Highlight such events on media for awareness among public and for motivation of nascent entrepreneurs.
- One policy for all SMEs will not be effective. The distinct and important needs of small, medium, young and old firms should be treated differently. Thus, policies should be developed and implemented after appropriate customization on the basis of needs and requirements of each type.

What can Entrepreneurs do?

The entrepreneurs are important part of the entrepreneurial ecosystems approach. They are not only the recipients in the entrepreneurial ecosystem, but they are also feeders into that system. The feedback loop mechanism ensures that input from entrepreneurs is used to inform reforms of the entrepreneurial ecosystem. Entrepreneurs in LMICs can contribute to improvements of the institutional framework in following ways:

- Collaborate with other business people to host entrepreneurial social events where entrepreneurs could learn from each other and share the successful practices and how entrepreneurs can do value addition in the society. Moreover, stay in touch on social media platforms to improve awareness of nascent entrepreneurs about how to go through the formal business processes. This awareness will mitigate the fear of potential entrepreneurs about how to deal will business rules and regulations.

- Foster research and development culture in the market by encouraging and supporting the people around you, who are interested in setting up their own ventures based on new product or service ideas. Liaise with your entrepreneurial association and government in an effort to mentor or promote the best practices of interaction between different stakeholders in entrepreneurial ecosystem.
- To ensure productive entrepreneurial contribution in the market identify and exploit the unique or under-served opportunities in the market with potential for growth in future. Also, set challenging and ambitious goals for expansion and growth of your entrepreneurial venture. This will promote innovation in the market and disrupt the status quo.

6.1.2 Physical Conditions

The variations in entrepreneurial ecosystems across different regional spaces happen to be because of both institutional framework and physical conditions. The physical conditions play an important role in making any entrepreneurial ecosystem attractive for entrepreneurs. Therefore, different remedial actions can be suggested, at whichever level the ecosystem is measured, for improvements in this direction and both policymakers and entrepreneurs have their distinct roles to play. The recommendations for policymakers and entrepreneurs are explained below:

What can Policymakers do?

Policymakers are not only responsible for institutional reforms but also improvements in the physical conditions largely depend on the reforms agenda adopted by the policymakers. Therefore, the following ways are suggested for policymakers to improve the physical conditions of the entrepreneurial ecosystems of LMICs and Pakistan.

- Eliminate barriers to getting funds for starting new business. The financial institutions are inefficient and their terms and conditions are not favourable for SMEs. Obtaining equity financing should be easy for businesses and sources of external financing should be bound by the government to provide loan to SMEs on suitable terms and conditions. Moreover, micro financing schemes can be useful to facilitate small businesses in getting short-term loans.
- Strictly follow the laws for child labour and through distance learning, at least, provide free access to education for all. Moreover, start business education modules at secondary education level to improve the understanding of students about value addition by entrepreneurs in the society. In addition, improve the quality of education in the technical and vocational institutes for improvement in the skill level of industrial workforce.
- The access to tertiary education should be improved so that larger set of population could get benefit from it. Moreover, the quality of scientific institutions should be improved for the increased supply of qualified scientists and engineers for the industrial sector. Also, tax credits to the general public should be offered for investing in education.
- Use social safety nets to encourage people initiating an entrepreneurial venture. This should be used for protecting entrepreneurs from the damages of a failed entrepreneurial effort. Moreover, create business incubation centres in different underdeveloped regions to facilitate nascent entrepreneurs in start-up and early settlement phase in business.
- Foster academia-industry collaborations for creation of new technologies and innovation in the existing technologies. Appreciate the local technologists and encourage local technology development by providing tax reliefs for preferred

industries. Moreover, start collecting and disseminating data on the entrepreneurial activity and its effect on economy at local and national level.

- Improve the consistency in government policies and there should be no conflict of interest among institutions. Consistent government policies will help in reducing the uncertainty surrounding the business environment. The investment decisions of the entrepreneurs rely heavily on the political stability of a region.
- Though the experience in the informal economy has a positive effect on the performance of registered SMEs in LMICs, yet the enormous number of businesses operating in the informal economy should be motivated to register formally by sharing attractive benefits of registration.
- The provision of uninterrupted electricity to all businesses, especially SMEs should be ensured to overcome this biggest infrastructural obstacle to productivity of firms in Pakistan.
- The micro-level data collection on all components of the entrepreneurial ecosystem should be ensured for policy oriented studies.

What can Entrepreneurs Do?

Whatever physical conditions are available, entrepreneurs can play a key role in utilization of existing resources. The optimum utilization of existing resources can create more opportunities for entrepreneurs and they can also push policymakers through feedback loop mechanism for immediate improvements in certain physical conditions. Therefore, following ways of contribution by entrepreneurs can be recommended for improvements in the physical conditions:

- Collaborate with the business community to provide seed funding to the nascent entrepreneurs with innovative business ideas and willing to take risk. Control the risk

of implementing new business ideas by doing a pilot test to validate the possibility of success of your idea. Also, identify the dependence of success of your idea on external factors beyond your control. Keep in mind that success of any idea is linked with the skill set of the entrepreneurs.

- Always keep looking for new technologies and improvements in existing technology for improving the process and product efficiency of your business. Moreover, explore international markets and exploit trade affiliations of countries to expand the market for your products and services.
- Invest in continuity of both formal and informal education of your employees and provide training and development facilities to your employees for learning new technologies and trends. Also, invest in apprenticeship programs to improve the skill set of your future workforce.
- Stay connected with the entrepreneurs in your area and ask peers how they developed the skill level of their workforce. Moreover, with the help of network of entrepreneurs try to sponsor industry related skill building programs.

6.2 Future Research Directions

There is need to dig deeper into the existing entrepreneurial ecosystem problems to look for the possible solutions. Further research at different levels is required to investigate this area with potential for improvement in entrepreneurship and subsequent economic growth. The contribution of this thesis is (i) the measurement of the entrepreneurial ecosystem of Pakistan as an interdependent set of components, and (ii) identification of weak links in the entrepreneurial ecosystem of LMICs. However, there is a long way to go in understanding the complicated nature of the interactive effects between different components of the entrepreneurial ecosystem. Further research should be undertaken to better measure the

components through improved quality of data. Different units of analysis (countries, regions, provinces, districts, cities, industrial clusters, etc.) should be used to identify and measure the composition and functioning of various types of entrepreneurial ecosystems. The future research directions recommended on the basis of this study are given below:

- The concept of entrepreneurial ecosystems is in an evolutionary phase and needs further empirical studies to establish the causal relationship between components and outcomes of their effect on firm performance. Moreover, more studies on developing countries are needed for comparisons.
- The impact of the entrepreneurial ecosystem of Pakistan at national level has been empirically investigated in this study. However, different effects for different industrial sectors are also expected. Therefore, future research should be directed at looking for the types of entrepreneurial ecosystems for different industrial sectors.
- Different regions could be hosts to different types of industrial sectors, therefore, depending upon the availability of data, future research should be aimed at finding entrepreneurial ecosystems at further micro-level (province, city, cluster of businesses) for improving the understanding of stakeholders of this approach. This will also help in evaluating the entrepreneurial potential of different regions for different industrial sectors on the basis of their regional characteristics.
- Depending upon the availability of data, future research should use longitudinal data to track the ups and downs in businesses cycle within a manageable time frame for properly understanding the development of the entrepreneurial ecosystem, especially the feedback loop mechanism.

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