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Public Policy for Entrepreneurship and Innovation: Trade-offs and Impacts in Managed and Entrepreneurial Economies

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Dedication

This thesis is dedicated to my teachers: from the past, the present and the future.

Acknowledgement

Looking back at the time spent working on this project; I see the hard work and recognize the experience and knowledge that I have gained. It has been an interesting sometimes fun and often times difficult journey. I am proud of my work and the achievement. Its completion and more importantly its quality, is however the sum of the input of several persons. I am the fortunate recipient of helpful suggestions and insights from a number of persons to whom I expressed my heartfelt gratitude.

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CHAPTER 1: PROBLEM STATEMENT

1.1 INTRODUCTION

There is hardly any argument against the view that the world economies have undergone and continue to experience significant structural changes. Technological advances have contributed to an increasingly prominent role for new and small firms in economic activities in the most advanced economies. This has been recognized by academics, governments, industries as well as individuals.

Many developed economies have faced increased competition from emerging economies of Central and Eastern Europe as well as those from Asia. They have seen their comparative advantages eroded and their economic growth reduced to uncomfortably low rates. It has been suggested that these are the effects of advances in information and telecommunication technologies and globalization. Counteracting the challenges to their economic status and way of life has required a shift in focus, away from the managed economy as characterized by Chandler (1977, 1990) to an alternative structure which Audretsch and Thurik, (2001) characterized as the entrepreneurial economy. The new structure stresses innovation and entrepreneurship as the means to maintain comparative advantages and achieve economic growth.

The new economic structure differs from the old in many ways, but at the heart of it all is the significance of new and small firms. These are the output of innovative activities which are implemented by talented entrepreneurs. The old system is less supportive of both entrepreneurship and innovation favouring large established corporations.

One of the most widely touted differences between the two economic systems is that of public policies to support entrepreneurship and innovation. Since public policy can be more easily manipulated, some governments have undertaken to create supportive infrastructures through public policy initiatives. In this way they hope to stimulate innovation and entrepreneurship activities and, through these activities, maintain comparative advantages while achieving greater levels of economic growth. Others have not taken these steps, preferring to continue along the old pathways. This has created the trade-offs between the two 'economic pathways'.

1.2 PROBLEM AREA

From as far back as 1912[1], Schumpeter had linked entrepreneurship to economic growth. His assessment was that the innovative activity of entrepreneurs feeds a creative destructive process causing a constant disturbance to an economic system in equilibrium which creates opportunities for economic rent. These opportunities allow entrepreneurs to enter the economic system during the process of adjustment, even as other innovations are spun-off (Schumpeter, 1912). More recent research however, have not provided any conclusive evidence that entrepreneurial activity (measured in different ways), contributes to increased employment and economic growth (Van Stel, Carree and Thurik, 2005, Audretsch and Keilback, 2004, Wennekers and Thurik, 1999).

[1] This book was later translated into English in 1934.

The lack of conclusive evidence has not changed the firmly held belief that there is positive relationship between innovative and entrepreneurial activities and economic growth. It has also not altered the view that entrepreneurship is responsible for much of the recent economic growth and even social development throughout much of the world (OECD, 1998; Audretsch and Thurik, 2001). This belief extends beyond academia as politicians, policy makers and others who influence public policies have also recognized the increased importance of entrepreneurship, whether real or perceived. The European Commission advocates the need to become more entrepreneurial by 'nurturing a culture of entrepreneurship' (Crijns, 2003).

Evidence of this can be seen in several areas including the increasing number of sponsored conferences and workshops on issues relating to entrepreneurship and innovation. It is also evident in the increasing support for teaching entrepreneurship and innovation in established universities around the world and in the efforts that institutions such as the OECD and the European Commission have placed on these issues. Many of the latter activities have been in response to pleas for guidance on how to proceed in positioning countries to realize 'potential' economic growth and prosperity through making their economies more innovative and entrepreneurial.

This belief that entrepreneurship leads to economic growth, has contributed to the proliferation of a plethora of public policy initiatives with the conviction that through these public policies, countries can stimulate their entrepreneurial and innovative capacity and, in this way, achieve higher levels of economic growth (Crijns, 2003).

The renewed interests have resulted in several public policy programs to stimulate innovation and entrepreneurship. These efforts have included policies to reduce regulatory barriers in general business areas in labour practices as well as to increase international activities to provide opportunities for new firms to enter the economy as well as for existing firms to grow. Policy initiatives focused on creating an infrastructure in which innovation and entrepreneurship thrive have addressed issues of access to higher education and the development of a system of finance that can accommodate greater levels of risk. Recognizing the importance of a regional innovative system in the quest to become more innovative and entrepreneurial, a significant number of countries have begun initiatives to develop competencies in regional and local authorities to help them articulate their own policy objectives and goals (Smallbone, 2004; Welter, 2004).

The extents to which such policies have actually impacted the levels and types of entrepreneurial and innovative activities that different countries experience have not been systematically investigated. It is therefore not known which public policy programs are effective in stimulating innovative and entrepreneurial activities under shifting economic conditions**.** This gap exists despite the great deal of attention that has been placed on the importance of entrepreneurship and innovation in the economic growth of countries. The proliferation of public policies to stimulate entrepreneurship and innovation activities has occurred without much emphasis on measuring the actual impact that the public policy programs are having on the intended target: that target of making economies more innovative and entrepreneurial.

The European Commission together with national governments has invested billions of euros in different programs to foster entrepreneurship and innovation in member countries. This is also true of the other OECD countries. This response is by no means unfounded; it is in keeping with documented changes that are taking place in the way economic activities are organized especially in the developed countries. There has been some empirical evidence documenting a shift away from large corporations towards smaller enterprises in many developed countries (Birch, 1987, Brock and Evans, 1988, Loveman and Sengenberger, 1991), which would indeed reflect the emergence of more entrepreneurial economies. Empirical evidence in support of the effect of public policy on this emergence has not been forthcoming. To a large extent it remains unknown just how effective specific programs are at actually increasing entrepreneurship and innovation in the different environments.

The move by some of the most developed economies of the world, from a managed structure to an entrepreneurial economic structure (Audretsch and Thurik, 2001) is part of the driving force behind this greater emphasis on increasing innovative and entrepreneurial activities through public policy. This idea of a shift in the economic structure is not a new one. The concept of the new economy has been discussed and documented in the literature; see for example Gordon, (2000); Ceccihetti, (2002); Eliasson et al. (2004) and Atkeson and Kehoe, (2007). Audretsch and Thurik (2001) however, were the first authors to emphasize the key role of entrepreneurship in the emerging new economic structure, crowning this new emergence as the 'entrepreneurial economy'.

In identifying the fundamental elements that separate the old from the newly emerging economic structure, they emphasized that the role of new and small firms in the newly created economic structure is at the core of what makes it different from the old setting. They therefore labelled the new emerging economic structure as the 'entrepreneurial economy' while those that continued along the traditional path are labelled the 'managed economy'.

The manifestation of the difference between the old and the new economy according to Audretsch and Thurik comes in the form of fourteen trade-offs divided among four groups as laid out in Table 1.1. A summary introduction of the trade-offs is being made here with a more detailed elaboration later in chapter 3. The first group concentrates on the forces underlying behind the two economies. It comprises three trade-offs; localization versus globalization, change versus continuity and jobs and high wages versus jobs or high wages.

Trade-off 1: **Globalization versus Localization** as a fundamental element that distinguishes the two economies, deals with the difference in meaning of geographic space. In the managed economy, product and the production process are standardized and utilize the traditional inputs of land, labour and capital. Here regional specific characteristics have no significant bearing on what transpires in the economic process. The effect of globalization however has erased the comparative advantage that high wage countries have gained from routine economic activities, which are based on these traditional factors. Such routine activities can now be transferred with relative ease to low cost areas of the world thanks to advances in information technology.

The entrepreneurial economy, however, is the consequence of a system in which knowledge has emerged as the most important factor of production. Tacit knowledge is believed to be the main source of competitive advantage for knowledge-based firms. Since its development takes place in localized networks and clusters and it is not costlessly transferred across geographic space, it is not affected in the same ways by globalization. Local conditions which facilitate knowledge creation and returns from externalities such as its spill-over are therefore crucial in this new economy. The developments of local spaces, towns, cities or regions, to create 'innovation milieu' in which knowledge creation and its spill-over flourish are therefore more important in this kind of economy. This sets the stage for all the other fundamentals that helps to differentiate the managed and the entrepreneurial economy as can be perceived from the subsequent trade-offs.

Trade-off 2: **Continuity versus Change**. The managed economy is characterized as based on continuity, doing the same things repeatedly which reduces the level of uncertainty or risk involved in the economic process. Firms here are said to suffer from a technological lock-in meaning they follow a particular technology trajectory and are only able to absorb incremental innovation within this trajectory. The entrepreneurial economy at the other end of the spectrum is constantly changing. The greater number of firms increases the approaches to innovation that are pursued. This subsequently increases the number of technology pathways that exist in any given industry, advancing technological development rather than creating 'lock-in' as in the managed economy.

Trade –off 3: **Jobs or high wages versus Jobs and high wages**. The belief in the managed economy was that job creation came at the expense of wages. The downsizing and the dislocation of many large firms have created rising unemployment rates in many advanced economies. The prevailing belief is that reducing the rising unemployment rate can only be achieved by creating routine jobs in mature industries. These kinds are the kinds of jobs that carry lower wages. In the entrepreneurial economy, increasing number of new firms many of which are knowledge-based, provide new opportunities for jobs. The new jobs attract higher wages; proving that it is possible to combine high employment with high wages.

Three trade-offs dealing with the underlying environment make up the second group. Trade-off 4: **Stability versus Turbulence**. The managed economy is characterized as having a set of homogenous products made by the same set of firms to satisfy stable and durable demand. The down side of this is that there are therefore few opportunities for new firms in these conditions, although such conditions contribute to lower turnover rates for both jobs and workers. The setting for the entrepreneurial economy on the other hand is characterized by turbulence. Diverse sets of new ideas are constantly emerging which together with the various experimentations for their commercialization helps to create turbulence both within incumbent firms as well as outside of them. There is a constant churning of firms although only a few of the new firms will be successful enough to challenge the incumbent. There is also dynamism in the job markets as well as in the relationships between employers and their employees.

Trade-off 5: **Specialization versus Diversity**. In the managed economy there is more specialization in industries to realize benefits from lower transaction costs and static efficiencies. This however restricts intra-industry knowledge spill-overs which are important for innovation activities. Since knowledge is an important input in the economic process in the entrepreneurial economy, diversity of industry becomes necessary to facilitate these spill-over effects.

Trade-off 6: **Homogeneity versus Heterogeneity**. This trade-off concerns the extent to which the population is homogenous or heterogeneous. The managed economy is characterized as having a relatively homogenous population. This results in reduction in the cost of communication and transaction and the spilling of knowledge across individuals. However, new ideas are not likely to be generated in this setting as the homogenous population will tend to have similar thought processes, experiences and even ways of accessing information. The heterogeneous population in the entrepreneurial economy on the other hand, while incurring greater communication and transaction costs is more likely to generate novel ideas. This is due different genetic, unique experience profiles as well as differential access to information of individuals in this setting.

The third group of trade offs is concerned with activities within the firm.

Trade–off 7: **Control versus motivation**. In managed economy a given set of outputs is expected from employees. This is characterized as controlling where the objective is to realize outputs equivalent to the value of their wages from employees.

In the entrepreneurial economy on the other hand, highly skilled workers are taken on and given the resources and encouraged to be creative. This is characterized as motivation; in this way they will be able to discover and implement innovative ideas that will push the firm ahead of competitors.

Trade-off 8: **Firm transaction versus market exchange**. The managed economy with its low levels of uncertainty and predictability of information makes inter firm transactions more efficient. Increasing levels of uncertainty and information imperfection and asymmetry which exist in the entrepreneurial economy make exchanges within markets a more efficient process.

Trade-off 9: **Competition and co-operation as substitutes versus competition and co-operation as complements**. Vertically integrated firms in the managed economy compete with each other in the product market. Co-operation among firms at this level would therefore not just reduce the number of competitors; it will also reduce the degree of competition. Since firms in the entrepreneurial economy are vertically independent (outsourcing and independent contractors), co-operation among independent firms does not carry the same negative effects as above. The nature of these arrangements also means greater co-operation among entities. The increasing number of firms also contributes to greater levels of competition in the entrepreneurial economy.

Trade-off 10: Scale versus Flexibility. Through scale economies, firms in the managed economy can reduce their costs. This contributes to a concentrated industrial structure characterized by a handful of powerful corporations. Small and new firms are locked out of such industrial structure. In the entrepreneurial economy, firms achieve reduction in costs through flexibility. Flexibility takes on different forms which together provide the effect of reducing the importance of scale economies.

The final group of trade-offs concern public policy and is the group that holds the greatest interest for this study.

Trade-off 11: Regulation versus stimulation. Antitrust (competition policy), regulation and public ownership are the general characteristics of public policies that existed in managed economies, especially in the post war periods. They aimed to regulate or constrained the activities of the existing large powerful corporations. In the entrepreneurial economy which is characterized by a large number of firms, many of which are small and new, the general goal of public policies is to create a stimulating environment that supports economic activities that will lead to economic success.

Table 1.1: Summary of trade-offs

Group	Trade-offs	Managed Economy	Entrepreneurial Economy
Underlying Forces	**1.**	Globalization	Localization
	2.	Continuity	Change
	3.	Jobs or high wages	Jobs and high wages
Underlying Environment	**4.**	Stability	Turbulence
	5.	Specialization	Diversity
	6.	Homogeneity	Heterogeneity
Firm Function	**7.**	Control	Motivation
	8.	Firm transaction	Market exchange
	9.	Competition and Co-operation as substitutes	Competition and Co-operation as complements
	10.	Scale	Flexibility
Policy	**11.**	Regulation	Stimulation
	12.	Targeting output	Targeting input
	13.	National Policy	Local Policy
	14.	Low-risk Capital	Risk Capital

Source: Self elaboration

Trade-off 12: Targeting outputs versus targeting inputs. Public policies are targeted at outputs in the managed economy. This means that emphasis is placed on targeting a set of industries or even firms through which it was believed that the country could gain comparative advantages. These could be promoted through specific government programs to ensure that there could compete with other such entities in other countries or even dominate of world markets.

In the entrepreneurial economy, targeting inputs into the economic process becomes important. With uncertainty about what to produce, how to produce it and who should produce it, it is difficult to target outcomes, industries or firms. Public policies are therefore targeted at creating inputs specifically the creation and commercialization of new knowledge which has become the most important input in the economic process.

Trade-off 13: National Policy versus Local policy. In the managed economy the locus of public policy is at the national or federal level where national institutions are responsible for shaping public policies for localized recipients. In the entrepreneurial economy public policies tend to be developed locally. These public policies are influenced by the local conditions incorporating special needs and result in more effective public policies.

Trade-off 14: Low Risk Capital versus Risk capital. Traditional means of financing where existing companies are provided with liquidity for investments dominate in the managed economy. In the entrepreneurial economy however, where ideas for new products and services resulting from innovative activity are shrouded in uncertainty, a different system of financing becomes necessary. Venture capital combing liquidity with other resources such as management competence and experience and personal networks is needed to accommodate these embedded uncertainties and risks (Audretsch and Thurik, 2001).

Evidence of the changes especially based on these proposed trade-offs has not yet been provided. The effort required to analyze the entire set of trade-offs is beyond the scope of this thesis. The increasing interest of public policy to stimulate entrepreneurship and innovation as a way to achieve economic success that was outlined earlier helped in the decision to analyze the group which deals with policy in this study. This is coupled with the notion that many governments hold strongly that knowledge based industries are vital to economic growth and that they can improve the future of their countries through public policy targeted at these areas (Eliasson and Eliasson, 1996).

1.3 PURPOSE

Research in the area of public policy for entrepreneurship and innovation has focused mostly on documenting existing public policies for entrepreneurship (Stevenson and Lundström, 2001; Veciana et al., 2004; Lundström and Stevenson, 2005). There is also an existing body of work that has investigated individual measures of public policy, such as research and development (R&D) expenditure on single measures of entrepreneurial activities, for example new firm formation by Kirchhoff et al., (2002).

These studies have provided very important information about public policy in this area and useful inputs to the present investigation. However, little attention has been given to actually measuring the effects of these programs. In addition it appears to be a constant renewal of entrepreneurship policy and increased interest in innovation as part of the entrepreneurial process. Furthermore, I am unaware of any research to date that has investigated public policies based on the trade-offs that supposedly exist between the managed and the entrepreneurial economies as have been outlined. The differences in the goal, target and focus of public policies as well as the system of finance in the managed and the entrepreneurial economy will be investigated.

The overwhelming interest in entrepreneurship and innovation and the existing gap in what is known about the effect of public policy on entrepreneurship and innovation, means that there is contribution to be made by undertaking this research project. The increasing interest in the new economy and the role that entrepreneurship and innovation plays in this development as well as the role that public policy can have on the level of these activities combines to provide an interesting research area. This research is significant as it will provide empirical evidence of the trade-offs in public which have implications for policy creation and implementation. It also contributes to filling the gap that exists in what is known about the effectiveness of public policies for entrepreneurship and innovation on different measures of these phenomena in the two economic settings.

This thesis has two broad purposes. The first is to classify a sampling of European Union member countries as one of two types of economies, managed or entrepreneurial. Then to investigate and validate or refute the existence of the trade-off in public polices in relation to these propositions; regulation versus stimulation, targeting outputs versus targeting inputs, nationally versus regionally formulated policies and low risk versus risk financing policies. The second purpose is to establish statistical relationship between selected public policy programs in the four trade-offs areas and actual levels of entrepreneurship and innovation in the sample of European Union (EU) member countries that have been classified as managed or entrepreneurial.

Specifically, the purpose of the thesis is to:

i) Present the Institutional Theory as purported by Douglass North, which forms the theoretical basis of the thesis;

ii) Define the factors that characterize the new economic structure and use these to cluster a sample of countries into separate groups of managed and entrepreneurial economies;

iii) Determine if the focus, targets and locus of public policy as well as the system of financing for entrepreneurship and innovation are different in the managed and the entrepreneurial economies;

iv) Analyze the effect of selected public policies programs for entrepreneurship and innovation on actual levels of (a) entrepreneurial activity and b) level of innovation in managed and entrepreneurial economies;

v) Analyze the relationship between the effects of public policy programs on levels of entrepreneurship and innovation activities when different indicators are used for entrepreneurship and innovation;

vi) Briefly discuss the theoretical and empirical results against the background of the existing focus on stimulating economic growth through entrepreneurship and innovation.

1.4 RESEARCH QUESTIONS

This thesis is done in two parts. In the first part I use a combined quantitative/qualitative approach to answer the following research questions:

1. Which of the EU member states can be classified as managed or entrepreneurial economies?
2. What are the significant factors that separate the countries into managed and entrepreneurial economies?
3. Are public policies for entrepreneurship and innovation different in the managed and the entrepreneurial economies?

a. Are the goals of public policy for entrepreneurship and innovation in the entrepreneurial economies to stimulate while they are to regulate in managed economies?
b. Are public policies for entrepreneurship and innovation created at the regional/local levels in entrepreneurial economies and at the national level in managed economies?
c. Do public policies for entrepreneurship and innovation target inputs in the entrepreneurial economies and outputs in the managed economy?

d. Do entrepreneurial economies have a more developed system of risk financing than do managed economies?

The second part of the thesis tries to establish statistical relationships between selected public policy programs and actual levels of entrepreneurship and innovation in the sample of countries. The main research question in this section is the following:

1. How do selected public policy programs for entrepreneurship and innovation impact the measurable levels of entrepreneurship and innovation in each country?

a. What are the relationships between different levels and measures of regulations and national levels of entrepreneurship and innovation?
b. Are there significant relationships between where public policies are created and levels of entrepreneurship and innovation?
c. Are there significant relationships between public policy programs that target outputs/promote innovation levels of entrepreneurship and innovation?
d. Are there significant relationships between public policy programs to create more non-traditional methods of financing enterprises and levels of entrepreneurship and innovation?
e. Are the relationships between public policy programs and levels of entrepreneurship and innovation different in managed and entrepreneurial economies?

1.5 SIGNIFICANCE OF THE STUDY

The world economies, regardless of the level of development, are looking to entrepreneurship as a way to stimulate growth. With this in mind, just about every country has developed public policies or in some cases reformulated existing policies to make them 'supposedly' more effective in creating an environment conducive to innovation and entrepreneurial activities.

While many countries have long focus on new business creation, there are those that assume that innovation will contribute more to their economic development and so have created additional public policies aimed at increasing the levels of innovation. A common concern, however, is that many public policy programs lack evaluation mechanisms. Very little is therefore known about the effectiveness of many of these programs that have been implemented (Storey 1998; Stevenson and Lundström, 2001).

The results from this investigation will serve several purposes including providing evidence of how public policies are impacting actual entrepreneurship and innovative activities in different countries. It will provide evidence of or refute the trade-off in public policy in managed and entrepreneurship. This will be a step in substantiating the existence of the two economic groupings. Evidence of the programs that are most impacting levels of innovation and entrepreneurship will serve as guidelines for subsequent adjustments in public policies in the countries that are included in this analysis.

In addition, as emerging and developing economies embark on their own development of public policies for entrepreneurship and innovation (taking their cues from the developed world), we hope to provide interesting evidence that the effectiveness of public policies is dependent on the overall institutional climate but more so, on the existing economic structure.

The results of this research will be especially useful if they help to stimulate ideas for the development of build-in evaluation mechanisms for entrepreneurship and innovation policies. Like most research we hope to provide useful information for some stakeholders. At the top of the list are those who make decisions on public policy issues and the research community. Public policy advisers as well as public policy makers will have some empirical evidence of the effect of different public policy programs on entrepreneurship and innovation. They can therefore make better informed decisions about the particular measures that maybe more effective for their individual settings depending on existing conditions or institutional framework.

The results will also provide a more substantiated background against which the research community can expound the relationships between public policy and innovation and entrepreneurial activities in different settings. It will also act as the springboard for further research into the other proposed trade-offs that distinguishes the managed from the entrepreneurial economies. And importantly begin to provide a picture of what managed and entrepreneurial economies look like at least in these limited ways.

1.6 OUTLINE OF THE THESIS

My thesis is written as a monograph. It contains eleven chapters (divided into two parts) which are organized as follows:

Section One: Development of a theoretical framework

Chapter 2 introduces the Institutional Theory proposed by North (1990) with other elements of institutions from Scott (1995).

Chapter 3 outlines economic transformations and the ensuing institutional changes including descriptions of how the old and the new economies differ and introduces public policy in the old and the new economic settings.

Chapter 4 contains a limited review of the literature on public policy and entrepreneurship.

Chapter 5 presents the research model and the hypotheses.

Section Two: Issues of methodology. Analysis and Presentation of Results

Chapter 6 introduces the methodology for a mixed (quantitative/qualitative) analysis

Chapter 7 presents and discusses the results from the mixed analysis.

Chapter 8 contains the methodology for the quantitative analysis.

Chapter 9 presents and discusses results from the quantitative analysis.

Chapter 10 contains the conclusions and sums up the thesis including implications and limitations.

Chapter 11 is the References.

SECTION ONE: DEVELOPING A THEORETICAL FRAMEWORK

CHAPTER 2: INSTITUTIONAL THEORY

2.1 INTRODUCTION

Economists in the last decades have given increasing attention to the role of institutions in economic development. This has come about in response to the failure of neo-classical models to fully explain economic growth. Institutions have been elevated as one of the many variables that influence innovation and economic growth by theorist such as North, Rosenberg, Nelson and Williamson. The aim of the chapter is to describe neither the history nor the different variations in institutional theory. Rather, the theory is reviewed in an effort to establish the meaning of institutions especially as described by North and emphasized by Scott. To highlight the influences institutions have in the development of geographic spaces, particularly in the strong economic sense. It remains necessary, however, to locate the selected views on institutions in the broad area of institutional economics.

This chapter introduces and summarizes the Institutional Theory proposed by North, (1990, 2005) and the three pillars of institutions outlined by Scott (1995) to identify the links between a country's institutions and its economic activities. According to North, '…the individual entrepreneur who responds to the incentives embodied in the institutional framework' is the agent of change (North, 1990, pp.83). Innovation results from human interaction through entrepreneurship.

Institutions dictate and or regulate the interaction between people by defining the incentive structures in an economy. It naturally follows that institutions will affect innovation and entrepreneurship activities. It has been suggested that Institutional Theory '….currently provides the most consistent and appropriate conceptual framework to probe the influence of environmental factors on entrepreneurship" (Veciana 1999, 2007: pp.32). And to show how these are reflected in the entrepreneurial and innovative activities that occur in countries. Several researches have applied an institutional approach to the study of entrepreneurship and have shown that institutions are important facets to the entrepreneurial process. Some of this research will be outlined later. Although the softer social aspects of institutions are acknowledged, they are not emphasized in keeping with the objectives of the study.

2.2 THE CONCEPT OF INSTITUTIONS

There are at least two institutional paths the old institutionalism and the new institutional economics (Hodgson, 1989). The old institutionalism said to be a reaction against orthodox economic theory is accredited to Thorstein Veblen, Wesley Mitchell and John R. Commons (Rutherford, 2000). The importance of institutions for economic development was emphasized. Rutherford (1995) states that 'Veblen's analytical scheme is one of cumulative causation, in which each step in institutional evolution is shaped by what happened before'. *The existing institutions and social norms mould behavior, and the goals and incentives set up may lead to either predatory or productive types of activities.*

The prevailing habits of thoughts and the incentive system also affect the pace and direction of learning, and it is new knowledge, in Veblen's case particularly technological knowledge, that brings about shifts in the basic patterns of life and , ultimately , alterations in institutions and cultural norms (Rutherford , 1995 pp. 447) . Commons emphasized that '*individual actions are really trans-actions instead of either individual behaviors or the 'exchange' of commodities. It is this shift from commodities and individuals to transactions and the working rules of collective action that marks the transition from the classical and hedonic schools to the institutional schools of economic thinking'* (Commons, 1931, 651).

The new institutional economists originally focused to a large extent on the emergence of institutions and their comparative efficiency. It refers to the original work of R. Coase (1937), O. Williamson (1975) and D. North (1990, 2005). The new institutionalism for the most part, upholds the standard approach based on the rational choice model with emphasis on its extension and modification. It analyses the influence of institutional factors which were traditionally taken as given. It therefore defers from the old institutionalism whose efforts were to replace the existing theories. Institutions and institutional change provided a framework for analyzing ways of reducing transaction costs; reducing uncertainty and producing collective benefits from harmonized and cooperative behaviours. North (1990) for example has gone beyond this efficiency explanation of institutions.

His work has since included the importance of mental models and ideological convictions and other social aspects of institutional settings. Both formal rules including government structures as well as informal norms and behaviours form part of the discussion within the realms of the new institutionalism.

2.3 INSTITUTIONS ACCORDING TO NORTH

Institutions are constraints that humans impose on themselves to provide structure for political, economic and social interaction. They exist to reduce the uncertainties involved in human interactions. These uncertainties arise from the complexities of the problems to be solved. The mental capabilities to organise, process and utilize the information concerning the problems to be solved also contribute to the existing uncertainties. They are the generally applied rules in a community that serve to constrain potential opportunistic behaviours. They therefore carry sanctions for their breaches which serve to limit the extent to which breaches occur in a society (North, 1990).

According to North, *"Institutions affect the performance of the economy by their effect on the cost of exchanges and production". "Together with the technology employed, they determine the transaction and transformation (production) cost that makeup the total costs"* (pp 5-6, 1990). At any given time however, this is the results of events in the past and their present interpretations.

This is important as it signals the extent to which history and institutions are connected to determine economic activities and the level of development in different geographic spaces. Institutions, including political and economic policies, define and limit the set of opportunities that are available to individuals in a society. They also help to determine how these opportunities are perceived as well as the incentives for individuals to transform perceived opportunities into actions. In many ways this determines the extent to which the environment facilitates economic activities including entrepreneurial behaviour. Political and economic policies shape the rules of competition and create areas where investments and entrepreneurial activities are perceived as being more or less attractive. While institutions exist to reduce uncertainty, the created structure is not guaranteed to be always efficient and may induce or reduce productivity.

In addition, North points out that although institutions are stable they are also evolving and changes are generally incremental. In this process of evolution, institutional changes create opportunity for productive and non-productive activities. Institutions differ from organizations, which also provide a structure for human interactions. The latter, however, is created with purposive intents or to achieve specified objectives, while the former dictates what objectives are reasonable and how they can be achieved (North, 1990). Two basic types of institutions or constraints exist and these are heavily influenced by each other. Formal institutions include laws, property rights, contracts and economic rules which influence government policies and procedures.

Informal institutions include the ideas, beliefs, attitudes and values of a group of people which are embedded in their codes of behaviours commonly referred to as culture (North, 1990).

2.3.1 INFORMAL INSTITUTIONS (CONSTRAINTS)

Informal constraints such as codes of conduct, norms of behaviour and conventions account for the majority of the institutions that shape our daily interactions and are more resistant to deliberate policy initiatives than formal rules. They form the cornerstone of ancient societies and influence the effectiveness of formal constraints even in modern economies. They are socially sanctioned norms of behaviour where the choices that one makes are dependent on what society perceives to be right even if all other indications point to some other action. They are also internally enforced standards of conduct and maybe driven by religious belief or commitment to the collective good of the community rather than wealth maximizing goals of individuals (North, 1990).

These institutions influence the decisions that are made by individuals in a society on two main levels. On one level they determine the motivation of individuals which may include wealth maximizing, altruistic motives, fairness and justice or free-riding intents. They also influence attitudes towards wealth maximisation through entrepreneurial endeavours as well as attitudes towards innovation and developing new ideas. The next level involves the deciphering of the environment where pre-existing mental constructs determine how the environment is seen and understood and the approach to finding solutions for problems (North, 1990).

They form part of the process used to identify opportunities for entrepreneurship as well as openness to uncertainty, an attitude which is necessary for exploring the unknown so that innovation can take place. Informal institutions are cemented into the society and changing them takes much time. However, as Baumol, (1990), has outlined, it is possible to achieve changes in these areas by enacting formal institutions (policies/laws) which are more readily instituted.

2.3.2 FORMAL INSTITUTIONS (CONSTRAINTS)

The shift from mostly informal settings in ancient societies, to more formal constraints have emerged and evolved with the increased complexity of societies. Formal rules descend from the polities to property rights and on to individual contracts. The willingness of parties to enter into contracts are signals of the incentives or disincentives imbedded in property right structures and have direct implication for the host of economic activities taking place in societies including entrepreneurship and innovation activities. Formal institutions comprising economic policies and regulations, contracts, judicial and political rules provide more efficient possibilities for handling complex interactions. They also provide the structures that may facilitate the use of informal constraints in handling evolving human interactions. Even though formal constraints have become more sophisticated the informal ones have not lost their usefulness. Formal rules are designed to facilitate exchanges as manifestations of the negotiating power of political and economic interests within a society. In addition to facilitating exchanges, they also create a framework within which changes to their own structures are made possible.

This has resulted in a structure of formal and informal constraints that is constantly interacting and evolving. This structure of constraints, together with the nature of their enforcement, defines the existing wealth-maximising opportunities which can be realised by engaging in economic exchanges.

Institutions, including political and economic policies, define and limit the set of opportunities that are available to individuals in a society. These also shape the rules of competition and create areas where investments may occur. The mix of formal rules and informal norms help to determine how these opportunities are perceived. They also define the incentives for individuals to transform perceived opportunities into action.
In this sense helping to determine the extent to which the environment facilitates economic activities including entrepreneurial behaviour. The nature of both types of institutions also influences alertness to opportunities and the incentives for pursuing entrepreneurial activities. However, although institutions exist to reduce uncertainty, the created structure is not guaranteed to always be efficient and may induce or reduce productivity. There the ensuing opportunities (including entrepreneurial activities) are not always productive.

Institutions in the form of policy guidelines are required to mould organizational structures that will encourage productive activities and discourage non-productive activities (Baumol, 1990). In addition, although institutions are stable, they evolve over time and in the process of evolution help to create opportunities for new and different economic activities which maybe labelled entrepreneurship or innovation.

2.4 COUNTRY INSTITUTIONAL PROFILE

Scott (1995) viewed institutions as constituting three core elements. First are the meaning systems which exist together with some behavioural patterns. These in turn contain symbolic elements which are enforced by the regulatory process. Accordingly, institutions are conceptualized as comprising of regulative, normative and cultural-cognitive elements that provide stability and meaning in social life'. In addition, 'institutions are transported by various carriers', such as cultures, structures and routines, which operate at several levels of jurisdiction (Scott 1995, pp.33, 2005 pp.48). The cognitive dimension is a reflection of the cognitive structures and social knowledge that are shared by people in a given region or country. It constitutes symbols, words, signs and gestures, shaping the meaning that is assigned to objects and activities. Cognitive frames are part of the every day information – processing activities that human engage in and therefore affects evaluations, judgments, predictions and inferences (Scott, 2005).

The normative dimension concerns the social norms, values, beliefs and assumptions about human nature and behaviour. Values conceptualize that which is preferred or desirable as well as standards to which existing structures or behaviours can be compared and assessed. Norms, on the other hand, define legitimate means through which desirable ends are pursued. These have direct implications for economic activities as they define goals such as profit making and the acceptable means of accomplishing this (Scott, 2005).

The regulatory dimension entails rule-setting, monitoring and sanctioning activities. It consists of laws, regulations, rules and government policies which define the national environment which promotes certain types of activities while restricting others.

Costova, (1997) developed Scott's three pillars into a three-dimensional country institutional profile. It was applied to explain how a country's characteristics, determined by its culture, economic and political systems, affect organizational behaviours. It included a regulatory dimension consisting of laws, regulations and government policies that provide support for new businesses reduce the risk involved in starting a new company and facilitate the efforts of entrepreneurs to acquire resources. The cognitive dimension consisted of the knowledge and skills for starting and running a new business that the country's population possesses while the normative dimension comprised the level of admiration for entrepreneurial activities displayed by the society (Kostova, 1997).

Following on Kostova's approach, Busenitz et al. (2000) used the same three dimensions of a country's institutional profile- regulatory, cognitive and normative- to determine the role that institutions play in determining the level of entrepreneurship across different countries. They found that countries had different ratings on each of these dimensions. In addition, they suggested that each of the three is related to different aspects of entrepreneurship across countries (Busenitz et al., 2000).

Findings from Spencer and Gomez (2004) appear to further support the notion that a country's institutions described as cognitive, normative and regulatory have implications for its level of entrepreneurial activity. In an empirical application, the regulatory dimension was shown to be a significant negative predictor of self-employment, but not a good predictor of the prevalence of small firms. It was however a significant predictor of advanced entrepreneurship, measured as the number of new firms listed on a country's stock exchange. The cognitive dimension did not predict self-employment but was able to predict the prevalence of small firms and the presence of advanced entrepreneurship. The normative dimension could not predict the presence of small firms nor advanced entrepreneurship and was only able to predict self employment with marginal significance.

The use of institutional theory to explain entrepreneurship is not limited to recent research as those outlined above would suggest. Max Weber (1905) is credited for one of the first efforts in this area, with his book 'The Protestant Ethic and the Spirit of Capitalism' which probed the entrepreneurial phenomenon from a socio-cultural perspective (Veciana, 2008). Cochran, (1960) has also explored the effect of cultural differences on the entrepreneurial behaviour. While others such as Dana, (1987, 1990) and Tiessen, (1997) have explored the effect of informal constraints on venture creation and economic development.

Aponte, (2002) and Urbano, (2003) have investigated the effect of the institutional framework on entrepreneurship. Djankov, et al., (2002) have also looked at entrepreneurship in different institutional contexts. The GEM (Global Competitiveness Report) also provides annual information on entrepreneurship activities in various regulatory contexts.

CHAPTER3: INSTITUTIONAL CHANGE AND ECONOMIC TRANSFORMATION

3.1 INTRODUCTION

The fundamental role of institutions in societies is to act as the "underlying determinant of the long run performance of economies" (North, 1990, pp.107). The cost of information and the existence of asymmetry in the information held by contracting parties have given rise to market imperfections in even the most developed markets of the western world. Formal rules emanating from political decisions are not always sufficient to deal with such market imperfections and therefore must rely on informal codes for enforcement. An infrastructure that promotes and aids corporations among economic agents will facilitate problem solving and this will have a positive impact on economic activities (including entrepreneurship) in a country (Carson, 1990).

This infrastructure needs to provide protection for individual creations and is a complex mix of societal rules that contribute to certain political, economic and legal structures and processes. These structures which include patent and property rights have played important roles in the continued economic growth of developed economies such as the USA and countries in Western Europe. The differences in the way that the most advanced economies of the world have progressed have been attributed to the development of their institutions' structures. This can be compared to the lack of economic prosperity that the countries of the developing world have experienced (North, 1990, 2005).

This lack of prosperity have been linked to inadequate development of strong and effective formal institutions ((Nelson, 1982; Busenitz and Lau, 1996; North, 1990; Bartholomew, 1997). Although these economically underdeveloped places usually have strong informal institutions, their lack of prosperity points to the importance of the combination of the formal and informal institutional structures in realizing economic progress.

3.2 THE CHANGING INSTITUTIONAL FRAMEWORK

There is a new wave of change taking place especially in developed economies as they grapple with eroding comparative advantages and stagnating economic growth. These changes are affecting the entire economic arrangements in these developed economies, resulting in changes in labour laws, tax laws and laws governing a host of other areas. The extent to which these changes are successful is arguably hinged on the evolution that happens within their overall institutional settings. The institutional framework must undergo changes in similar proportions to how they achieved advanced economic standings in the first place as described for example by North. Success will mean, among other things, that they can continue to provide high paying jobs for their citizenry, lead in the introduction of new products in world markets thus capturing a significant share of the world's markets.

Globalization and advances in telecommunication technologies have been credited as major sources of this new wave of change. They have facilitated the creation of new industries, new ways of organizing and executing exchanges and the emergence of a new economic model referred to as 'the entrepreneurial economy' which is significantly different from the old model of the managed economy of Chandler 1977, 1990 (Audretsch and Thurik, 2001).

In the early post-war economies of North America and Western Europe, it was generally accepted that large firms were the driving force for economic development (Audretsch, 1995). Through scale economies and the related advantage in transaction costs, big firms were able to achieve greater productive efficiency than small firms (Coase, 1937). The gain in efficiency however came with the cost of concentrated economic activities in a handful of very large powerful corporations. As pointed out by Audretsch and Thurik (2001), the advanced economies of Western Europe and the USA were moving towards a situation where their markets were dominated by a few powerful enterprises whose power could be curbed only by the force of government and the unions representing workers. This concentration of power created major concern from different quarters of society. There appeared to be an inevitable trade-off. On one hand you had productive efficiency, which was good for the overall progress of the economy, but which was coupled with concentrated economic power. And on the other you had decentralization and democracy (Audretsch and Thurik, 2001).

A common reaction to this dilemma was the emergence of formal institutions in the form of policy initiatives from the relevant governments for constraining the freedom of firms to contract (Audretsch and Thurik, 2001).

Policy initiatives in the form of public ownership, regulation and antitrust policies became common in Western Europe and North America. Without consensus, governments in these regions were moving in the same general direction. The only difference appeared in the level of emphasis on each control mechanism which varied by country. This singular focus on restricting the power of large corporations created the model of the managed (old) economy. Large enterprises ruled the markets and government responded to their strength by placing restrictions on how they could transact business (Audretsch and Thurik, 2001).

Small firms were considered to have no significant role in this kind of economy and were generally seen as less efficient than their larger counterparts and a luxury that western countries needed to ensure the decentralization of decision-making. They were characterized by low levels of employees' compensation and were only marginally involved in innovative activities which contributed to their declined importance in these advanced economies. In fact, the small business sector, especially in the United States, came to be seen as important only for political and social reasons and, as such, required the protection of the government which gave rise to the creation of programs to protect small businesses (Gilbert, et al., 2004).

3.2.1 EVIDENCE OF CHANGE

Systematic international analysis conducted in the 1990s, however, showed the re-emergence of small businesses and entrepreneurship in North America and Europe (Birch, 1987, Loveman and Sengenberger, 1991 and Acs and Audretsch, 1993). These analyses revealed that although the importance of small businesses varies across countries, their importance had increased significantly since the mid 1970s in many countries. This has contributed to noticeable increases in the number of enterprises operating in the economies of many of these countries.

One of the early signs of this shift came from changes in the labour market, especially in the areas of job creation. While job losses were occurring in many large corporations as they underwent changes in response to a changing environment, it was small firms that were creating the majority of the new employment opportunities (Birch, 1987, Acs and Audretsch, 1993). Several hypotheses have been put forward for the revitalized role of small businesses in the economies of industrialized countries. Technological change is believed to reduce the importance of scale economies in manufacturing paving the way for small firms to enter industries that were once dominated by large corporations. As markets have become more globalized, the presence of a larger number of foreign rivals and increased competition have rendered markets more volatile, and small firms maybe better able to manoeuvre in this volatile environment.

In addition, several other factors, which are in many ways interconnected with those described earlier, have played important roles in the new developments.

Greater participation of women, immigrants, young and older workers in the labour force is helping to facilitate smaller enterprises which can absorb the flexibility with which these groups may wish to enter the workforce. A proliferation of consumer demand for tailored and personalized products, rather than for standardized and mass produced goods also facilitates smaller producers serving niche markets. Deregulation and privatization in many countries have facilitated the entry of new and smaller firms into previously protected markets and has provided easier access to some industries (Conway et al., 2006). The explosion of new technology in high-wage countries has reduced the relative importance of large-scale production. It has also fostered smaller scale organizations and greater incidences of entrepreneurial activity (Audretsch and Thurik, 2004).

More interactions and corporation among the people of the world on all levels have necessitated the creation of new constraints to accommodate these new methods of interaction. The relevance of institutions has not declined in any way. Instead the need for different institutional patterns has emerged. Allowing greater access to research and educational institutions; developments in patenting and copy right laws and modern systems of financing economic activities are the new realities.

These formal rules also transcend national borders[2] and often offer better protection and greater incentives to the creators of knowledge which has become the 'new gold' in the new economic settings that have developed in many places.

[2] For example, World Trade Organization (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs)

These newly created constraints however require more stringent mechanisms of enforcement, which themselves are contributing to the changes taking place.

3.3 TECHNOLOGICAL CHANGE AND THE NEW ECONOMY

The new economic setting has been characterized as the 'entrepreneurial economy' by Audretsch and Thurik (2001). In other places it has been referred to as the 'New Economy' or the 'Knowledge Economy'. At the heart of this new economy are changing technologies, particularly, advances in information technology, which have in many ways, revolutionized how economic activities are organized. As pointed out earlier, smaller firms have acquired renewed significance in these economic activities. New firms have also become a principal component of economic activities playing particularly important roles in the innovation process (Segarra, 2007).

These new developments have been attributed to the effects of globalization. Within the multiple dimensions of globalization, two fundamental aspects have been credited with the new developments. One has to do with the emergence of highly skilled competition from Central and Eastern Europe and Asia and the other is the revolution that has taken place in telecommunication and microprocessors. Both of these are heavily interrelated and have given rise to a new economy which is generally characterised as one where the influences of advances in information technology abound (Audretsch and Thurik, 2001).

The internet, initiated several decades ago by the US Department of Defence has fuelled the spread and use of information technology. The major advantage of the IT industry in spearheading these new developments is twofold. One aspect is the tremendous possibilities for radically new products, change in product quality and new production organization. The other dimension is the possibilities that it gives to the creation of generic technologies with industrial possibilities such as biotechnologies in its modern form and nanotechnologies which did not exist just a few decades ago (Audretsch and Thurik, 2001; Eliasson, et al., 2004). The PC revolution which evolved mostly outside of existing corporate structures created a new industry with a set of new firms that have now become household names. Their successes have created opportunities for entrepreneurs not just in the USA but also around the world (Venkataraman, 2004). These developments have spearheaded a revolution of proportions comparable to the industrial revolution. The PC revolution has lead to the creation of new industries and given new possibilities to old ones. This has further created possibilities for entrepreneurs.

In the Schumpeterian sense, the entrepreneur is a crucial part of technological change and subsequently economic progress. He is the individual who carries out new combinations of resources in effect bringing about innovations.

'…the function of the entrepreneur is to reform or revolutionize the pattern of production by exploiting an invention or, more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way, by opening up a new source of supply of material or a new outlet for products, by reorganizing an industry and so on.…' (Schumpeter, 1976, pp.132).

Schumpeter identified four distinct functions in the process of innovation. The inventor invents new ideas or produces innovations as described above. These innovations however are often the result of the collective efforts of several actors working in cyclical loops of improvements in a manner where the innovative process maybe slow and incremental or it maybe evolutionary or even a revolutionary process (Cummings, 1998). The entrepreneur[3] commercializes the new ideas using the money provided by the capitalist who accepts part of the risk involved in the commercialization of new ideas. Finally, there is the manager who oversees the day to day activities of a functioning corporation. All four functions are essential parts of the process of technological change.

Technological change is therefore a key explanation for innovation and subsequently economic growth. According to Schmookler (1966), technology is the social pool of knowledge of the industrial arts. Technological changes therefore represent changes in this stock of knowledge.

[3] The entrepreneur and the inventor may or may not be the same individual.

Since institutions facilitate or impede the creation and employment of new knowledge through the organization of business activities, the legal environments, social and political structures, technological change is therefore not just a response to changes in the knowledge pool, but is also a product of the formal and informal institutions.

There is no doubt that tangible infrastructure such as a sound legal system, transparent capital markets, advanced telecommunication and transportation systems are needed for technological transformation of a region (Venkataraman (2004). Entrepreneurs and innovators are entrenched in the specific institutional arrangements of their particular country and these provisions or structures may facilitate or impede the incentives to pursue entrepreneurship and innovative activities (Busenitz et al., 2000). The provision of these infrastructures, however, is not itself sufficient to facilitate technological transformation. Other factors are important in the process. For instance, there is the need for the great institutions of learning to produce and help develop the knowledgeable individuals who will be the idea generators (Gomez, 2006). In the new economy, the best universities and research laboratories provide breeding grounds for a consistent flow of new technical ideas. This is evident in the development of places such as Silicon Valley and The Research Triangle Park in the USA and on lesser scales, Grenoble in France and Brandenburg in Germany.

However, while ideas are developed within these institutions, it is in the informal gathering outside of them that their development into more than ideas takes place. The social networks that are created around these institutions are crucial to giving shape and form to ideas. These are part of what Audretsch and Keilbach (2004) refer to as the 'innovative milieu' *(chapter 4 pp.57)*. Venkataraman, (2004) has referred to them as 'intangibles of entrepreneurship' which are needed for the technological transformation of localities. They are listed as focal points capable of producing novel ideas, role models, informal forums, region specific ideas, safety nets, access to large markets and executive leadership. They represent the combined effects of the formal and informal institutions of a region or country that impact technological change, innovation and entrepreneurship.

Advances in transportation and communication have facilitated the increasing interconnection of people and places. The integration of world markets has provided opportunities for scale exploitation but has also increased competition. On the one hand these developments are potentially threatening to the survival of small new firms which are not able to compete based on scale economies. On the other hand, however, globalization has contributed to an increase in the diversity of consumer demands. Increasing demand for tailored goods and services has created opportunities in niche markets that can be more readily satisfied by small firms than by large corporations. Advances in technology have also created new ideas many of which are commercialized in new small firms.

Greater interactions among people from different parts of the world have affected behaviours and personal preferences in many ways making them more alike than ever before. The development of universally recognized brands and products such as Microsoft, Sony, Nike or Coca Cola and iPods are often quoted in support of the idea of a convergence of taste and preferences among the consumers of the world and the existence of universal subcultures. This has made traditional brands such as Coca Cola stronger. A more significant effect however has been in the opportunities that it has provided newer companies such as Apple and Microsoft to become household names around the globe in really short time spans. The organization of economic activities have also been impacted which is evident in the creation of Amazon and other business enterprises that exist solely on the internet.

3.4 MANAGED AND ENTREPRENEURIAL ECONOMIES

The models of the entrepreneurial and managed economies can be distinguished based on a set of factors which includes underlying forces, the external environment, internal or firm characteristics and policy characteristics, table 3.1. The manifestation of these differences comes in the form of fourteen trade-offs. Four of these trade-offs concern government policy. They address differences in the focus, locus and target of public policies as well as policies regarding the financing of economic activities. These help to structure the institutional framework which exists in each country.

In keeping with the objectives of this research, it is these four public policy trade-offs and their underlying differences and influence on the levels of entrepreneurship and innovation in managed and entrepreneurial economies that are contemplated in this study.

Globalization versus Localization deals with the difference in meaning of geographic space as described earlier. It could be seen as playing a pivotal role in the evolution of the entrepreneurial economy from the well established managed economy. It forms the pillar on which many of the other trade-offs stand. In the managed economy system, traditional production factors of land, labour and capital provided sufficient competitive advantages. Economies where capital abounds, together with good supply of skilled labour and good quality land, were therefore more competitive than those that lacked these factors. Globalization however, has reduced the cost of obtaining information and has ushered in high quality competition from once far reaching places such as Asia and Central and Eastern Europe.

The need to regain comparative advantages has seen knowledge becoming a more important factor in the production processes. Unlike in the case of information, globalization has not reduced the cost of obtaining knowledge since especially tacit knowledge cannot be transfer costlessly across geographic space. Globalization has shifted the comparative advantage of high cost locations towards economic activities that cannot be diffused without cost across geographic space.

In the entrepreneurial economy, with knowledge as the premium factor of production, local proximity and regions have gained esteemed positions as the locus of economic activities (Audretsch and Thurik, 2001, pp.275).

Continuity versus Change. The managed economy is described as based on continuity. This is evident especially in terms of the approach to technology and innovation. As pointed out earlier the firms in this kind of economy do not have any incentive to deviate from the present technology course. Innovative activities which fit the existing technology trajectories provide sufficient means for them to remain competitive. There are therefore neither incentives nor challenge to push against their technological boundaries. The increasing number of new firms, firms that in many instances are based on innovative ideas dictates that technological boundaries are constantly being pushed back in the entrepreneurial economy. Increasing number of firms, the competition to come up with the next big thing create a technology 'hot bed' of exploration leading to continuous change. This continuous change will not always benefit individual firms but it creates dynamism within industries and subsequently the entire economy benefits.

The above trade-off can be considered to be very closely linked to this next one, Jobs or high wages versus jobs and high wages. Operating within the boundary of their existing technologies eventually catches up with firms in the managed economy. This has been characterized by periods of corporate downsizing resulting in increased unemployment rates in many developed economies.

The policy approach to the rising unemployment, has been to reduce wages as way to bring the unemployed back into the work force. These may take the form of routine jobs in mature industries or low skilled self-employment. The entrepreneurial economy, at the other end of the spectrum, is constantly changing. The race to the next technological breakthrough creates an oasis of novel idea filled with uncertainty as new knowledge is developed or configured. This provides opportunities for the creation of new firms as described elsewhere in this paper. But equally important is the fact that the new firms that can survive in this highly competitive setting will over time become the growth firms that provide high paying jobs (Audretsch and Thurik, 2001).

The next group is concerned with the external environment within which the firm operates. The trade-offs are stability versus turbulence, continuity versus diversity and homogeneity versus heterogeneity. The managed economy exists in a stable environment where old systems and procedures are used in the production process and there is great degree of specialization. Competitiveness is sought through pricing rather than through any variation in the product. Stability of the demand ensured the sustainability of such systems and even transferred into stability in both workers and jobs. Workers could count on having particular jobs for life. The search for new ideas is limited to specially created departments operating within routine structures. Fewer opportunities are thus created for enterprising individuals to start new firms. This makes it relatively easy to predict the outcome of economic activities.

Industries become specialized as a way to reduce transaction costs and increase levels of efficiencies although the realized efficiencies are not dynamic. There is little inter-firm or inter-industry interaction and collaborations. This restricts opportunities for knowledge spill-overs through which new knowledge is created and innovations are spawned. The managed economy is also made up of a mostly homogenous population. This homogeneity while providing further benefits in terms of reduced cost of communication is disadvantageous as it limits creativity and the possibilities for new idea generation (Florida, 2003).

The entrepreneurial economy operates in a different surrounding one that thrives on turbulence, diversity and heterogeneity. New idea generation is not the sole domain of any special department in the entrepreneurial firm. This creates diversity not just in the ideas emerging but also in the values appropriated to these ideas. As pointed out earlier, differences in the values allocated results in varying schemes for commercializing such ideas. News firms are constantly being created as some forms exit creating a tumultuous atmosphere. Here firms and industries interact and collaborate constantly pushing the technological boundaries which contribute to the development of new industries and expansion of existing ones. Changing demand for new or better products also feed into the creative process. Since many firm activities are based on unproven ideas, there are no guarantees about the outcome of these activities. Survival therefore requires that several ideas are worked on simultaneous and an ease and flexibility to move on to the next idea. This setting is the product of a diverse population, where creativity abounds and ideas are constantly being churned (Audretsch and Thurik, 2001).

Table 3.1: Trade-offs in managed and entrepreneurial economies

Group	Trade-offs	Managed Economy	Entrepreneurial Economy
Underlying Forces	**1.**	Globalization	Localization
	2.	Continuity	Change
	3.	Jobs or high wages	Jobs and high wages
Underlying Environment	**4.**	Stability	Turbulence
	5.	Specialization	Diversity
	6.	Homogeneity	Heterogeneity
Firm Function	**7.**	Control	Motivation
	8.	Firm transaction	Market exchange
	9.	Competition and Co-operation as substitutes	Competition and Co-operation as complements
	10.	Scale	Flexibility
Policy	**11.**	Regulation	Stimulation
	12.	Targeting output	Targeting input
	13.	National Policy	Local Policy
	14.	Low-risk Capital	Risk Capital

Source: Self Elaboration

The third group deals with the internal or firm characteristics and covers control versus motivation, firm transaction versus market exchange, competition and co-operation as substitutes versus competition and co-operation as complements and scale versus flexibility . In the managed economy workers are required to provide an established set of outcomes. This is in keeping with the idea that labour is no different from the other production factors which should be controlled and the benefits extracted from it are expected to be equal to what it is paid. There is little room for the creativity of labour.

The creation of new knowledge requires among other things creativity and freedom of expression. In the entrepreneurial economies, knowledge workers are encouraged to be creative and explorative. In these ways they are more likely to discover new ideas with great commercial potential for their firms.

In managed economies, a low level of uncertainty and the predictability of information combine to make firm level transactions more efficient rather than allowing the market to dictate which transactions should be kept inside and which should be decided in the market. The opposite is true of the entrepreneurial economy, high degrees of uncertainty the unpredictability of knowledge dictates that transactions are better left up the market. An important aspect of this trade-off has to do with the ability for new knowledge to be integrated into the economic process. The risk involved with new knowledge and the asymmetry between agents (who create knowledge) and the firms (within which they are created) often result in agency problems including difference in the value assigned to the new knowledge. These often provide enough incentives for the agent to start a new firm to appropriate value to the new knowledge (pp.291). In the next trade-off, competition and co-operation are seen as substitutes rather than compliments and there is no room for coopetition[4]. The large corporations that make up the managed economy retained their transactions in-house becoming vertically integrated powerhouses. There are little incentives to corporate with each other. In fact, as pointed out back in chapter 1, since they compete in the product market any co-operation among such firms would only result in lack of competitiveness in the markets (Audretsch and Thurik, 2001).

[4] A term used to describe a situation where firms corporate with each on one level but on another levels they become competitors.

Both inter and intra industry co-operation is vital among the many smaller independent firms that make up the entrepreneurial economies. There are incentives to co-operate in areas such as research and development even as firms compete in the product market or even the other way around. Firms in the managed economy reduce cost by concentrating on achieving economies of scale. This advantage though is the exclusive domain of large firms and has resulted in the concentration of large firms in specialized industries where such scale economies can be realized. In the entrepreneurial economy, any reduction in average cost is gained through flexibility. A flexible system of production becomes necessary when demands are constantly shifting. The emergence of new technology has given rise to higher levels of flexibility. This has facilitated new ways or organizing production to meet changing demands as well as to accommodate greater demand for higher quality products from more affluent consumers (Audretsch and Thurik, 2001).

The last group addresses the characteristics of policy and includes regulation versus stimulation, national versus local policy, targeting output versus targeting input and low risk capital versus risk capital which are the focus of the next section. The general aim of public policies is to create a stimulating environment that supports economic and social activities leading to economic success. This, however, can be achieved in different ways. Economic, political, social and technological changes are challenging the old ways of achieving economic growth. This has contributed to a divergence among the world economies as can be seen in the different approaches of the managed and the entrepreneurial economies (Audretsch and Thurik, 2001; Eliasson et al., 2004).

3.5 PUBLIC POLICY IN MANAGED AND ENTREPRENEURIAL ECONOMIES: THE TRADE-OFFS

Focus of Policy: Regulation versus Stimulation

Three general types of public policy towards business is said to have emerged in managed economies of the post war periods. These policies, antitrust (competition policy), regulations and public ownership were aimed at restricting the freedom of the large powerful corporations of the time. They emerged from the belief that government needed to control the power of these corporations as a way to ensure that resources were allocated in ways that guaranteed certain acceptable levels of economic welfare. These kinds of interventions were pervasive in many Western economies.

New and small firms have, however, become key components of the entrepreneurial economy. This has created more dynamism in the markets of many developed economies (Birch, 1987, Loveman and Sengenberger, 1991 and Acs and Audretsch, 1993). The goals of public policy have thus shifted to deal with the new reality by becoming more enabling rather than constraining. The policy objective is to create an environment that supports the success and viability of firms in the economy. Many of the newly created firms are small firms and pose no threat neither to national nor to international markets. Through more open markets they benefit from programs of co-operation to help them become more competitive as they grow. Some will eventually grow into large international businesses even as many others die. The motivation of government policy in this kind of economy is therefore to foster growth rather than to constrain it.

Locus of Policy: National versus Local Policy

In managed economies the development of public policies is concentrated at the national levels although the targeted recipients of these policies are in many instances at the local or regional level. This is a consequence of the makeup of the economy (as stated earlier), where there are a few large corporations with national reach and power. It was therefore not prudent for policies to control these large corporations to be developed locally, where a small group of agents could craft policies to benefit themselves at the detriment of the rest of the economy. This meant that there is a trickle down mechanism to get nationally developed public policies to the regional and local levels. There is therefore little consideration given to the idiosyncrasies of regions and this result is policies and programs that are not addressing regional and local specific issues that impact economic activities.

In the entrepreneurial economy policies are developed at the regional or local levels. Since there are larger numbers of small and medium sized firms with less power than the large powerful corporations of the past, the concerns raised about the agents no longer exist. Also, knowledge and knowledge spill-overs which is the source of many new firms tend to be localized in regional clusters. The transfer of knowledge either through knowledge spill-overs or otherwise is much localized and happens through the close interaction among those who create new knowledge as well as between them and others. Many newly created firms are spin-offs from large corporations or universities and are the results of different levels of interactions among entities in these localized communities.

Effective public policies that hope to influence such spill-overs must therefore take the mechanisms which facilitate such spin-offs and spill-overs, as well as their interactions into consideration (Audretsch and Thurik, 2001, Uyarra, 2008). Effective public policies therefore require the input of the affected regions from regional authorities.

Target of Policy: Targeting Output versus Targeting Input

The managed economy is still predominantly the playground of well established industries controlled by large corporations. These corporations still emphasize economies of scale and scope to supply relatively certain markets with standardized products. It is not the environment in which new industries are created. Selected industries and firms in the economy maybe targeted with public support programs as they are seen as the most beneficial to the economy. The public policies in these economies are therefore targeted at helping these corporations create greater demands for existing products and meeting these demands in the most efficient ways.

Due to uncertainty about what to produce, how to produce it and who should produce it, it is difficult to target outcomes, industries or firms in the entrepreneurial economy. With this uncertainty, it is better to target input, specifically those inputs that are geared towards the creation and commercialization of knowledge (Krugman 1994). Such policies must therefore include measures that will build an environment that facilitates the creation and commercialization of knowledge with application for basic and applied research at universities and research institutes.

Investment in the general level of education as well as advanced technical specialties and the training and upgrading of the skill level of workers are seen as ways to achieve this. In a general way, this characteristic is at the heart of the entrepreneurial economy and identifies it as the knowledge economy referred to in other places.

System of Finance: Low-risk versus Risk Financing

The financing of economic activities in the managed economy is mostly through providing homogenous liquidity to existing companies which have large existing investments in land and labour. To acquire financing for a project, it is necessary to have tangible assets. In the entrepreneurial economy many projects that require financing are not based on tangible assets. Rather they are based on ideas and untested concepts which even though they might be protected by patents are not readily understood by traditional financiers. A new system of financing is therefore needed. Venture capital and other informal capital markets which provide financing for high-risk and innovative new entities are needed in this new economic setting.

The US economy, for example, which has probably the largest knowledge industry, also has the largest supply of venture capital. The latter is usually located in close proximity to where new knowledge is created such as science parks and high calibre research institutions.

Risk financing (venture capitalists or business angels) usually combine liquidity with forms of advice, knowledge and varying levels of involvement in managing the entity. The liquidity, together with other resources such as management competence and experience as well as access to personal or other networks can give the new enterprise a much better shot at survival and growth (Johnsson, 2001).

CHAPTER 4: LITERATURE REVIEW

4.1 INTRODUCTION

Entrepreneurship is a multifaceted phenomenon with elements from several academic disciplines including economics, sociology and psychology. The interdisciplinary nature of entrepreneurship means that no one discipline can analyze all units of observation of this phenomenon which has contributed to a lack of a generally accepted definition. Definitions are usually dependent on the discipline within which the research is established, whether it is economic, management science, psychology or it has another focus (Veciana, 1999, Audretsch and Keilbach, 2004). However, according to Veciana, (2007), debates on how entrepreneurship should be defined or which is the right definition of the phenomenon are rather sterile. Entrepreneurship is justified as a distinctive field of research on the basis that it addresses areas that are not covered by other disciplines in the field of business administration. One of those areas is the creation of new firms or the entrepreneurial function. It is this concept of entrepreneurship which is adopted and integrated into this study.

Entrepreneurship and innovation are increasingly seen as overlapping concepts. The link between them, however, probably goes back to Schumpeter (1912) where the entrepreneur was defined as the individual who carries out new combinations of resources in effect bringing about innovations. Schumpeter identified four distinct functions in the process of innovation. The inventor invents new ideas or produces innovations.

These innovations maybe in the form of processes, products, services and technology and are the result of the collective efforts of several actors working in cyclical loops of improvements in a way that the innovative process is slow and incremental or it might be evolutionary or even a revolutionary process (Cummings, 1998). The entrepreneur commercializes the new ideas using the money provided by the capitalist who accepts part of the risk involved in the commercialization of new ideas. And finally there is the manager who oversees the day to day activities of a functioning corporation. It is therefore clear that entrepreneurship transcends small business development and is intertwined with innovation. It also includes strategic focus in large corporations, where radical technological innovations are linked to strong R&D concentration and comprises spin-ins or acquisitions, spin-outs or start-ups, or the sale of companies (Uljin and Brown, 2004).

Two lines of literature are important to encapsulate in this section. One is related to the documentation of the existence of managed and entrepreneurial economies. The second area should cover public policy for entrepreneurship and innovation and their relationship to actual levels of entrepreneurship and innovation. The former is for the most part nonexistent, at least in the specific terms of managed and entrepreneurial economies. What exists is a limited literature on the existence of more knowledge oriented economies and it is to this that we look for guidance in that area.

The Knowledge Economy Indicator (KEI) project of Joint Research Centre (JRC), of the European Commission and UNU-MERIT offer an extensive list of factors that are important drivers of the knowledge economy. It covers several indicators which have undergone robust assessment to determine their relevance and usefulness in identifying innovation and technological changes in the economy. Indicators are included for some 30 European and other countries. The 2007 State New Economy index also identifies the kinds of factors that are indicators of transforming economies.

The literature dealing specifically with public policy for entrepreneurship and innovation is sparse and rather recent and discrete. Some of the earliest works were mostly description of public policy programs that existed in different countries and the motivation behind them (Stevenson and Lundström, 2001, Lundström and Stevenson, 2005, Welter, 2004, Veciana, 2004). Another line of research has looked at factors that account for differences in new firm formation at the regional level (Audretsch and Fritsch, 1994, Guesnier, 1994, Hart and Gudgin, 1994, Reynolds et al., 1994). Still another branch of literature has focused on individual areas that are tackled by public policy programs such as culture (Baughn and Neupert, 2003) or education ((Burke et al., 2000, Benchflower et al.2001, Grilo and Irigoyen, 2006) and have assessed how they affect the rate of entrepreneurship, measured usually, as new firm formation. In a related study, Welter, (2001) analyzed the effect of factors such as gender, age professional experiences and regional environment on the growth potential of nascent entrepreneurs.

Investigations that aim specifically at establishing relationships between public policy programs to support entrepreneurship and innovation and levels of entrepreneurship and innovative activities are not very common. Storey (1998) has looked at how the effectiveness of public policy programs might be measured. Van Stel et al. (2006) have looked at the effect of business regulations on nascent and actual entrepreneurship while Hoffman (2007) is one of the few researchers who have actually focused on assessing the effect of a wide gross section of public policy programs. The research in this area, understandably, has progressed in accordance with the type of data that is available. This has resulted in fragmented and limited knowledge about public policy programs and whether or not they are having any measurable and meaningful effect on the levels of entrepreneurship and innovation.

4.2 KNOWLEDGE ECONOMIES

As pointed out in the introduction, the separation of a group of countries into managed and entrepreneurial economies is new. Two projects that have provided some information for use in this research are 'The 2007 State New Economic Index', and 'Knowledge Economy: measures and drivers'. In The 2007 State New Economic Index, Atkinson and Correa, used 26 indicators divided into five categories- knowledge jobs, globalization, economic dynamism, the digital economy and innovation capacity- to rank the 50 states of the USA according to how far along they were as the new economy.

According to Atkinson and Correa (2007), 'the new economy is a global, entrepreneurial and knowledge-based economy in which the key to success lies in the extent to which knowledge, technology and innovation are embedded in the products and services' (pp. 3). Massachusetts was the highest ranking state followed by Connecticut, New Jersey, Maryland and Washington to round out the top five. California was ranked at number 6 which was down from its number 2 spot back in 2002. These top ranking states are characterized as having high concentration of knowledge jobs[5]. Most of them have manufacturing geared towards global markets both in terms of export as well as in terms of foreign direct investments. They all have high levels of entrepreneurship activities and are at the forefront of the digital revolution. The bottom five states were Kentucky, Alabama, Arkansas, South Dakota, Mississippi and West Virginia all of which were also bottom ranking states in 2002. These states are characterized as being dependent on natural resources or on mass production manufacturing and rely on low cost rather than on innovation to gain advantage (Atkinson and Correa, 2007).

In Knowledge Economy: measures and drivers, Saisana and Munda (2008), applied 23 indicators in 7 categories to rank EU25 countries together with the USA and Japan based on their performance as knowledge economy. The categories are: Production and diffusion of ICT; Human resources, skills and creativity; Knowledge production and diffusion; Innovation, entrepreneurship and creative production; Economic outputs; Social performance; and Internationalization.

[5] Jobs that require at least a two-year degree.

They represent a reduction in the number of indicators of the knowledge economy that was developed in the Knowledge-based Economy conceptual framework that was developed by UNU-MERIT[6]. Sweden was the highest ranking country followed by Denmark, Luxemburg, Finland, the USA and Japan. The UK, Netherland, Ireland, Belgium, France and Germany were next. At the bottom of the ranking were Poland, Slovakia, Portugal, Hungary Lithuania, Greece, Italy, Latvia and the Czech Republic, Spain, Cyprus, Malta, Estonia and Slovenia.

They found that although GDP appears to be an important component in the knowledge economy, there are countries such as Italy and Spain that have high per capita GDP but which perform badly in terms of the KEI ranking. The number of PhDs was also important in explaining the success of the top ranking knowledge economies except in the case of Portugal. Innovation, entrepreneurship and creative destruction did not appear to have any relevant impact on the ranking of knowledge economies (Saisana and Munda, 2007).

[6] UNU-MERIT is a joint research and training centre of United Nations University (UNU) and Maastricht University, The Netherlands.

4.3 DETERMINANTS OF ENTREPRENEURSHIP AND INNOVATION

Entrepreneurial activity is believed to be an important source of technological innovation and economic growth and development in countries. The reverse is also true in that technological innovation is believed to be the driving force behind the increased levels of entrepreneurial activities that are seen in many countries. However, as outlined earlier, these two are overlapping concepts which have been linked to economic growth and development. The rate of entrepreneurship in a country depends both on the environment as well as the individual preferences of the people in the society. It is widely believed that such factors can be manipulated for desired results (Schumpeter, 1934; Birley, 1987; Wennekers and Thurik, 1999; Carree and Thurik, 2003).

It is widely held that government can influence entrepreneurship and innovative activities from a regulatory perspective through established legislation and economic policies[7]. It is affected by those policies directly aimed at influencing the level of entrepreneurship and innovation as well as those which are focused on broader national economic issues (North et al., 2001; Storey, 2003).

[7] Legal rules including property rights which are part of the formal institutions are not considered here.

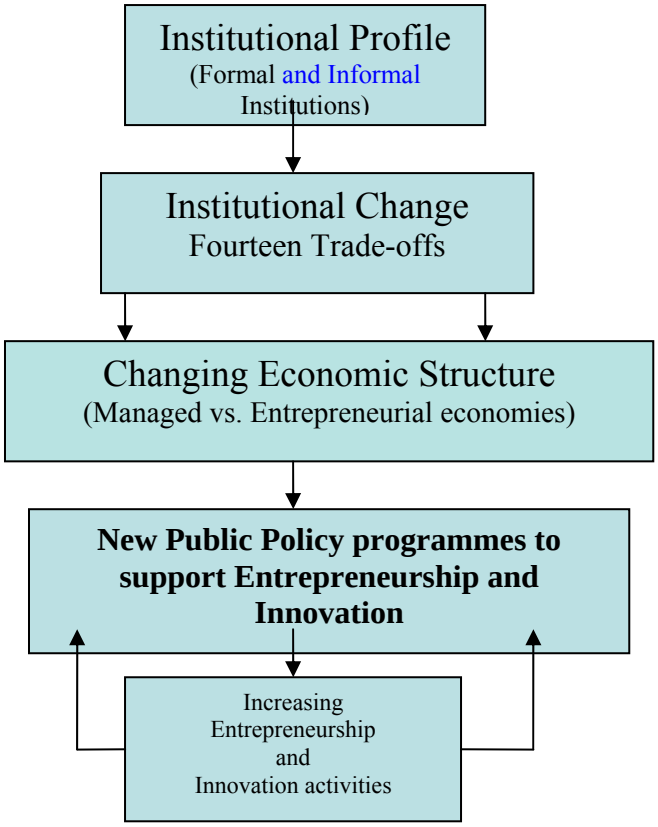
The cultural filter with which individuals make sense of their surroundings is vital to the effectiveness of government public policy programs as it determines how such programs/actions are perceived and acted on. Individual agents must first see entrepreneurship as an esteemed (activity) career option for themselves as well as their children. This positive perception will then, to a large extent, determine the success of other public policy programs. However, the positive perception can also be created although it may take a much longer time to have the desired effect than is the case with economic policies.

Since entrepreneurship and innovative activities are influenced by a supportive infrastructure which comprises economic incentives as part of the formal institutions, but also by the perception of individuals as part of the informal institutional framework a full public policy intervention must therefore consider both sets of institutional factors. However because this research has been limited to focusing on the four trade-offs as previously described, and because these particular tradeoffs deal more directly with formal institutions, the analysis is restricted to formal institutions as depicted in Figure 4.

The impact of public policy intervention measures might be on the actual rate of entrepreneurship and innovation resulting from the short-term balance of supply and demand or a long-term equilibrium rate determined by the state of economic development such as technology and market structure. It should be noted, however, that any measurable impact of such determining factors can be, and often is, different at the micro, meso and macro levels.

This will result in different relationships being observed, depending on the level at which the analysis is undertaken (Noorderhaven et al., 2004). A macro level analysis is undertaken in this thesis with the hope of providing a broad assessment of public policy intervention specifically in the four trade-off areas outlined earlier.

Figure 4: Theoretical Framework



Source: Self elaboration

4.4 THE ROLE OF ENTREPRENEURSHIP AND INNOVATION

The single most important reason for the interest in entrepreneurship and innovation is their role in the economic development of places. This link between entrepreneurship and economic development is not a new one. Cantillon (1680-1734) first recognized the crucial role of the entrepreneur in economic theory. Schumpeter in 1912 also recognized this link when he argued that large firms tended to be resistant to change which forces the creation of new firms by entrepreneurs to exploit innovative activities. Contemporary economic theory has also recognized entrepreneurship as an independent factor of production almost equal to land, labour and capital despite an ongoing debate about the exact relationship between entrepreneurship and economic development (Hébert and Link, 1988). *"A modern dynamic economy would fall apart were it not for the entrepreneurial actions of a wide array of human agents who reallocate their resources and thereby bring their part of the economy back into equilibrium"*. Their actions have economic value. The aggregation of this value in a dynamic economy accounts for significant portions of national income (Schultz, 1980 pp. 443).

Baumol (2002) argues that entrepreneurial activity might account for an important amount of the growth that is not explained in traditional production function models.

Innovation and economic growth, is however, a more recent association where the ability to innovate or to absorb innovation is believed to be an important part of economic vitality which contributes to growth and development (Feldman and Florida, 1994; Audretsch and Feldman, 1996, Rodriguez-Pose and Crescenzi, 2008).

The public policy → entrepreneurship + innovation (→ economic growth)[8] link assumed in this research is most closely associated with the diffusion and absorption of innovation in a knowledge spill-over approach and forms part of what has been categorized an entrepreneurial capital.

Mixed relationships have been established between entrepreneurial activity and economic growth for different units of observations including cities, regions and countries. Fritsch (1997), Reynolds et al. (1999), Carree, et al. (2000), Carree and Thurik (1999) and Carree (2001) have all reported positive links. Entrepreneurship activities are seen as related to economic growth, measured as employment at the country level, in the GEM reports compiled by Reynolds and his colleagues. Acs, Audretsch, Braunerhjelm and Carlsson (2004) have proposed positive relationships between various measures of entrepreneurship and economic growth at the national level while Carree et al. (2000) have provided empirical evidence to support the association between increased entrepreneurship, measured as the rate of business ownership, and country level employment growth.

Audretsch et al. (2002) have also provided evidence that OECD countries which have experienced increases in entrepreneurship have also experienced higher growth rates and lower levels of unemployment. Wennekers, et al. (2005) have demonstrated a U-shaped relationship between economic development and entrepreneurship.

[8] This latter part of the linkage is not covered in this research.

At low levels of economic development or at the stage where an economy is just developing there appears to be high self-employment levels. As levels of economic development increases, the rate of self-employment decreases. Further advances in economic development, along with technological development, create a more differentiated demand which contributes to a second increase in level of self-employment.

The findings of van Stel et al., (2005) also indicated a relationship between entrepreneurship and economic development. They suggested that the effect of entrepreneurship on economic growth depends on the present level of economic development which they measured as the level of per capita income. Using the total entrepreneurial activity (TEA) from the GEM, they observed a negative impact on Gross Domestic Product (GDP) growth in the countries with the lowest levels of GDP and a positive impact in the countries with the highest GDP levels. In another study, Van Stel and Storey (2004) used a sample of firms from the United Kingdom to show that increased firm birth in the 1980s did not lead to increased employment. However, after a change in public policy in the 1990s, which shifted support to established businesses with high growth potential, employment rates increased in those areas of the UK where such changes were implemented. Scotland however, which had continued to focus its policy on general business start-ups, experienced a decline in employment rates.

Along similar lines, Acs and Varga (2004) have concluded that necessity entrepreneurship[9], opportunity entrepreneurship[10] and total entrepreneurial activities do not have significant impact on economic development. According to them, only higher-level (high growth potential) entrepreneurship appeared to be necessary for technology change, which contributes to greater economic development. It therefore seems that though there is a clear relationship between entrepreneurship and economic growth it is not a straightforward one. However, this has not deterred the belief that policy objectives can help to determine the direction of that relationship.

Entrepreneurship capital, described as all the "….factors that are conducive to the creation of new businesses" has also been shown to have positive effect on economic growth, demonstrating strong impact on regional GDP in Germany (Audretsch and Keilbach, 2004 pp.951). It includes the regulatory framework that facilitates the creation of businesses as well as a system of financing with bankers and venture capitalist willing to share the risk of entrepreneurship. A general acceptance of entrepreneurship by individuals and the society at large and the existence of an "innovative milieu" and networks are also part of what constitutes entrepreneurial capital. It is expected to impact economic growth through the mechanism of spill-over and through increased competition from a larger number of enterprises in a location (Audretsch and Keilbach, 2004).

[9] Necessity entrepreneurship represents those individuals for whom self employment is their only means of earning a living.
[10] Opportunity entrepreneurship is an active decision made when there is a perceived unexploited or underexploited existing business opportunity.

Spill-over gives rise to the creation of new businesses and as Porter (1990) argues, competition among several firms is more conducive to knowledge externalities than local monopoly. There is evidence that increased competition, measured as the number of enterprises in a city, increases the growth performances of that city (Feldman and Audretsch, 1999 and Glaser et al., 1992).

Another aspect of entrepreneurial capital is 'innovative entrepreneurship' which is said to contribute to economic growth on two levels. On one level, innovative new firms have higher growth potential and are better survivors than their non innovative counterparts. In this way they make direct contribution to the economic development of the area where they are concentrated. On the next level, this kind of entrepreneurship may contribute indirectly to economic growth by providing specialized input to other firms either for existing products or to strengthen their innovative processes (Dahlstrand, 2007, Segarra, 2006).

4.5 TRADITIONAL ENTREPRENEURSHIP POLICY

It is those evidences showing positive relationship between entrepreneurship and economic growth that have fuelled the conviction that the growth of cities, regions or countries is tied to their level of entrepreneurial and innovative activities. This has resulted in the proliferation of public policies that are geared towards generating higher levels of entrepreneurship, even though it is unclear what role policy should take in facilitating entrepreneurial and innovation activities in different geographic regions, and whether the effect of public policy is always positive. Although providing support to businesses, especially small and medium enterprises, is not new, the focus of these new public policy measures is different as will be explained later on.

According to Porter et al. (2002) economic development means increasingly sophisticated ways of competing and implies the evolution from a resource-based to a knowledge-based economy. Audretsch and Thurik (2001) have shown that economic activities, especially in the most developed countries, have become more knowledge-based and less driven by the traditional production factors of land, labour and capital. These factors are no longer the sources of any real competitive advantage. This has also significantly influenced the shaping and development of the new set of public policies for entrepreneurship and innovation. Even in countries where economic activities are less knowledge driven, there have been changes in the kinds of public policies that are being implemented as these countries take their cue from the developed world in trying to foster growth.

4.5.1 TRADITIONAL PROGRAMMES

A country's economic and regulatory framework can influence entrepreneurship and innovation directly through support policies or establishment legislation or indirectly through policies not directly aimed at influencing the level of entrepreneurship such as fiscal, monetary and competition policies which are aimed at achieving stable interest and exchange rates and monitoring scarcity and opportunity cost which form part of a supportive infrastructure (Story, 2003). According to Lundström and Stevenson (2005), macro-economic, demographic and structural issues constitute one of several dimensions that impact the level of entrepreneurial activity. The macro perspective focuses on the overall institutional framework which includes government regulations and the industry structure, part of which is determined by the present technological infrastructure.

Regulations affecting the entry and exit of firms, social security regulations and policies, as well as the structure of banking and financial systems have also been identified as impacting the prevalence of entrepreneurship in a country. Low barriers to entry and exit of businesses are necessary in the creation of economic dynamism and renewal as part of a "creative destructive" process which fuels growth. Technological development also drives entrepreneurship by creating opportunities for new products and services and is considered to be one of the driving forces in the renewed demand for entrepreneurship. Technological innovations also help in the creation of an industry structure which is more conducive to entrepreneurial activities in a region or country. The demographic makeup of the population influences the supply of future innovators and entrepreneurs (Lundström and Stevenson, 2005).

Public policy programs are therefore usually oriented towards creating favourable conditions in these areas in an effort to effectively stimulate entrepreneurial and innovative activities of countries. Stevenson and Lundström (2001) and Lundström and Stevenson (2005) arguably have compiled the most comprehensive documentation of existing SMEs and entrepreneurship policies. Other documentation of public policy programs for several countries has been compiled by the OECD's Fostering Entrepreneurship (1998) and Veciana et al. (2004). Some of the most common programs that appear in these publications are described briefly below. As was stated earlier, none of these studies has focused on the public policy tradeoffs between the managed and the entrepreneurial economies which are emphasized in this study.

Entrepreneurship Promotion

Promotion plays a critical role in fostering a supportive culture for entrepreneurship. An awareness of entrepreneurship as an option for career choice is strongly influenced by the attitudes and belief and personal identification with the 'entrepreneurial role'. Highlighting entrepreneurial role models can have a positive impact on a country's level of entrepreneurial activity (GEM reports). Countries such as Australia, Ireland, the Netherlands and the UK have been described as having weak entrepreneurial cultures. The USA falls among the countries with the strongest entrepreneurial culture (GEM, Hindle and Rushworth, 2003, Fitzsimons and O'Gorman, 2003, Harding, 2003 and Bosma and Wennekers, 2004).

Reducing Regulation and Bureaucracy

The reduction in the time and cost required to register a business as well as more open competition policies and tax breaks are all factors which could strengthen the motivation of persons who see entrepreneurship as desirable. Some specific policy programs include increasing the ease of starting a business and simplifying or reducing reporting requirements. Taxation related issues such as tax credits and holidays as well as the legislation affecting business entry and exit and labour market regulations are also addressed. Many countries including Spain, the Netherlands and Finland have created one-stop shops where the majority of the paper work required for starting a business is completed in one location (OECD, 1998, Stevenson & Lundström, 2001, Welter, 2004; Lundström and Stevenson 2005).

Providing business services and finance

Useful programs in this area include providing business training programs for first time business owners to develop specific competences as well as providing entrepreneurship training for non-business students. Special funds for financing start-ups and other loan guarantee schemes are quite common among countries but reflect a concentration on SMEs rather than entrepreneurship and innovation.

Many countries provide incubator services to facilitate business start-ups. Many of these are structured for knowledge-based start-ups and are often located on university campuses and are wired with high-speed access to the Internet and usually networked to researchers, technology experts, venture capitalists, experienced entrepreneurs and large

corporations. The incubators provide access to information, counselling, financing, potential partners etc. (OECD, 1998, Stevenson & Lundström, 2001, Veciana et al. 2004, Lundström and Stevenson 2005).

Promoting Innovation (Innovative Entrepreneurship)

Governments started to include innovation in their entrepreneurship policy agenda at the start of the twenty first century with the first initiatives emerging in a few countries in 2001. With this new focus, greater emphasis is being placed on commercialization of promising results from R&D laboratories as well as university research centres.

Patenting and intellectual property ownership and protection mechanisms are important factors with this new focus. In addition, the availability of high-risk development capital such as venture capital funds and a supply of angel investors as well as more sophisticated entrepreneurs who can navigate this more complex process are important to the development of innovation related entrepreneurial activities. These policy initiatives, which aim to increase the number of technology-oriented start-ups and stimulate the growth of higher-growth potential firms, need to be supported by an effective learning platform which is geared towards increasing the number of graduates in science and engineering. Countries such as Germany, Sweden, the USA and the UK are progressing in their effort to promote innovation, especially in regards to developing non-traditional means of financing (Veciana, 2004, Lundström and Stevenson 2005).

4.6 THE FOUNDATION OF THE NEW ENTREPRENEURSHIP AND INNOVATION PUBLIC POLICY

The ways in which small and new businesses matter in the economy, especially in the developed countries, have changed over time. Once seen as inefficient and technologically retarded, it is now established that some small firms, many of them new firms, are dynamic, innovative entities that make significant contribution to economic development (Acs and Audretsch (1988; Acs, et al., 1999).

Small firms as significant contributors to technological change had, however, been long established. Sawers, Stillerman and Jewkes in their book 'The Sources of Invention' first published in 1958, highlighted the contribution of small firms to much of the technological changes that have taken place in the 19th and 20th centuries. While there are those who contend that innovation, measured mostly as R&D expenditure, rises more than proportionately with firm size, the results of The Futures Group (1984), Pavitt et al. (1987) and Acs and Audtersch, (1990) support the view that there is no advantage lost or gained based on size in terms of innovative outputs. They point out that small firms continue to account for a disproportionately large share of innovation relative to their size. Aron and Lazear, (1991) have also pointed to the fact that many small firms that were introducing innovative products were actually new firms. Looking at the PC software industry, Prusa and Schmitz, Jr. (1991) have shown that new firms are an important avenue for the introduction of innovative products to the market.

The 1990s was a period of economic decline for many of the developed economies. Many of these economies saw their competitive advantage from traditional factors of production eroded by the effects of globalization and advances in communication technologies. Rising concerns about unemployment in Europe and across North America, the disappearance of jobs, slow economic growth and the erosion of international competitiveness in global markets resulted in a demand from many sectors of society for government and those in public offices to take steps to alleviate the 'burdens' that were being felt. Lead 'arguably' by the USA, these economies have tried to regain competitive edge by redirecting the focus of their economic activities more towards knowledge as a significant factor in the economic process (Audretsch and Thurik, 2001).

Knowledge as a factor of production and a source of competitive advantage, however, cannot be managed in the ways that traditional production factors of land, labour and capital have been managed. Knowledge is uncertain and asymmetric and is more difficult to be evaluated than traditional factors of productions. In addition, tacit knowledge, (which is believed to be needed to gain competitive advantages), is most effectively transmitted through face-to-face, frequent and repeated contacts requiring geographic closeness among the creators. Geographic proximity also facilitates knowledge spill-overs through social interactions (Audretsch and Thurik, 2001).

To facilitate the development of knowledge-based economic activities, it is crucial to consider the tendency for knowledge to remain localized. It therefore required adjustments in the types of public policies that were developed as well as in how public policies were developed and managed.

The refocusing of public policy on knowledge as an important factor driving economic growth would, at first glance, seem more conducive to large corporations with their access to resources for research and development - the source of most of this new knowledge - and not small new firms. For as some authors such as Harrison (1997) have maintained, it is large firms which dominate innovation due to greater access to resources. However, as outlined earlier there is strong support and evidence of the role of new and small firms in this process of knowledge creation and commercialization. This had resulted in a significant number of start-ups in the geographic vicinity of places where knowledge is created including universities and government as well as private research laboratories (Anselin et al., 1997).

The noticed link between entrepreneurship and the growth of regions was acted on by many policy makers who responded with measures of public policy geared towards better facilitating the start-up process as well as policies to promote the development and commercialization of knowledge (Gilbert et al. 2004).

As outlined by Audretsch and Thurik (2001), this refocusing reflect a change in the role of government from constraining businesses to one where they join forces with economic agents to develop more suitable environments that nurture the creation of new firms, many of which start out small. These new policy objectives have been referred to as enabling entrepreneurship policy and, based on Audretsch and Thurik's perspective, are different from the policies that are to be found in environments where it remains relevant for government to constrain the power of large corporations.

4.6.1 PUBLIC POLICY TO GENERATE ENTREPRENEURSHIP AND INNOVATION

In a cross-national comparison of new firm formation involving France, West Germany, Italy, Ireland and the United Kingdom, Reynolds et al. (1994) examined factors such as the demand for goods and services, urbanization/agglomeration[11], unemployment, small firms/specialization and government spending/policies[12] regarding their effect on firm formation. They found that although at a general level, the same factors explain variations in new firm formation across these countries; these factors were not responsive to public policy programs in the short run (Reynolds, et al., 1994). This caused them to question the prudence of devoting public resources towards increasing new firm formation across the board and to contemplate whether such resources would not be better channelled to the most promising firms.

[11] Urban areas act as incubators to new firms, the ease of access to customers is one of its advantages.
[12] Spending on infrastructure and programs that provide support to new and small firms

They suggested that public policies should be tailored based on the level of economic growth in a region. Where there is satisfactory economic growth, policy efforts should be geared towards high growth-potential firms, while in regions with poor growth but promising economic base, both high growth-potential as well as all new firms should be targeted. And in regions where neither economic growth nor promising economic base exists, providing general assistance to all potential new firms would be the best solution (Reynolds, et al., 1994). Acs and Varga (2004) have also found that only higher-level (high growth potential) entrepreneurship was necessary for technology change, which contributes to greater economic development.

This would imply that only these kinds of firms should be targeted with policy programs, especially where resources are limited. On the question of whether some form of entrepreneurship, such as lower level service entrepreneurship, should be given lower priority than high growth potential entrepreneurship, Acs and Storey (2004) argue that this is a dubious road for policymakers to take on, as it "requires judgmental talent that neither the research community based on evidence nor policymakers based on experience would find easy to exercise" (pp.876). If we think in terms of the entrepreneurial economy, where it is not known what to produce nor who should produce it, this strategy of picking winners will not be the optimal strategy for public policies.

This attitude may have contributed to the range of public policy programs for entrepreneurship in recent times. Much of what can be found range from the very broad, aimed at creating a generally favourable environment for new and small firms. At the other extreme are the very specific public policies that are targeted at high-growth potential firms in knowledge intensive industries and special needs groups in the society (OECD, 1998; Smallbone et al., 2002; Veciana at al., 2004; Lundström and Stevenson, 2005).

Entrepreneurship will take place in all contexts but the contribution to economic development depends a great deal on the "rules of the game-the reward structure of the economy..." (Baumol, 1990, pp.894). Public policies are developed with the aim of creating those conditions necessary for entrepreneurship to thrive and make positive contribution to the society. Several factors affect the suitability of a mix of public policy programs to generate greater levels of entrepreneurship and innovation for a geographic space. The current level of entrepreneurial activities, together with the structure of the labour force, the size and role of government and the pervasiveness of existing SMEs, create a peculiar context that helps to determine the most suitable mix of public policy.

According to Lundström and Stevenson (2005) the optimal mix of public policies for entrepreneurship in an economy would have high levels of motivation, skills and opportunity factors. This is closely related to another view on the suitability of the mix of public policy for entrepreneurship and innovation which considers where policies are targeted which is either at the supply side or the demand side of the phenomenon.

On the supply side, potential entrepreneurs are targeted. These are individuals who have the resources, abilities and preferences to engage in entrepreneurial activities. Issues of demography and diversity of the population need to be considered. On the demand side the aim maybe to affect the market demands for goods and services with policies targeted at the demographic composition of the population and the resources and abilities of individuals in the community. Differentiation of consumer demand and a change in the industrial structure of the economy to accommodate smaller firms are also ways that the demand for entrepreneurship maybe increased (Verheul et al. 2001, 2002).

Mcquaid (2002) has argued that there are different stages of entrepreneurship in an economy and that a different public policy program is needed at each stage. He outlined a process that begins with entrepreneurial innovative behaviour in firms or what may also be called the knowledge creation stage. This is followed by entrepreneurial activities where opportunities are identified from the innovations produced earlier and commercialized. In the third stage the opportunities created by the innovations are exhausted and firms then start to focus on improving efficiency and price competition.

Programs that promote innovation or which support commercialization of research result maybe appropriate public policy focus in the first stage. In the second stage the role of public policy would be to ensure access to new information technology infrastructure or to help create markets while in the third stage ensuring a stable macroeconomic environment would be adequate public policy focus.

This is a very static assessment of entrepreneurship which would see entrepreneurship and innovation, as we have defined it, drying up after stage two resulting in a very stagnant economy. This line of reasoning is, however, in keeping with the mindset of the managed economies which resulted in the creation of a few large powerful corporations whose power government tries to restrain with antitrust and other regulatory public policy measures. A different scenario exists in the entrepreneurial economy, where even mature firms continue to be involved in research and development so that there is a constant supply of new ideas some of which are commercialized through new, small firms. Mature firms, through outsourcing, also provide opportunities for new firm creation and help in the creation of what had been referred to as an innovative milieu (Audretsch and Kielbach, 2004).

CHAPTER 5: RESEARCH MODEL AND HYPOTHESES

5.1 INTRODUCTION

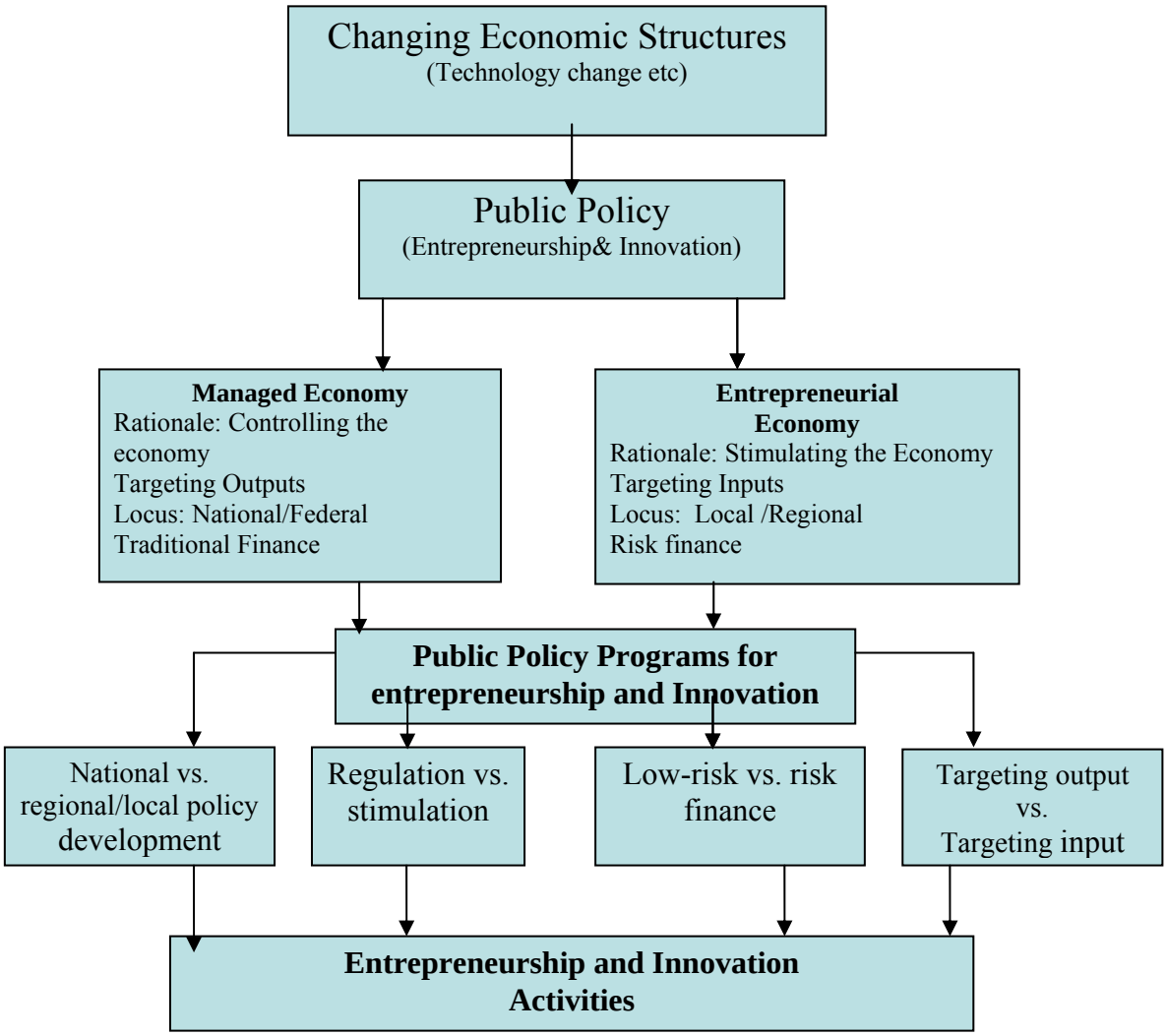
The underlying proposition of this research is that the economies of the countries included in the sample can be separated into managed and entrepreneurial economies as described by Audretsch and Thurik. This separation is done based on several indicators which have been shown to be signs of the new economic structure. These indicators are tied in directly or indirectly to the public policy trade-offs which are analyzed in a later section. The objective is to determine whether the perceived difference between public policies in the managed and entrepreneurial economies as outlined by Audretsch and Thurik (2001) does indeed exist and can be identified among these countries. Next the aim is to link these differences to demonstrated levels of entrepreneurship and innovation. Figure 5 depicts a conceptualization of the factors and the relationships that are proposed and which are the basis of this thesis.

5.2 THE ECONOMIES

The Institutional Theory stipulates that institutions including economic policies significantly impact the level of economic development that is experienced by countries. The economic progress made by the most developed economies has been attributed to their institutional arrangements which better facilitate human interaction. Their institutional arrangements have also been blamed for the low levels of economic development that planned and developing economies have experienced.

Although the extant literature on public policy does not distinguish between the managed and the entrepreneurial economies, the institutional theory provide general characterization that would envisage the most advanced economies to have institutions (regulations, laws and public policies etc) that better promote entrepreneurial and innovative activities.

Figure 5: Research model



Source: Self elaboration

For this first section, the proposition is that the countries that show the highest levels on each of the indicators (those signs of the new economic structure) will be classified as entrepreneurial while those showing lower levels will be classified as managed. On closer examination it is expected that signs of the trade-offs in public policy will be evident in the two kinds of economies. This section makes reference to propositions rather than hypothesis (the latter are used in the next section). This is done because the first analysis is more qualitative in nature while the second section is strictly quantitative to establish statistical relationships between the different independent variables and each dependent variable.

The following propositions and subsequent hypotheses are based on the assumption that it is possible to clearly distinguish and operationalize for research purposes, the differences of the EU countries to be separated into managed and entrepreneurial economies. The distinction elaborated by Audretsch and Thurik between managed and entrepreneurial economies is very appealing and have motivated me to embark on this research. It is however not always easy to draw a straight line between these two economic structure. Since inevitably countries will embody elements of both the managed and entrepreneurial economy. This does not in any way detract from the appeal. Rather it provides a challenge to come up with plausible demarcations between the two economies in keeping with their theorizing. In this light, a set of plausible variables, described in *chapter 6*, is used to draw a first line among the economies. A method of separation that will group the most similar countries together is applied.

Technological change is at the heart of what is driving the transformation of the economic structure in countries, *chapter 3*. This has helped to create the infrastructure in which innovation and entrepreneurship thrives. Indeed it has created new significance for small and new businesses in economic activities (Audretsch and Thurik, 2001). It would stand to reason then, that it is the countries that have experienced the greatest levels of technological change and transformation which would better facilitate these processes. Based on this premise, elements of technological transformation based on (Atkinson and Correa, 2007; Saisana and Mundo, 2008), and described in the next chapter, will be looked to in an effort to draw a line between the economies. Countries with the highest values of the indicators signalling technological transformation or embracing the new economy are therefore expected to be clustered together while those with the lowest levels should fall together. In this light the group with the highest values will be classified as entrepreneurial economies and the other group will be classified as managed economies.

On closer examination it is expected that:

P1.Entrepreneurial economies will be less regulated than managed economies.

P2.Public policies are formulated at the local or regional levels in entrepreneurial economies and at the national level in managed economies.

P3.Public policies will target inputs in entrepreneurial economies and outputs in managed economies.

P4. Risk capital will be more readily available in entrepreneurial economies than in managed economies.

5.3 TRADE-OFFS IN PUBLIC POLICY

The second part of the thesis comprises an analysis of public policy programs for entrepreneurship and innovation that are representative of the four trade-offs. Public policies relating to focus, locus, target and system of finance, from both the managed and entrepreneurial economies as established in the previous section will be analyzed. The objective is to establish statistical relationship between each selected public policy program and actual levels of entrepreneurship and innovation achieved by each country. Public policy programs are deliberately selected to fulfil a most important requirement: the ability to capture the essence of one of the four tradeoffs. These programs are representative of public policy programs for entrepreneurship and innovation that can be found in countries that transcend the sample used in this study. The general hypothesis is that each measure of public policy will have a particular effect on each indicator of entrepreneurship or innovation and that the effects maybe different in each country but also in managed and entrepreneurial economies as groups. The public policy programs and the hypothesis that they inspire are presented below.

5.3.1 RATIONAL OF PUBLIC POLICY (regulation versus stimulation)

Reducing regulations

The regulations that affect the creation and operation of businesses cover a wide range of areas. General regulations relating to the focus of public policy in terms of public ownership of enterprises, access to certain industries or competition forces is one big area. Within this are others such as rules that govern entry and exit and labour regulations. The rules governing the entry and exit of businesses are very important in stimulating business start-up both in innovative field as well as traditional areas. Conway and Nicoletti (2006) have outlined some of the many ways that government regulations can distort economic activities in a country.

Djankov et al., 2002 have indicated that the regulations that govern entry have significant implication for the proliferation of entrepreneurship and indeed innovation in a geographic space. Van Stel, Storey and Thurik (2006) have however shown that the impact of entry regulation is indirect and not that significant in determining entrepreneurial and innovative activities. Rather it is labour regulations that appear to have the most significant impact.

In an effort to determine the effect of regulation on nascent[13] and actual entrepreneurship, Van Stel, et al. (2006) isolated two categories of business regulations, entry and labour market regulations.

[13] Nascent entrepreneurship refers to the number of people who are actively involved in attempting to start a new business expressed as a percentage of the adult population.

They found that entry regulations had only a small indirect effect on actual levels of entrepreneurship while labour markets regulations have the more pronounced impact as it may reduce the rate of entrepreneurship in an area. With a sample of 124 countries, they found indications that labour market regulations may have the effect of reducing the rates of entrepreneurship in these countries. Flexible labour market regulations may provide less safety for paid employment and may also provide greater flexibility in running ones own business.

Both of these conditions make it more advantageous for individuals to start businesses. What is clear from the above discussion is that regulations affect business start-up. In combination with the theory which suggest that economic activities are the result of a country's institutions it is proposed that:

H1: Regulation will have positive effect on the rates of entrepreneurship and innovation in entrepreneurial economies.

H2: Regulations will have negative effect on the rates of entrepreneurial and innovation in managed economies.

5.3.2 LOCATION OF PUBLIC POLICY (national versus locally developed public policy)

The location of public policy development has come to prominence in the past two decades. A key concern in these discussions has to do with the level of government that is most appropriate for public policy development and implementation (Uyarra, 2008). The emergence of the entrepreneurial (knowledge) economy and subsequent discussions about the nucleus of this economic orientation is often accompanied by accounts of the region as the appropriate level for the making of public policy. It should be pointed out, however, that much of the discussion is centred on policy for innovation and by extension entrepreneurship (OECD, 1996; Uyarra, 2007).

The region as an appropriate unit for policy development and implementation has also been discussed in the literature by authors including Cooke and Morgan, (1998), Malmberg and Maskell, (1997); Storper, (1995) and the European Commission, (2001). The location of public policy development has not, as far as we are aware, been singled out as one of the important determinants of neither entrepreneurship nor innovation. Two general lines of reasoning surround this relatively new emphasis. One has to do with greater recognition of regional (sometimes) unelected bodies and the development of the regional institutional capacity which would improve the legitimacy and accountability of these bodies and in many ways represent a democratization process through which more power is given to the people (Uyarra, 2008). The other is based on the idea that regional/sub-regional governments are better placed to act in the best interest of their regions.

This latter reasoning is based on the suggestions that many of the industries that are driving the entrepreneurial/knowledge economy have strong tendencies towards geographical concentration of research and the related economic activities including funding sources. This has acted as triggers for governments to provide a framework of policy measures for the development of such clusters. A significant component of that is facilitating the development of regional competencies in articulating growth and development objectives and pathways.

In order to reap the most benefit from knowledge which drives economic activities in the entrepreneurial economy and which is located in regional clusters, "public policy requires an understanding of regional-specific characteristics and idiosyncrasies" (Audretsch and Thurik, 2001, pp.304). The development of regional systems of innovation has being given priority status by the European Commission. This is evident in the numerous programs that have been undertaken with EU Structural Funds especially the European Regional Development Fund (ERDF). There are significant disparities in the factors that contribute to both entrepreneurship and innovation levels, among the different regions of the EU. These disparities have become more distinct with the addition of new members. It has been suggested that a regional innovation system is justified based on difference in the institutional framework, inter-firm relationships, learning capability and R&D intensity among regions.

Oughton et al. (2002) have shown that there is a generally greater variation between the indicators of innovation activities across the regions than there is across countries of the EU. Based on a sample of 12 EU countries[14] divided up into 178 regions they found that almost 70% of the total variation in R&D expenditure across regions was accounted for by variations across regions within the same country while variations across countries accounted for only 30%. The differences were also similar for patent per head of population. They pointed out that regions that have the lowest GDP per capita and would potentially benefit the most from increases in areas such as R&D spending and other innovation related activities, tend to devote less of their resources to these areas. This is likely an indication of a situation where public policies are dictated from the national level and not regionally or locally formulated and therefore less emphasis is placed on developing local resources and competences. One way to change that is to develop the competences of local and regional organization to make them able to articulate their own public policy objectives. These factors and conditions have lead to these next hypotheses:

H3: Regionally developed public policies in entrepreneurial economies will have positive effects on the level of innovation and entrepreneurship.

H4: nationally developed public policies for innovation and entrepreneurship will have negative effects on the level of innovation and entrepreneurship in managed economies.

[14] The data used in this analysis dates back to 1999.

5.3.3 TARGET OF POLICY (output versus input)

The level of technological innovation in a country as well as the capacity for its renewal is dependent on an infrastructure comprising the country's policy on science and technology, the basic mechanisms in place to support basic research and higher education and the existing stock of technological knowledge.

These crucial factors play important roles in the level and kinds of economic activities and subsequent levels of economic development that takes place (Nelson, 1993, Stern et al., 2000). Blau in 1987 argued that the rise of entrepreneurship in the USA was a result of changes in technology which cause changes in industrial structure. These changes have contributed to a loss of comparative advantages in large corporations and have provided opportunities for smaller firms to flourish. An economy whose industries are characterized by "a high technological opportunity class" which is not focused on scale economies and has a large representation of non capital intensive sectors such as a large service sector will provide more fertile ground for entrepreneurship and have a more common occurrence of smaller firms since these factors favour small firms (Audretsch, 1995 pp. 105).

New economic knowledge is one basis for starting many new firms in technological regimes. While much of this new knowledge is created in established corporations, small firms do play an important role in the development and spread of innovation. Although research in large corporations contributes to the generation of many innovations, often time these new technology or ideas cannot be commercialized in large established firms.

Many factors contribute to this including difference in the appropriation of value of the new knowledge between the worker who created the knowledge and her employer. This difference will lead to the setting up of a new, most time small firm in order to commercialize the new knowledge (Audretsch, 1995).

In addition, the social interaction among employees leads to knowledge spill-over which result in spin-offs and the development of the related arms of industries and the formation of industry clusters. This is the kind of environment in which many small to medium size firms start and survive (Reynolds, 1987; Audretsch, 1995; Christensen and Rosenbloom, 1995). Restructuring within many large corporations have resulted in them outsourcing several of their functions which have also created opportunities for smaller firms to exist and flourish.

Innovation is said to be concentrated close to the sources of new knowledge. An education platform comprising ready access to higher education as well as universities and other research centres helps to create knowledge flows, which are responsible for innovation (Audretsch and Feldman, 1996). The effect of education on the level of entrepreneurial activity is however not clear-cut. Higher levels of education have been found to lower the levels of entry into self-employment in the UK (Burke et al., 2000). This however contradicts Reynalds et al. (1999) which have shown that the larger a country's investment in tertiary level education then the greater the rate of new firm formation. It was therefore suggested that a key to success in the knowledge-based economy is the presence of high human capital or talent.

Human capital is the collective skills and knowledge embodied in individuals. It is the mechanism by which knowledge flow or spill-overs actually happen and is therefore crucial in the innovation process (Florida and Gates, 2002).

Kirchhoff et al., 2002 have identified university expenditure on R&D as having significant impact on new firm formation, especially technological oriented firms' in the regions surrounding universities and research institutions. The above would suggest that the investments that are made in creating knowledge (both directly and indirectly) provide opportunities for innovation and subsequently entrepreneurship. This therefore leads to the following general hypotheses.

H5: The targeting of inputs will have positive effect on the level of entrepreneurship and innovation in entrepreneurial economies.

H6: Targeting of inputs will have negative effect on the level of entrepreneurship and innovation in managed economies.

5.3.4 SYSTEM OF FINANCE (low risk versus high risk capital)

The important function of capitalists, who provides money and share the risk involved in commercializing new ideas in the innovative entrepreneurial process dates back to Schumpeter. Since then many others including Eliasson and Eliasson (1996) have highlighted the importance of capitalists to bankroll the ventures of especially knowledge-based entrepreneurs. The availability of financing for new firms has been an issue from the very beginning of government intervention.

Providing access to affordable financing to disadvantaged small and medium sized firms to help them survive or even compete with the large firms in the economy was part of the objectives of those countries such as the USA, Taiwan, Canada and the Netherlands, who were at the forefront in implementing measures to support the small and medium enterprise sectors (Stevenson & Lundström, 2001).

With the shifting focus to the entrepreneurship/innovation combination and with the increased role that knowledge creation and commercialization plays in the process, the need has arisen for more flexible systems of finance. Parts of this need stems from the asymmetry in information between the entrepreneur/innovator and the investor/capitalist. It is believed that if this information asymmetry could be eliminated, then financing constraints would no longer be an issue for those seeking capital. As it now stands, information asymmetry exists and increases in proportion the more evolutionary or revolutionary the innovation is.

Venture capitalists can reduce this information gap through rigorous inspection of ideas before providing capital and then careful monitoring afterward through active involvement in the management of the project (Lerbner, 1994). Many countries such as Ireland, the USA, and the UK have initiated regional venture capital initiatives starting back in 2000. Public venture capital programs have also had significant impact in Germany which has created many financing programs for technology–intensive start-ups (Lerner, 1998, Stevenson & Lundström, 2001).

The perception, however, is that it is the entrepreneurial economies that have made the most significant changes in this area which has contributed in part to their entrepreneurial status. The managed economies on the other hand continue to emphasize traditional means of financing economic activities.

Stuart and Sorenson (2003) found that proximity to resources such as technically skilled workforce and venture capital funds as well as the age of the industry had positive and significant impact on the creation rate of biotechnology ventures. Venture capital and other non traditional forms of financing are especially needed when the new ventures are based on new uncertain knowledge. Such as is the case in the newer industries such as biotechnology, nanotechnology, and even in the information and telecommunication sectors. Much of this new knowledge is created first in university research centres and often time requires the nurturing environment of these places or even science and technology parks before they become attractive to venture capitalist. The following general hypotheses are therefore suggested for testing.

H7: The risk capital activities will have positive effect on entrepreneurship and innovation in the entrepreneurial economies.

H8: Low-risk capital activities will have negative effect on entrepreneurship and innovation in the managed economies.

SECTION TWO: METHODOLOGY, ANALYSIS AND RESULT

CHAPTER 6: MIX QUANTITATIVE/QUALITATIVE ANALYSIS

6.1 INTRODUCTION

There are two principal goals of this first section of the study. One is to classify a sample of EU countries that are in many ways representative of the countries that make up the full membership of the European Union. Using characteristics that epitomize the transformations that have taken place (from old to new economies) in many of the world economies, the aim is to classify the selected countries into managed and entrepreneurial economies. Then to ascertain the focus, locus, target as well as the system of finance of the public policy for innovation and entrepreneurship among these two groupings of economies.

6.2 METHODOLOGY

Hierarchical agglomerative cluster with squared Euclidean distance is applied to categorize the twenty countries into a two cluster solution based on data for the 2005. Where the data is not available for 2005, the latest available year is used. One of these two clusters will be identified as managed economies and the other as entrepreneurial economies.

The goal of cluster analysis is two fold; to combine variables to form groups in which the characteristics of the variables are as homogenous as possible while ensuring that the characteristics of variables between groups are as dissimilar as possible. Wards method is the agglomeration or linkage method used in the cluster analysis. It is regarded as an efficient means of clustering as it attempts to minimize the sum of squares (SS) of any two potential clusters that can be formed at each stage of the clustering process. The clustering was made based on fourteen indicators that aim to capture the characteristics of the entrepreneurial economy. Discriminant function analysis is subsequently applied, specifying the groups as dependent variables to identify the variables that are significant in determining group membership.

Using the two newly formed economic clusters, a qualitative data analysis is used to identify the four trade offs (focus, locus, target and system of finance) in the public policy regime for entrepreneurship and innovation in the countries that make up the groups. This analysis is based on some of the same variables that are used for the clustering along with some new ones which are used in the second part of the analysis and are described in detail under variables in chapter 8.

6.3 THE SAMPLE

The population for this study is the entire list of countries which make up the present European Union (EU) and which also happen to be members of the OECD. The sample was purposefully selected from this population to depict a range of characteristics typical of the countries that make up the union in terms of size, level of economic development and old and newer members. France, Germany, Italy, and the United Kingdom represent large economies with populations in 2005 of 63, 83, 59 and 60 millions[15] respectively. They are also founding or earliest member countries (the UK joined in 1973) and with the exception of Italy have some of the highest per capita GDP in the union. The Netherland and Belgium are also founding members but with smaller populations, 16 and 10 million respectively and with relatively high per capita GDP. Luxemburg, also a founding member, has one of the smallest populations, half a million, in the EU but enjoys an extremely high per capita GDP (Eurostat).

Ireland and Austria are newer members with average per capital GDP and even smaller population size at 4 and 8 million respectively. Denmark, Finland and Sweden, the Nordic members of the union, with small populations of 5, 5 and 9 million respectively, all enjoy high per capita GDP. Spain with a population of 40 million and Portugal and Greece with 10 and 11 million respectively can be considered as later members of the union and among them share mid range per capita GDP within the union.

[15] Rounded to the nearest million

The Czech Republic, Hungary, Poland Latvia and Slovenia[16] represent newer member states and low GDP per capita and a mix of population sizes. Among these latter countries, Poland had the largest population at 38 million. Slovenia and Latvia with 2 million populations each represent some of the smallest countries in the European Union (Eurostat). For this clustering of countries, the data is taken for the period 2004/2005.

6.4 THE VARIABLES

Many of these indicators are adapted from the Technology and Innovation Foundation's report titled 'The 2007 State New Economic Index' and the paper 'Knowledge Economy: measures and drivers'. There are also elements from the Knowledge Economy Index (KEI) indicators by the EC Joint Research Centre (JRC). The original KEI was developed in a joint JRC-UNU-MERIT project[17] to collect evidence of innovation and technological transformation and develop and improve indicators of the knowledge economy for 36 of the world's economies including 30 European countries, the USA, Canada, Japan, China, India and Australia. The categories are globalization, knowledge jobs, economic dynamism, digital economy, technology innovation capacity. The indicators fall under each of these categories and are listed in table 6.1. As noted earlier these are indications that an economy has undergone changes to embrace entrepreneurship and innovation and are either directly or indirectly connected to the four public policy trade-offs.

[16] The latest round of ascension in 2007 was excluded from consideration.
[17] Some detail of the project is available at http://www.merit.unu.edu/research/projects_view.phpid=24.

GLOBALIZATION

This is an assessment of the extent to which the economy is participating in the global marketplace. In the entrepreneurial economies a shift has taken place from a national to a global scope. Serious growth in terms of income, technology, and talent can only be achieved when companies participate in global activities. It is operationalize as FDI intensity, total export and high-tech export.

FDI intensity

FDI intensity is an average of inward and outward Foreign Direct Investment (FDI) flows divided by gross domestic product (GDP) used to gauge the extent to which a country's investment is integrated within the international economy.

Total export

This covers trade in all movable property, including electric current. It includes both the trading of goods between a member state and a non-member country (extra-EU) as well the trading of goods between member states (intra-EU).

High-tech export

This is measured as export in all movable goods belonging to the following sectors: aerospace, computers and office machines, electronics and telecommunications, pharmacy, scientific instruments, electrical and non-electrical machinery, chemistry and armament, as a percentage of total export. Both intra-EU and extra-EU exports are aggregated in calculating the indicator for each member.

KNOWLEDGE JOBS

Knowledge workers are a driving force behind the new economy. These kinds of workers who usually have some college education form the foundation of the important industries that will ensure continued prosperity of the most advanced nations. Science and technology workers, researchers, those engaged in knowledge-intensive service sectors are crucial to sustaining competitive advantage in the new emerging economic structure.

Employed in Science and Technology

The percentage of the total labour force in the age group 25-64, who are economically active in science and technology (S&T). They have either successfully completed an education at the third level in a S&T field of study or are employed in an occupation where such an education is normally required. It is measured mainly using the concepts and definitions laid down in the Canberra Manual, OECD, Paris, 1995.

Researchers

These are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems, and in the management of the projects concerned. FTE (full-time equivalent) corresponds to one year's work by one person (for example, a person who devotes 40 % of his time to R&D is counted as 0.4 FTE.

ECONOMIC DYNAMISM

Economic dynamism is a kind of yardstick of the extent to which the economy is equipped or equipping itself to be adaptable in the changing world. It is the ability for an economy to renew itself through innovation, competition and vibrant industry structures that support small and new firms. It is measured as the number of patents granted, the number of enterprises, and the number of the fastest growing technology firms that a country can boast.

Patents

The number of patents granted by the United States Patent and Trademark Office (USPTO) measured per million populations. USPTO data refers to patents granted while EPO data refers to patent applications. Data are recorded by year of publication as opposed to the year of filing used for the EPO data. This is because patents in the US (at least in the past) were only published once they were granted. Patents are allocated to the country of the inventor, using fractional counting in the case of multiple inventor countries. The methodology used is not harmonised with that of Eurostat and therefore the comparison between EPO and USPTO patents data should be interpreted with caution.

Deloitte Technology Fast 500

This is a ranking of the 500 fastest-growing technology companies in Europe, the Middle East and Africa (EMEA)[18]. It includes private and public companies in all areas of technology including Internet, biotechnology, medical, scientific and computers.

[18] The European countries were selected from this list.

DIGITAL ECONOMY

Globalization is being driven to a very large extent by the evolution that has taken place in information technology. As outlined by Audretsch and Thurik (2001) the re-emergence of the entrepreneurial economy has much to do with what is happening with Information technology. It has transformed traditional industries, increased productivities and has created new ones. Some features of the digital economy include household access to the internet access, broadband penetration rate and the availability of e-government.

Household internet access

This is the percentage of all households who have Internet access at home and include all forms of access to the Internet. The population considered is aged 16 to 74.

Broadband penetration

This describes the number of dedicated high-speed connections per 100 inhabitants and is an indication of the spread of this kind of access across the country. Broadband lines are defined as those with a capacity equal or higher than 144 Kbits/s. It includes various technologies such as ADSL, cable modem as well as other types of access lines.

E-government availability

This indicator shows the percentage of 20 basic services for which it is possible to carry out full electronic case handling. For example if in a country 13 of the 20 services were measured as being 100% available on-line, and one service was not relevant (e.g. does not exist), the indicator is 13/19 which is 68.4%. Measurement is based on a sample of URLs of public web sites agreed by member states as relevant for each service.

TECHNOLOGY INNOVATION CAPACITY (TIC)

TIC is the complex system that facilitates the use of new knowledge, access to technology, and an enterprising populace to create growth and prosperity within an economy. It's the components that come together to set the entrepreneurial economy in motion even as the managed economy stagnate. The indicators considered are: the percentage of GDP invested in research and development (R&D), venture capital investment as a percentage of the GDP, and the number of science and technology graduates per one thousand population aged 20-29.

Research and Development (R&D)

R&D expenditures include all expenditures for R&D performed within the business enterprise sector (BERD) on the national territory during a given period, regardless of the source of funds. It is shown as a percentage of GDP.

Venture capital investment

These are private equity raised for investment in companies expressed as percentage of GDP. Data are broken down into two investment stages: Early stage (seed + start-up) and expansion and replacement (expansion and replacement capital). The data exclude management buyouts, management buy-ins and venture purchase of quoted shares.

Science and technology graduates

This indicator includes new tertiary graduates in a calendar year from both public and private institutions completing graduate and post graduate studies compared to an age group that corresponds to the typical graduation age in most countries.

It does not correspond to the number of graduates in these fields who are available in the labour market in this specific year. The levels and fields of education and training used follow the 1997 version of the International Standard Classification of Education (ISCED97) and the Eurostat Manual of fields of education and training 1999.

PER CAPITA GDP

The final category is concerned with the affluence of the economy. Higher income is an important factor in the entrepreneurial economy as it allows individuals to demand new and advanced products and services, thereby creating a new entrepreneurial opportunities and further driving the innovation. Altogether these indicators are crucial components in the infrastructure which are required for sustaining the entrepreneurial economy.

6.5 DATA SOURCE

The data used in the clustering of the countries in this study is taken from the European Commission's Eurostat database at http/epp.eurostat.ec.europa.eu. The OECD product market regulation in the non-manufacturing sectors database for the period 1975-2003 is also applied. This database is available at www.oecd.org/eco/pmr. The other data sources include the Economic Freedom of the World: 2007 annual report from the Fraser Institute, the European Commission's European Trend Chart on Innovation and OECD Economic Surveys for each country.

The annual report from competition and regulation agencies in the different countries, in some cases annual reports of large incumbent utilities companies also provided useful data.

The European venture capital association (EVCA) in collaboration with its members, which comprised venture capital association from each EU member country, provided data on venture capital activities. The websites of government ministries which have responsibilities for such functions as regulated industries and competition also provided useful information.

Table 6.1: Variable representing the knowledge economy; sources and prior use

Variables	Sources	Studies using a similar variable
FDI	Eurostat	Atkinson & Correa, 2007
Total Export	Eurostat	Atkinson & Correa, 2007
High-tech Export	Eurostat	NSF, Science and Engineering Indicators(VY)
Science and Technology employment	Eurostat	Atkinson & Correa, 2007, Saisana & Munda, (2008)
Researchers	Eurostat	Saisana & Munda, (2008)
Patents	Eurostat	Atkinson & Correa, 2007, Saisana & Munda, (2008)
Fastest growing firms	Deloitte	Atkinson & Correa, 2007
Internet access	Eurostat	Atkinson & Correa, 2007
Broadband penetration		Atkinson & Correa, 2007
E-Government availability	Eurostat	Atkinson & Correa, 2007
R&D Investment	Eurostat	Atkinson & Correa, 2007, NSF, Science and Engineering Indicators(VY), Saisana & Munda, (2008)
Venture Capital	EVCA	Atkinson & Correa, 2007, NSF, Science and Engineering Indicators(VY)
Science and Technology Graduates	Eurostat	Atkinson & Correa, 2007, NSF, Science and Engineering Indicators(VY)
Per capita GDP	Eurostat, WBI	Saisana & Munda, (2008)

Note: Eurostat = European Commission Statistics
Deloitte = Deloitte Touché Tohmatsu, Technology, Media and Telecommunications
EVCA = European Venture Capital Association
WBI = World Bank Indicators
NSF = National Science Foundation, Washington, USA
VY= various years

Source: Self elaboration

CHAPTER 7: RESULTS - MIXED ANALYSIS

7.1 THE CLUSTERS

Hierarchical[19] cluster analysis with Ward's method of clustering algorithm separated the sample of countries, based on the variables described earlier, and specifying two cluster solutions. Luxemburg was removed in the initial screening of the data as an outlier. The remaining 19 countries are clustered as follows: Czech Republic, Greece, Hungary, Italy, Latvia, Slovenia, Spain, Poland, and Portugal are classified into one group. The remaining countries, Austria, Belgium, Denmark, Finland, France, Germany, Ireland, the Netherlands, Sweden, and the United Kingdom are grouped together.

Discriminant function analysis using the same fourteen predictor variables described earlier and which are used to perform the cluster analysis, were performed. With only two groups, a single discriminant function was calculated which was statistically reliable at $p < .05$ and accounted for more than 90% of the variability between the groups. The discriminant function separates the two groupings of economies presumably based on comparison of the group centroids. All 100% of the original grouped cases were correctly classified. All of the predictor variables, except Researchers and FDI intensity, showed significant univariate Fs for group difference.

[19] K-means clustering specifying two clusters returned identical grouping.

The number of patents granted (.378), per capita GDP (.359); knowledge jobs (.330), internet access (.299), the percentage of GDP invested in research and development (.280) were the most discriminating variables for distinguishing between the two groupings of countries. Table 7.1 below shows that group1 has lower means and corresponding lower F values than the second group.

Table 7.1: Discriminating variables

Variable	**Group 1 Mean**	**Group 2 Mean**	**F**
Knowledge Jobs	32.03	44.2	31.9
Export	78.2	247.2	4.4
Internet Access	30.9	54.4	26.1
High Tech EXP	7.49	17.6	14.3
Patent Granted	6.02	68.3	41.7
Per capita GDP	17677.78	27719.9	37.6
% of GDP in R&D	.95	2.3	22.8
Venture Capital investments [20]	.04	.17	6.8
Science and Techno graduates	9.7	15.1	7.4
E-Government	42	61.4	6.8
Broad Band Access	5.8	15.1	18.2
FastGrowingTechnology firms	2.9	37.8	7.2
Researchers	37216	91893	2.5
Foreign Direct Investment	2.5	4.8	1.7

Source: Self elaboration

[20] The total amount of investments is used here. It is not broken down into its different parts.

The groups were subsequently labelled as managed (first group) and entrepreneurial (second group) economies. The managed economies are Czech Republic, Greece, Hungary, Italy, Latvia, Slovenia, Spain, Poland and Portugal while the entrepreneurial economies comprise Austria, Belgium, Denmark, Finland, France, Germany, Ireland, the Netherlands, Sweden and the United Kingdom.

This grouping of European member countries is consistent with the work of Saisana and Munda at the European Commission Joint Research Centre (JRC). In their research of the Knowledge Economy, involving EU 25 and the USA and Japan, they identified the same countries that have been identified here as entrepreneurial economies as the highest ranking countries in terms of a knowledge economy index that they developed. Sweden, Denmark Finland, the Netherlands, Ireland, Austria, Belgium, France and Germany were all ranked ahead of Slovenia, Spain, Czech Republic, Latvia, Italy, Greece, Hungary, Portugal and Poland. They also identified Luxemburg as a possible outlier demonstrating unusually high values on several of the dimensions including per capita GDP.

In the paper, 'Knowledge Economy: measures and drivers' (Working paper) Saisana and Munda identified several dimensions including ´production and diffusion of ICT, human resource, skills and creativity, knowledge production and diffusion, innovation, entrepreneurship and creative destruction and internationalization as playing important roles in the development of the knowledge economy. They pointed out that countries that invest heavily in research are ranked highly in knowledge economy index (KEI).

Another important highlight from their research is that while a knowledge economy appears to be relevant for a good overall economic performance, there are some exceptions. Germany, Italy and Spain for example all have relatively high levels of per capita GDP but are not particularly spectacular in terms of their ranking on the KEI. They are the only countries with relatively high GDP that are ranked the lowest on their KEI.

The countries in this research are all members of the EU although they vary in the length of time spent as members as well as their levels of economic development. Taken together, they start to represent the diversity that exists in the EU membership. They have a mix of time in the Union, population size as well as per capita GDP. Their segregation into managed and entrepreneurial economies, however, is much more than simply their levels of economic development, population or length of EU membership. Indeed it is the extent to which these economies embody the drivers of the entrepreneurial (knowledge) economy that provides this sensible categorization.

7.2 INTERPRETING PUBLIC POLICY TRADE-OFFS IN MANAGED AND ENTREPRENEURIAL ECONOMIES

7.2.1 REGULATION VERSUS STIMULATION

P1. Entrepreneurial economies will be less regulated than managed economies.

Regulation

In the managed economy, public policies towards enterprise are usually focused on three principles; antitrust, regulation and public ownership. These kinds of motivations, individually or in combination, restricted the freedom of firms to contract and gave control over much of what happened in the market to the governments. In the creation of an entrepreneurial economy, the focus of public policies have shifted to concentrate more on stimulating business activities through increased competition. This new concentration is geared towards creating avenues for growth in existing firms but also to create opportunities for new business formation as a means of creating employment and meeting national growth objectives (Audretsch and Thurik, 2001). This background therefore creates expectations that levels of regulation, public ownership and other anticompetitive mechanisms will be higher in the managed economies and lower or nonexistent in the entrepreneurial economies.

When a significant number of enterprises are fully or partially owned by government, it is the political process rather than the market which is allocating resources in the economy. High government spending in relation to the spending of individuals, households and businesses represent a substitution of 'government decision-making' in the place of personal choice.

This reduces economic freedom which ultimately leads to high levels of inefficiencies and burdens to consumers and has no positive impact on economic growth (Economic Freedom of the World, 2007).

Regulation has been shown to have negative effect on economic growth (Nicoletti and Scarpetta, 2003, Loayza, et al. 2005) even as it can potentially have positive impact on productivity. Regulations that restrict entry into certain industries facilitate inefficiency which often is passed on to consumers in the form of higher prices and inferior products and poor services. In addition to the negative impact on consumers, such regulations also remove any incentives on the part of operators in these industries to engage in research and development to improve their products and services. Regulations can also distort the dynamism in firms which limits their growth potential. Labour regulations for example, may prevent a firm from contracting its human resources when such action is crucial for the efficient functioning of the firm. Supporters of regulations have often argued that they are needed to protect the right of consumers, to ensure that product and services are maintained and that there are avenues for recourse when rights are breached. It is therefore important to determine the particular mix of regulations that will facilitate rather than hinder economic growth and meet other goals such as social equity and civil security in each economic setting.

Conway and Nicoletti (2006) identified what they referred to as two distinct regulatory regimes in 2003, using the OECD data on regulation in the non-manufacturing sectors. The UK, Netherlands, Denmark and Germany formed part of what they referred to as a 'relatively liberal' group of countries.

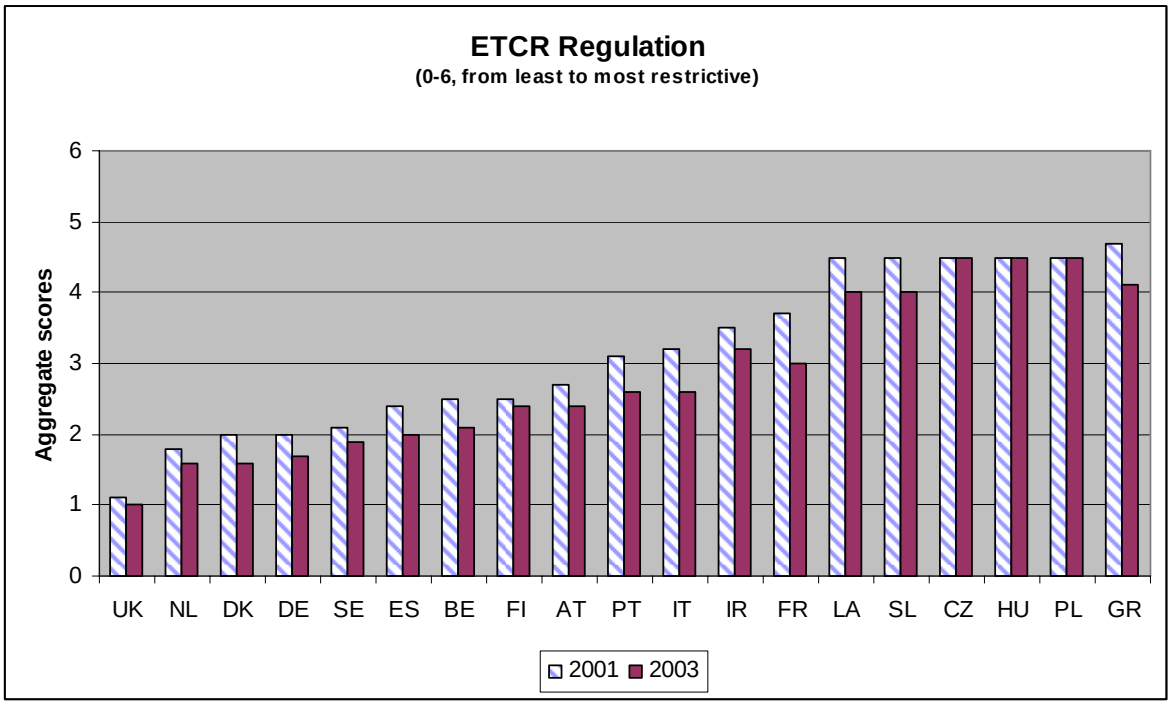
These are the countries with the least regulatory restrictions in the nonmanufacturing sectors of OECD countries. France, Greece and Ireland on the other hand, formed part of a 'relatively restrictive' group, or countries with the strongest restrictions. Of the countries for which the indicators were available, Spain and Sweden were examples of countries which were not statistically distinguishable from either of the two groups.

Using the same OECD database citied above, but concentrating on the energy, transport and communication (ETCR) aggregate scores[21] for 2001 and 2003, figure 3 depicts the level of regulation in the two grouping of economies that was identified earlier. It shows that in terms of a general trend the managed economies demonstrated higher levels of regulations in the energy, telecommunication and transportation sectors than in those economies classified as entrepreneurial. There are however some important departure from this general trend; for example France and Ireland both of which has been grouped as entrepreneurial economies recorded higher levels of regulation in these sectors than the managed economies of Spain, Portugal and Italy with the strongest difference been between France and Spain. The UK had the least restrictive markets for ETCR in 2001 and continued and by all indication continued along this path in 2003 and onwards.

[21] Details of the composition of this score are provided as appendix A.

It was ranked as the European country with the smallest size of government by the Economic Freedom of the World (EFW) index for 2005. All the networked industries in the UK have been privatized and experience varying levels of competition.

Figure 7.1: Aggregate ETCR regulation scores



Source: Self elaboration

The Railway which is owned and operated by a private sector monopoly, Network Rail, is closely regulated by the Office of Rail Regulations. The other network industries also continue to be regulated at various levels with price controls in some sectors.

The Netherlands follows behind the UK in terms of least restrictive regulations in these sectors. The Dutch market for electricity and gas were in advanced state of transition where all Dutch consumers could freely select their electricity suppliers.

They could also readily switch suppliers, even if the process of switching in 2005 had several glitches which negatively affected consumers' confidence in the process (NMa, Annual Report 2005). The telecommunication sector experienced healthy competition according to the Netherlands Post and Telecommunication Authority even though incumbent KPN, in which the state maintains a small percentage in 2005, has a large share of the markets (OTPA Annual Report and Market Monitor 2005). The Railway sector is still dominated by the government as the main operator NS (Nederlandes Spoorwegen) is fully owned by the state as well as Pro Rail which manage the rail infrastructure.

Two other entrepreneurial economies, Denmark and Germany complete the top four positions of countries with the least regulated ETCR sectors. The telecommunications market in Denmark was liberalized in 1996 and experienced competition even though the incumbent TDC (formerly Teledanmark) controlled 80.2% of the fixed market sector with the remaining 19.8% distributed among six operators. They also controlled approximately 31% of the mobile telephony market sector (Telestatistics 2005, NTA). According to the Danish competition authority, more liberalization is needed in these as well as other sectors of the economy (Competition Report, 2005). Despite several efforts at liberalization, legal monopolies have been created in electricity grid and transmission companies and natural gas transmission, storage and distribution.

For example, a new state owned company, Energinet.dk, which owns the electricity and gas transmission grids was created in 2005 with responsibility of ensuring that competition acts in the best interest of the society and consumers. Price regulations exist among utilities companies which have been granted legal monopoly statuses (DERA, 2005 Annual Report). There also remains a strong government involvement in the areas of rail. Although the railway sector has been opened to competition, the incumbent DSB, which is owned by the state, is the main operator in passenger transport. Another state owned enterprise Rail Net Denmark, controls the railway infrastructure (DERA, 2005 Annual Report).

Germany's ETCR sectors have relatively open product markets, where for example by 2005, all categories of consumers could choose their suppliers of electricity and gas. Despite efforts at liberalization however, the regulatory framework, significant public ownership and the structure of ownership in network industries have not brought about protracted competition. Even with an open outward policy, there are for example restrictions on ownership of the electricity and gas supplier E.ON with restriction on acquisition by foreign stake holders. The sector specific regulator for the gas and electricity was assigned to the Regulator for Telecommunications and Post and the agency renamed the Federal Network Agency (Bundesnetzagentur, FNA) in 2004[22]. While the FNA is separated from the government, the government can order it to take specific actions and this weakens its independence in some respects.

[22] The regulation of access to the railway network was given to the agency in 2006.

Full liberalization of the electricity market was followed by several mergers resulting in nine vertically integrated companies (Verbundunternehmen) controlling electricity transmission network and the majority of the generation capacity. Municipality-owned utilities companies control the majority of the electricity and gas distribution networks with only a minority under private control. These utilities companies are in many instances provider of other community services such as swimming pool services, local transportation and some even provide telecommunication services.

Both the state and the federal governments are important stakeholders in the vertically integrated electricity and gas transmission companies such as E.ON. Vertical integration is also strong in the gas market and these conditions make market entry of competitors difficult. The Federal government owns 41.7% of the incumbent postal service provider Deutsche Post AG (DPAG) which also owns 38% of the telecom incumbent Deutsche Telekom AG.

The Railway operator Deutsche Bahn AG was still fully owned by the federal government up until December 2005 when a five year bond for US$800 million was issued via Deutsche Bahn Finance B.V., Amsterdam/Netherlands (2005 Annual Report, DB). It is the monopolistic owner of the physical railway network (upstream market) as well as a dominating transport provider in the downstream markets (Martin, 2004).

At the other extreme are those countries with the highest levels of regulations resulting in the most restrictions in these sectors. Greece is the country with the most restrictions followed by Poland, Hungary, and the Czech Republic[23]. Greece demonstrated the highest level of regulation in 2001 and although it experienced some level of reduction in 2003, it remains a very restrictive regulatory regime. Despite liberalization laws which came into effect in 2001, the incumbent PPC SA continues to dominate with more than 97% of the market for electricity in Greece in 2005. The opening up of some sections of the market for natural gas has not created any competition for the incumbent DEPA SA which remains the only company involved in the importation and sale of gas in the country (REA, 2006).

Competition continues to develop in the telecommunication sector although Greece continues to lag behind other EU members in many aspects. In the broadband sector, a significant increase in the number of lines is observed; a fact that implies the intense interest of the market. This, however, could not prevent Greece from occupying last position in terms of EU 25 broadband penetration rates in 2005. There have also been significant increases in the interconnection traffic among mobile telephony operators and the percentage of the market served by alternative providers has increased from 19.5% in 2003 to roughly 29% in 2005 (EETT Annual Report, 2005).

[23] Substitute data is used for most of the former communist countries due to missing data.

The railway sector is monopolized by OSE (Organismós Sidirodrómon Elládos), a state owned group of companies which is responsible for rail transport including passenger and cargo transport and servicing of the rail infrastructure. The domain of air transportation is also under the control of a single entry, the state owned Olympic Airways group. Together these realities point to a lack of competition also in the transportation sectors (OSE, 2005; Olypicairways.com).

The Polish electricity market consists of two parts: the sale of energy within long-term contracts (power purchase agreements, PPAs) which is not open to competition, and the sale of long-term contracts which is open to competition forces (ERO Activity report, 2005). A restructuring is underway which should see the cancellation of PPAs and the introduction of competition mechanisms in the entire electricity market. By 2005 all non-household Polish customers were eligible to freely select their supplier of electricity and gas. This choice is expected to be given to all consumers as more liberalization takes place in the sector.

The majority of the gas consumed in Poland is imported and in 2005 the Polish Oil and Gas Company S.A. (PGNiG S.A group) of which the state treasury is the biggest share holder, was the only company involved in the import and wholesale trade of natural gas. Acts of privatization and restructuring in 2004 resulted in a breakup of formerly integrated companies. This has resulted in separate companies participating in distribution and transmission networks, market operators as well as services companies in areas such as geophysical and seismic studies and the reading of gas meters (ERO Activity report, 2005).

The Polish telecommunication sector was fully liberalized by 2005 although the incumbent Telekomunikacja Polska (TP), which has been privatized, dominates the fixed line segment with 85% market share. The mobile segment still contains barriers to entry and was dominated by three operators in a near three way equal split. This segment along with the internet access is still being regulated in an effort to stimulate competition and further development (Telecommunication Market, Report 2005). The Polish Railway industry has been liberalized and at the end of 2005 there were 92 licensed railway operators, 65 of which were freight operators and the other 27 operated passenger services. This represented the second highest number of rail operators in an EU state. Germany is the only country where more rail operators' licenses have been granted.

In 2005 only non-residential consumers in Hungary could freely purchase electricity and natural gas from the liberalized market. Residential consumers remained obliged to buy from the public utility companies. The incumbent MOL continues to dominate the wholesale trade of fuel with only a few smaller regional refineries as contenders for market shares. Despite an expansion in the retail trade of fuel and the entry of new participants with refining capacity and an increase in the number of fuel stations in hypermarkets, MOL remains the market leader with a market share that have remained unchanged for more than 7 years. The Hungarian telecommunications sectors were very active in 2005.

The fixed line telephony market is however quite concentrated with the incumbent Matáv Rt accounting for 78% of the market and its closest rival Invitel serving only an 11% market share. The mobile market is dominated by three players, two of which account for a combined 79% of all active subscribers (National Communications Authority, Hungary, Annual Report, 2005).

The railway industry was liberalized in 2004 and experienced increases in the number of players in the market in 2005 although this did not lead to increased competition. The experiences of the new companies have led to re-regulation of the market and the creation of a new Railroad Act. The market is dominated by MAV Zrt and GySEV Zrt and the only significant new comer was Central-European Railway Zrt with just about 1% of the market. The Hungarian state property agency ÁPV Rt owned 99.5% of Malév the national Airline, but in 2005 was making strong efforts for its privatization. There is however significant competition in the airline sector resulting from strong rivalry among low cost airlines operating in the market.

In an effort to increase competition in the electricity market, low consumption business customers gained the right to choose their supplier. This privilege is to be extended to all other categories of customers including households in 2006. Amendments to the Energy Act provided for the unbundling of the regulated activities of electricity transmission and distribution and gas transmission and generation form the non regulated activities of electricity generation and gas production and trading (2005 Report on the Activities and Finances of the Energy Regulated Office).

The liberalization of the natural gas market began in 2005 and was scheduled to be completed in 2007 when all natural gas final consumers should be able to freely select their supplier. However an analysis of the sectors by the Energy Regulation office found that there was no real competition and that the entry of an alternative competitive supplier could not be expected. This lead to the imposition of a temporary cap on the prices of natural gas and storage services provided by the dominant firm RWE Transgas a.s. as well as on the selling prices of distributers who buy gas from RWE.

The Czech telecommunication industry is fully liberalized and experience lively competition in 2005 according to Czech Telecommunications Office (CTO), the regulatory agency responsible for Telecommunication and Postal Services (Activity Report 2005, CTO). In the fixed lined market Cesky Telecom remains an important player while others such as GTS Novera[24] have increased their strength in this market which is expected to create greater levels of competition. Three major operators control the mobile market. One of them, Eurotel, is owned by Cesky Telecom and accounts for 41% of this market (Annual Report 2005, Czesky Telecom).Although the Czech Railway has been liberalized, competition and real benefits to consumers remains elusive. Ceske drahy a.s (CD) is part of the integrated company Ceske drahy Group and was established at the start of 2003 as the successor to the incumbent state enterprise Ceske drahy statni organizace. It is the largest operator accounting for some 99% of passenger transport in 2005. It is also a major player in cargo transportation and manages the rail way infrastructure which is owned by the government (Annual Report, 2005, Ceske drahy Group).

[24] GTS Novera was formed from the merger of GTS Czech and Aliatel. Three other companies were slated to be merged into GTS Novera.

Stimulation (Internationalization)

The stimulation of enterprise is the order of the day in the entrepreneurial economy. Businesses are encouraged to trade internationally as part of the strategy to grow and create jobs in the economy. As knowledge-based businesses become increasingly involved in international networks their activities also stretch across national borders. However traditional businesses are also heavily involved in the international strategy much facilitated by globalization and advances in information technology. The freedom with which international investments are made is dependent on the legislations of the home governments as well as those of the government in the recipient countries. It is the latter, inward FDI, that have proved most controversial with widespread concern regarding disproportionate foreign control of large corporations and its effective on national security and the political process (Golub, 2003).

Governments can utilize direct restriction mechanisms of tariffs and quotas as well as indirect ones such as the exchange rate and restrictions on foreign ownership to influence foreign investments in the local economy. The general trend toward liberalization that was portrayed earlier has also affected FDI. Policymakers have been swayed, if not totally convinced, of the merits of FDI especially as it relates to areas such as increasing employment and capital and technology transfer and have crated legislations to increase the intensity of FDI (Golub, 2003).

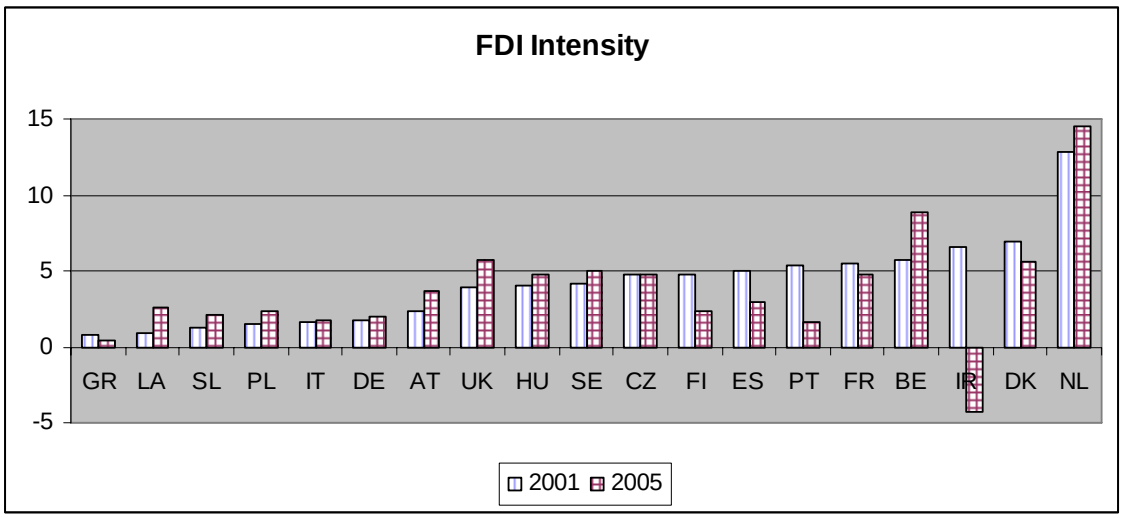
Foreign investment can create access to new capital, knowledge networks, markets as well as new technologies. Strong political discussions reigned in 2005 about various aspects of FDI but especially regarding Mergers and Acquisitions and national security.

While new EU member countries continue to privatize and create conditions to attract FDI, others such as France and Spain have tried to prevent the buyouts of national entities, (Endesa and Suez respectively), and have taken steps to protect national corporations (UNCTAD, 2006). By placing restrictions on foreign investments governments limit the inflow of capital and consequently limit the growth of the economy. A relatively free flow of capital without any action on the part of the state to direct the flow of capital is necessary for investment in knowledge creation which is a requisite for driving the entrepreneurial economy. Investments flow into a country is a sign of confidence in the institutions of the country. Investors are reassured by economic freedoms and functioning institutions including a strong an independent judicial system and security of property rights. On the other hand FDI outflows allow capital to flow to where it can realize the best returns and can provide access to new knowledge.

Figure 7.2 depicts the FDI intensity for both types of economies for 2001 and 2005. The FDI intensity reflects both inflows and outflows and is expressed as a percentage of GDP to remove the effect of the size difference of the economies. Although both managed and entrepreneurial economies have experienced growth and decline in FDI activities, the lowest levels of activities are within managed economies as shown in figure 7.2. At the same time, both the most impressive growth and the most dismal decline have been experienced by entrepreneurial economies; Belgium and the UK in terms of growth and Ireland in the case of decline.

The UK attracted the largest inflows of FDI in the world in 2005, and with the 25 member EU attracting almost half of the world's total FDI it can be considered as indication of an active FDI market in the European Union. The merger of Shell Transport and Trading (UK) with Royal Dutch Petroleum (Netherlands) accounted for much of the UK inflows (UNCTAD, 2006).

Figure 7.2: FDI Intensity



Source: Self elaboration

Other countries to attract large amounts of inflows are France, Netherlands, Germany and Spain. It is therefore not a clear case of the largest economies attracting the largest amounts of FDI inflows as the Netherlands with its mid size economy attracted the third largest amounts of FDI inflows. On the other hand the managed economies attracted the lowest inflows of FDI apparently regardless of size as in the case of Poland.

In the case of FDI outflows, the Netherlands reported outflows of €109205 million, followed by France and the United Kingdom (UNCTAD, 2006). The Shell merger mentioned earlier accounted for a significant portion of the Netherlands outflows. The general increase in FDI outflows can be attributed to increase cross-border Mergers and Acquisitions (M&As) in developed economies. A significant feature of the rise in M&As has been increases in private equity and related collective investment funds (UNCTAD, 2006). As we will discuss later, Private Equity is crucial in the entrepreneurial economy. It provides innovative entrepreneurs and enterprises in the host-country with the necessary financial resources to move to higher levels of development.

Despite the disparity among the different countries both in ETCR aggregate indicators and FDI intensity, the difference in terms of the two groupings of economies is obvious. This is however most pronounced at the extreme ends of a spectrum of most regulated to least regulated. The least regulated end is dominated by entrepreneurial economies while the most regulated are managed economies. This is therefore considered to be strong enough support to confirm the first proposition.

7.2.2 NATIONAL VERSUS LOCAL POLICIES

P2.Public policies are formulated at the local or regional levels in entrepreneurial economies and at the national level in managed economies.

Nationally or federally formulated policies administered by national institutions were created in the large managed economy (of the past) to protect the masses from abuse by a handful of powerful corporations which dominated existing markets (Audretsch and Thurik, 2001). This approach gave rise to the institutionalization of several powerful national regulatory agencies which had the responsibility of controlling the action of oligopolistic and predatory firms (pp 303). With the shift to the entrepreneurial economy, it is expected that many of these agencies would have lost their relevance and local or regional agencies or administrations would have gained prominence. In these new economic settings, competition rather than regulation direct activities in market, and local administrations take on greater responsibility for managing economic as well as more social activities giving rise to more regionally developed public policies.

Regions are located within a multi-level structure of local, regional, national and transnational governance that has emerged in Europe (Cooke, 2000). The level of political administration at local and regional levels varies among the EU member countries and has significant implication for public policy as it determines to a large extent the degree to which regions determine their development strategies in conjunction with national and transnational initiatives and strategies.

The EU has been pushing regional innovation strategies/systems as a way to close the gaps that exist between rich and poor member states as well as the gaps which exist among different regions within each country. In respond to this push several new regions or even artificial administrative units have been created especially in newest member states that are former planned economies such as Czech Republic and Hungary (European Trend Chart on Innovation, 2005, 2006).

Through a multitude of funding instruments including the European Regional Development Fund (ERDF), cohesion funds and pre-accession funds, members can access resources to develop and implement innovation strategies within identified regions. Part of this process is the creation of competence at the local and regional levels that will facilitate policy development (EU, 2004). Ultimately such strategies are expected to help poorer regions to catch up with others that are performing better economically bringing about the harmonization of the economies of the entire EU.

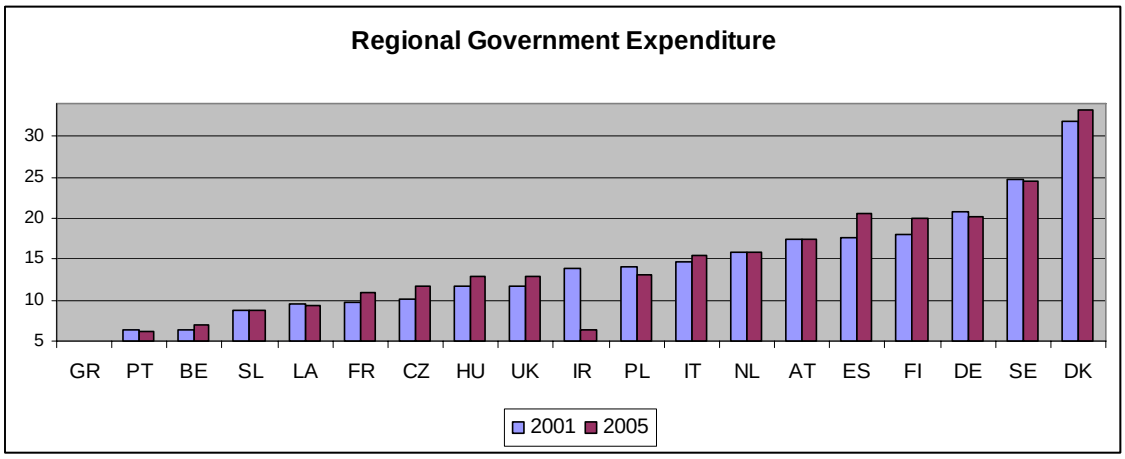
Quantifying the extent to which public policies are developed at the local or regional level is difficult and like the other areas covered in this study requires the use of proxy measures. To arrive at a plausible proxy, it is reasoned that the extent to which public policies can be developed by local or regional government, is dependent on the amount of the national budgetary resources that it controls. The proxy of this variable is therefore the amount of the national budget that is allocated to regional or local[25] government.

[25] Local and regional are used interchangeably throughout the text to refer to any level of political organization below the national government.

As has been suggested, entrepreneurial economies by large allocate more of the national budget to regional or local government. Denmark, Sweden and Germany for example, are the economies with the highest percentage of their national budget accounted for at the regional level while Greece and Portugal have the lowest percentage, figure 7.3.

It is however not altogether a clear cut case of entrepreneurial economies allocating more of the national budget to regional and local authority and managed economies allocating less. Belgium for example, which is classified as an entrepreneurial economy, has the third lowest allocation while Spain, a managed economy has the fifth highest portion of its national budget allocated to regional government. France is another of the entrepreneurial economies with low percentage of national budget to regional or local government placing it below managed economies such as Hungary and the Czech Republic. While some of this allocation is a reflection of the nature of a political structure that has been established in the constitution of many countries such as Germany, Spain and Italy, others are not. Instead it is a reflection of the increasing importance of regional development in the overall national development strategy of individual country and as have been pointed out earlier, of the European Commission's strategy to create economic equality among the different regions.

Figure 7.3: Regional government expenditure expressed as a percentage of GDP



Source: Self elaboration

The Czech Republic is a former planned economy where new regions have been created. Fourteen self-governing regions were created in the Czech Republic in 2001. As of January 1, 2001 several organizations, in the areas of education, culture, agriculture, healthcare, labour and social affairs, were transferred from the national ministerial levels to regions (Blazek and Uhlir, 2007). Regions are expected to be in charge of analyzing and assessing their levels of development and subsequently approve their own regional development programs, make decisions about which programs to finance from their budget as well as corporate with other regions and central government entities that work in regional development.

When regional competences are delegated from the national program, the regions participate by coordinating economic and social unity. A network of Regional Development Agencies (RDA)[26] was also created to elaborate municipal, local and regional development strategies (Blazek and Uhlir, 2007). They too are expected to facilitate better corporation among public administration at both national and regional levels, the business and non profit sectors as well as EC institutions and other foreign organizations which will lead to greater regional development. Despite these lofty expectations and much investment of EU money, many of these newly created units are not functional and it will take time before these newly created regions develop the competences and are able to draft their own innovation policies.

Greece however is the country which had the lowest percentage of its national budget allocated to regional or local government in both 2001 and 2005. The Greek governance system is characterized by the fact that government ministries are not only policy creators but also policy implementers. Although there are intermediaries and regional development companies that provide support, it is the competent ministry that maintains ultimate responsibility (European Trend Chart on Innovation, 2002, 2005). Greece's thirteen regions have different levels of competence in articulating regional policy including those for innovation. In 2000, the national government initiated the preparation of 'regional operational programs', in coordination with the European Commission's regional policy strategy, they required each region to formulate innovation priorities. The regions however suffer from lack of competence in this area and this effort was not successful.

[26] Some are established by regional authorities, while others have been established by private entities.

In the 2001-2002 periods four regions[27] (all regions were requested to do this) appropriated funds for R&D and Innovation, however a lack of adequate design and coordination between national and regional policies, has resulted in the immobilization of those funds. Even though the General Secretariats which manages the 13 regions are not denied the right to promote innovation and development, it just does not happen (European Trend Chart on Innovation, 2002).

In the case of Denmark which has the highest proportion of its national budget allocated to local government, the promotion of Entrepreneurship and Innovation takes place at three levels. There are national, regional and local level initiatives covering areas including education and culture, general guidance and networking as well as capital acquisition and taxation. The agencies responsible for each of theses areas fall within relatively small national ministries which gives them a high degree of autonomy to formulate and implement policies. There is also a significant decentralization of responsibilities which is manifested in different ways including the articulation of specific aspects of the innovative police by regional (county) authorities. The Danish regions are organized in a two–tier system with 14 counties and 271 municipalities[28]. The counties have responsibilities for national health services including hospitals, secondary and higher preparatory education, regional environment, parts of public transport, sections of employment services and regional enterprise policy.

[27] All regions were requested to do this. However, only four actually did with another two making some effort.
[28] This was slated to be changed in 2007, to reduce both the number of counties and the number of municipalities.

Local enterprise policy is the responsibility of the municipalities. It is only in the health sector that research and innovation policy has been an explicit responsibility for the regional and local authorities. Regional and local authorities account for only 7 % of the national R&D budget and nearly 90% of this is related to activities within the health sector. The Danish counties are to be replaced with 5 regions starting in 2006 and regional growth forums established to formulate regional development strategies which will in turn influence the national growth strategy and feed the national innovation policy development process (European Trend Chart on Innovation, 2002, 2005).

The demarcation between managed and entrepreneurial economies based on the percentage of the national budget that is allocated to regional/local government is clear. It is however not as strong a separation as would be expected providing only weak support for P2. As figure 7.3 shows countries such as Belgium and France both classified as entrepreneurial economies contribute to this weak separation.

7.2.3 TARGETING OUTPUTS VERSUS INPUTS

P3. Public policies will target inputs in entrepreneurial economies and will target outputs in managed economies.

Research and Development

In managed economies, the public policies including those for innovation & entrepreneurship will be directed at the output side of the production/economic process. The target of policy shifts however in the entrepreneurial economy, concentrating instead on what are the inputs into the process that create advantages for those that are involved. The creation and application of new knowledge takes a place of prominence as one of the most important inputs in the economic process in the entrepreneurial economy.

Knowledge like other factors of productions can be produced and used in the production of other goods and services and in addition is used in the production of itself (further knowledge). It is also subjected to depreciation with deterioration of skills or when certain knowledge is no longer used (Soete and Weel, 1999). However knowledge is unique in that it does not take a physical form but is rather embedded in blueprint forms or in human beings or in organizations. It is created by learned persons working in research and development in private organizations, universities and government funded institutions as well as through new combinations of discrete pieces in the existing stock of knowledge.

The European Council's Barcelona Declaration has set out to achieve global research expenditure within the EU of 3% of GDP by 2010 with the hope that this will create more innovation and growth among European firms (Wessner, 2004). With this increased recognition of knowledge as an important factor in the economic process, it is often assumed that greater investment in basic R&D will stimulate the need for greater applied research which will increase the number of new inventions with commercial values that will ultimately lead to economic growth (Rodriquez-Pose and Crescenzi, 2008). This linear perception is rather simplistic as the innovation process is complex involving many feedback loops through which learning occurs. It involves interaction on many levels of basic and applied research, the development of goods and services and the commercialization of such goods and services (Wessner, 2004). An effective innovation process that will stimulate economic growth therefore requires an approach that involves incentives and intermediating institutions that can encourage researchers to focus more on research as a way to solve society's problems and not just on research for the sake of advancing science in and of itself (Wessner, 2004).

Two major players involved in the funding of this process are government and private industry. Government supported R&D may have direct impact on industrial productivity growth thereby contributing to better economic performance. The indirect effect though may involve complimenting and stimulating private R&D expenditures. Knowledge and training pullovers created from public investment in R&D are also potential social benefits which contribute to the productive capabilities of the private sector through encouraging applied R&D which leads to technological innovation (David, et al, 2000).

This is research that results in the development of infrastructural knowledge described as general principles, tools and techniques and skills acquisition which raises the expectation for the rates of return of commercially oriented applied research by the private sector (David, et al, 2000).

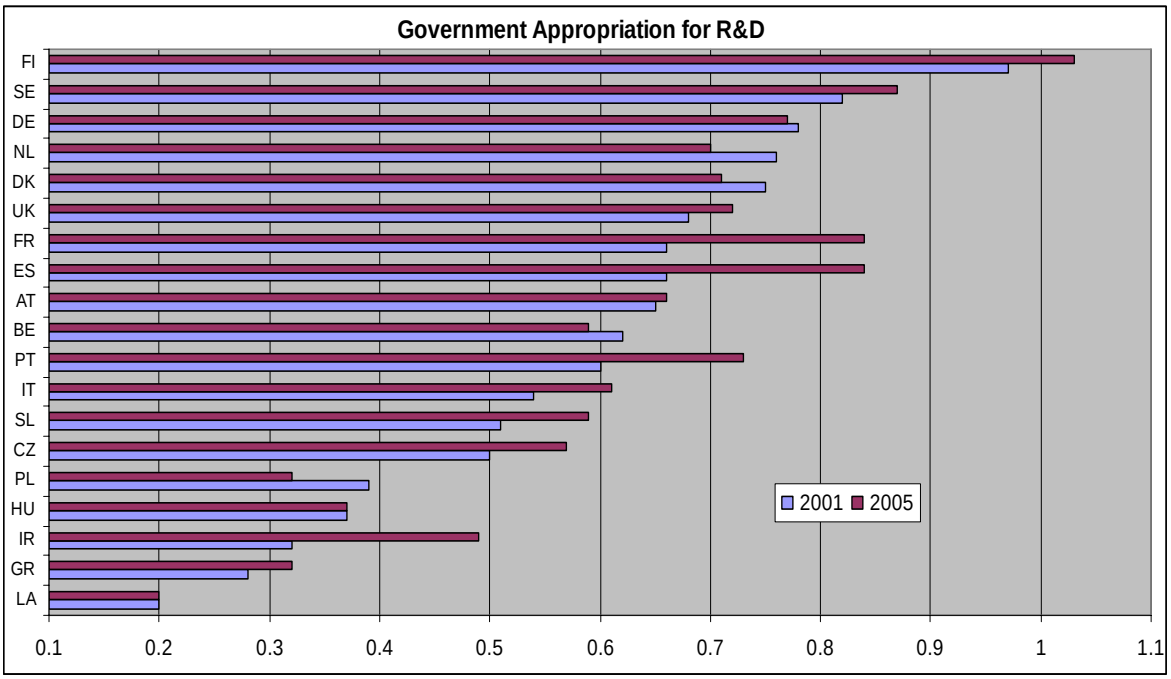
As Wessner (2004) has highlighted, it is the US government that have made many critical early investments in demonstration projects which have resulted in several new technology developments. It was government investment for example that created the forerunner to the internet, Arpanet, and which built the Global Positioning System. In spite of these positive effects of government supported R&D, there are those who believe that government spending may 'crow-out' private R&D spending (David, et al, 2000; Wessner, 2004). They argue that R&D investment should be domain of the private sector. Industry invest in areas in which they hope that they will be able to realize commercial benefits and are more likely to pursue research results from the laboratory to products and services. Private R&D is desirous of producing technological knowledge used in the production of goods and services sold in private markets and is therefore more applied in nature as well as it concentrates on the development and commercialization phases of the innovation process. It however benefits from a knowledge infrastructure that is created partly by Government supported primary research. High investment by the private sector is therefore important in the entrepreneurial economy as it provides opportunities for the exploitation of basic research that otherwise would have perished on the shelves of research institutions.

In assessing this trade-off, the levels of R&D expenditure as well as the sources of the investments in the creation of knowledge for the two types of economies are compared. A high level of R&D investments is an indicator that a country is serious about investing in the creation of knowledge. This is seen as the 'new' input into the production process and is different from trying to achieve economies of scale for existing products. This then becomes an objective in their public policy for innovation and entrepreneurship. The first look is at the share of the government budget that is appropriated (budget provision) for R&D as a percentage of each country's Gross Domestic Product (GDP). Actual R&D expenditure by industry as well as from foreign sources is also singled out for comparison.

Figure 7.4a illustrates an overall trend of increasing government appropriations for R&D investments for both managed and entrepreneurial economies. Germany, Netherlands and Denmark have all experienced a decline in 2005 over their 2001 levels. These three entrepreneurial economies, however, fall only behind Finland and Sweden which have the highest appropriations in the EU. Finland has the highest R&D appropriations while Latvia has the lowest level in both time periods. In terms of the classification of the economies, the managed economies, with the exception of Spain, all have lower government appropriations for R&D expenditure as a percentage of their GDP in 2001 as well as in 2005, figure 6a. Most, however, with the exception of Poland, have either experienced small increases, in 2005 over 2001 levels or have remained constant.

The government appropriations show government support for Research and Development. However it is the money that is actually spent that makes the most difference in terms of its effect if any on economic development and growth. The next figure therefore outlines the actual spending on R&D by each country. The differentiation between managed and entrepreneurial economies becomes clearer in figure 6b when actual expenditure on R&D is compared.

Figure 7.4a: Appropriations for R&D by national governments
(Percentage of GDP)

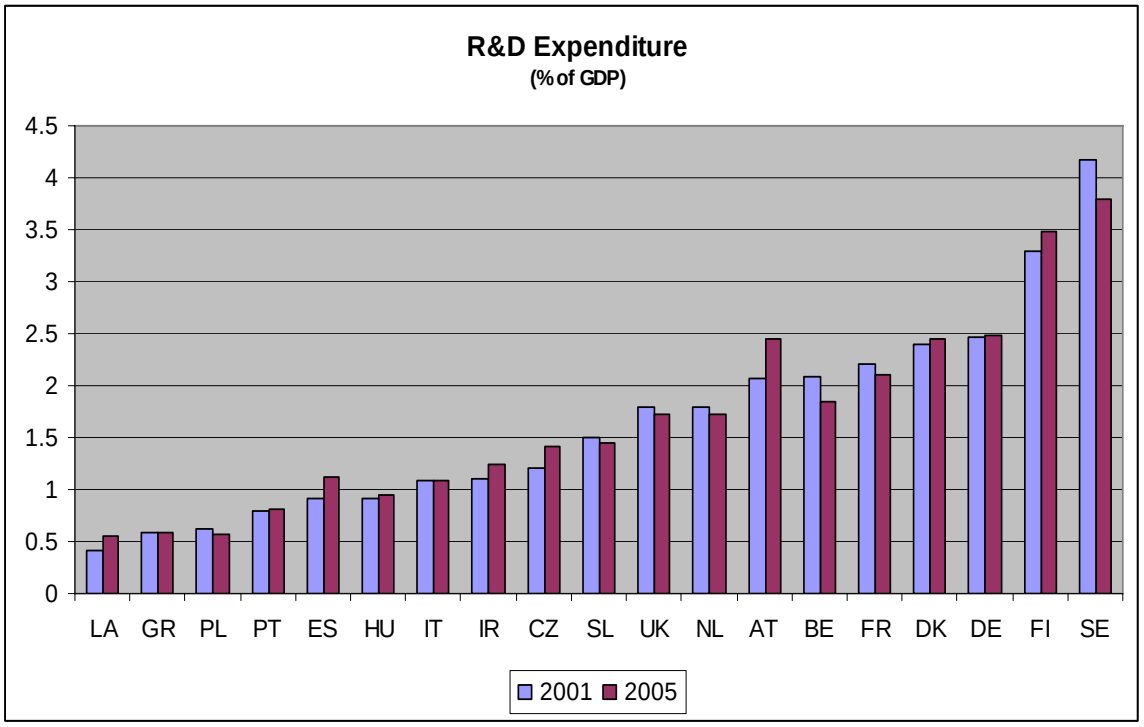


Source: Self elaboration

The entrepreneurial economies all but Ireland have higher percentages of expenditure on R&D than their managed counterparts. This is also one of the clearest signals of the trade-off between the managed and the entrepreneurial economy that has been proposed.

Another important dimension of R&D development is the sources of the funds that are invested. Sweden, Finland, Ireland and Germany have the highest percentage of R&D investment by industry while Latvia, Poland and Portugal have the lowest levels, figure 7.4b.

Figure7.4b: R&D expenditure

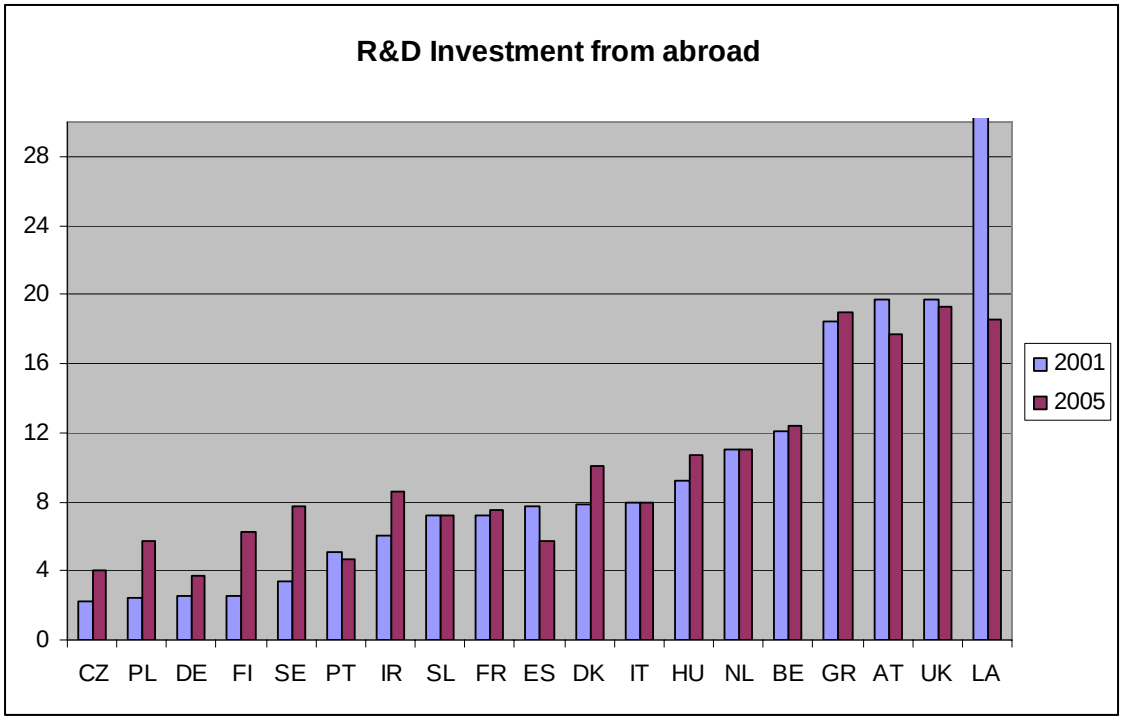


Source: Self elaboration

This suggests a fairly clear difference between the managed and the entrepreneurial economies with industry making greater contribution in entrepreneurial economies than in managed economies. The data depicted in both figures 7.4a and 7.4b are strong evidence on which P3 can be supported.

In terms of the contribution to R&D expenditures from abroad, figure 7.4c, there is however no clear demarcation between managed and entrepreneurial economies. Latvia, the UK, Austria and Greece all receive significant portions, more than 15% of their R&D expenditure from abroad. Czech Republic, Poland, Germany and Finland has the lowest contribution to R&D expenditures from sources abroad which indicate that local sources, government or industry make significant contributions to R&D in these countries.

Figure 7.4c: R&D Investment from abroad



Source: Self elaboration

Policy Objectives

In keeping with the broader EU declaration of achieving a global increase in R&D spending in member countries; all the countries have increasing R&D expenditure as a key objective in their policy for innovation and entrepreneurship.

Another almost universal objective especially among the entrepreneurial economies is to increase the number of technology-based or fast growth start ups. Denmark, for example, has stipulated that one of its objectives is to be the leading entrepreneurial society in the world where the most growth enterprise is launched by 2015.

France, Germany, Netherland, Sweden and the UK although with less grand objectives all want to increase the level of technology-based start-ups in their economies. The increasing of R&D expenditure has all the potential to lead to increase in the rate of start-up of technology-based enterprises by utilizing the outcome of the efforts from R&D efforts (European Trend Chart on Innovation, 2000- 2005).

However as Henrekson and Rosenberg (2001) and Acs et al. (2005) have pointed out, high levels of R&D expenditure do not always translate to expansion in the creation of new technology-based firms even in the presence of government support schemes. This dilemma therefore makes another set of related objectives very relevant in the transformation to more entrepreneurial economy.

They include: Promote technology transfer from public research to industry; Increase the use and commercialization of research results from public institutions; Creating better co-operation between industries who demand ideas from new knowledge and the public knowledge infrastructure that supplies it; Increasing commercialization of research results and ideas; Increase business's engagement in utilizing existing science base for ideas and talent (European Trend Chart on Innovation, 2000- 2005). In addition to creating knowledge it is also important to create mechanisms and infrastructure that is necessary to turn research results into innovative products and services that contribute to economic growth which is the ultimate goal for government.

Another important part of that infrastructure is ensuring that there are sufficient and adequately trained human resources that can engage in research and development as well as the individuals with the capacity to commercialize new ideas. It is therefore important that aspects of education development are advanced by both groups of countries. Indeed many economies, both managed and entrepreneurial, have included specific education objectives in their public policy for innovation and entrepreneurship.

7.2.4 LOW RISK VERSUS HIGH RISK FINANCE

P4. Risk capital will be more readily available in entrepreneurial economies than in managed economies.

Providing liquidity and other traditional means of financing to existing companies suffice in the managed economy, where there is certainty about what to produce and how that production structure should be organized. The economic process in entrepreneurial economies on the other hand is riddled with uncertainty, much of which arises from the fact that many ideas for projects are new and untested. It therefore requires new means of financing that are equipped to cope with the uncertainties and risks involved (Audretsch and Thurik, 2001). Private equity and venture capital (hereafter we use the term venture capital to refer to both) are financial mechanisms that are believed to be equipped to handle these higher levels of uncertainty.

A vibrant venture capital industry is considered to be an important element in the 'supportive infrastructure' which is necessary to sustain innovation and the entrepreneurial economy. It is required to provide robust supply of risk capital to develop enterprises based on evolutionary or even revolutionary ideas. Venture capitalists are better able to reduce information asymmetry[29] through rigorous assessment of ideas before providing capital and then careful monitoring afterward through active involvement in the management of the ensuing enterprises (Fenn and Laing, 1998).

[29]Asymmetry in information is the result of the difference in knowledge base of scientists that create innovative ideas and managers who usually have the responsibility to market such ideas.

Traditional banking institutions are not equipped to do this even in the countries such as Germany which allows banks to hold equity in private enterprises (Audretsch and Thurik, 2001). They have neither the specialization nor the focus that is required to reduce information asymmetry.

Dependence on traditional financing institutions as the source of financing would mean that many new technology-based firms with no tangible assets nor cash flow but with the potential for high growth and profits would not receive the financial support that they need. Even in the rare cases when financial support is given, it comes with such cumbersome conditions which often hamper their development (Fenn and Laing, 1998). Venture capital organizations, on the other hand, have the critical expertise necessary to reduce 'information gap' and can therefore more 'adequately' assess the potential of ideas for new technology-based firms which are presented to them for financing. They also encompass managerial skills necessary to help the new firms develop and succeed (Lerner, 1998).

A vibrant venture capital industry has been credited as a critical component in the development of the entrepreneurial economy in the USA. Its significance has often been singled out in the development of Silicon Valley and other such phenomenon (Kenney and Florida, 2000). Venture capital markets have not evolved in Europe to the same extent that it has in the USA. The UK stands out as having the most developed venture capital industry in Europe. Although all the countries in this study, both managed and entrepreneurial economies, have developed venture capital markets, the levels of sophistication lag behind that of the USA.

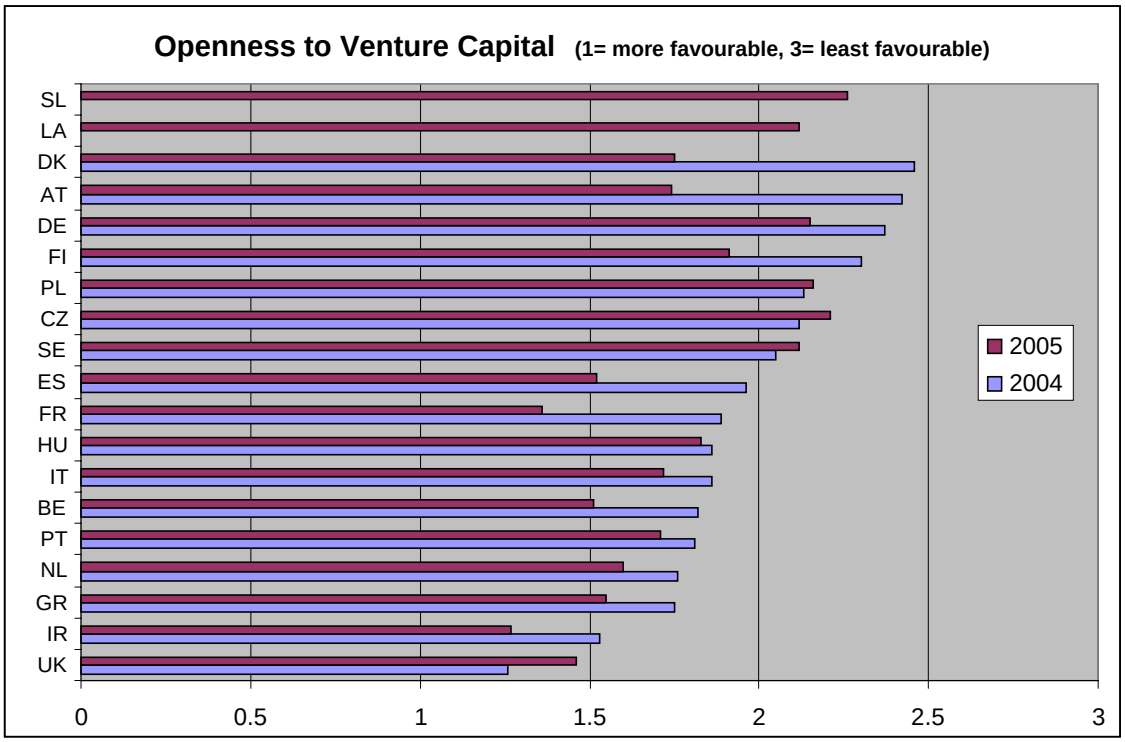
Further development and evolution of the venture capital markets in many countries is said to be inhibited by existing national tax and legal impediments (EVCA, 2006).

The European Venture Capital Association (EVCA) has created an index of the extent to which taxes and other legal impediments hamper the development of this segment of the financial sector. The index is based on a selection of factors including tax and legal environment for limited partners and fund managers, tax incentives for venture capital investments and fiscal R&D incentives, all of which can impede the development of a well functioning venture capital market. Although only a fraction of all possible areas that can impact the venture capital industry is covered, it is believed that improvements in these areas will not only nurture the industry but lead to better functioning of national as well as European level venture capital markets. Figure 7.5a shows where each country[30] falls in terms of these factors.

The UK and Ireland shows the most favourable regulatory attitudes for venture capital activities. Sweden together with Germany, Poland and the Czech Republic at the other end, rank among the least favourable places for venture capital investments. The location of Sweden at this level is quite interesting as Sweden has one of the highest venture capital investment rates in Europe as will be shown later. It therefore means that in addition to legal restrictions on holding of high-risk instruments by pension or mutual funds and high capital gains taxes other factors are important. Barriers to the consolidation of the stock market are also important to this development due to the significance of attractive exit routes to venture capital investors (de Serres et al., 2007).

[30] Data for Latvia and Slovenia is missing for 2004.

Figure 7.5a: Country score for the openness to venture capital



Source: Self elaboration

Denmark and Austria together with France and Spain and to a lesser extent Belgium have undergone significant reforms to improve conditions for the development of their venture capital markets in 2005 when compared with 2004. Figure 7.5a therefore does not present any strong demarcation between managed and entrepreneurial economies in terms of attitude towards venture capital.

Financing in stages

It is generally accepted that venture capital is a major source of funding for new technology-based firms. Freear and Wetzel Jr., (1990) have however pointed to the existence of a gap in the financing of projects by venture capitalist. Using a sample of new technology-based businesses (NTBS) from the USA, they showed that private individuals and not venture capital funds were the chief sources of financing for the seed and start-up stage deals. This gap is confirmed by among others, Acts and Tarpley Jr, (1998), who have shown that a shift from investment in early stage deals to later stage deals has created a widening of the equity gap even as the average size of investments has risen steadily. Since the USA has the most developed venture capital industry from which other markets take their cues, it is fair to expect that similar trends can be found in the various European markets.

The ability to attract seed and early stage financing is crucial in determining the levels of new business creation that is experienced by each country. Since venture capital funds are focusing more on later stage deals, start-ups must attract early stage[31] financing from other sources. This equity gap is filled by informal or angel investors, who though investing less in dollar amounts than VC funds, are crucial to the seed and early stage deal financing, before such entities become attractive to VC funds.

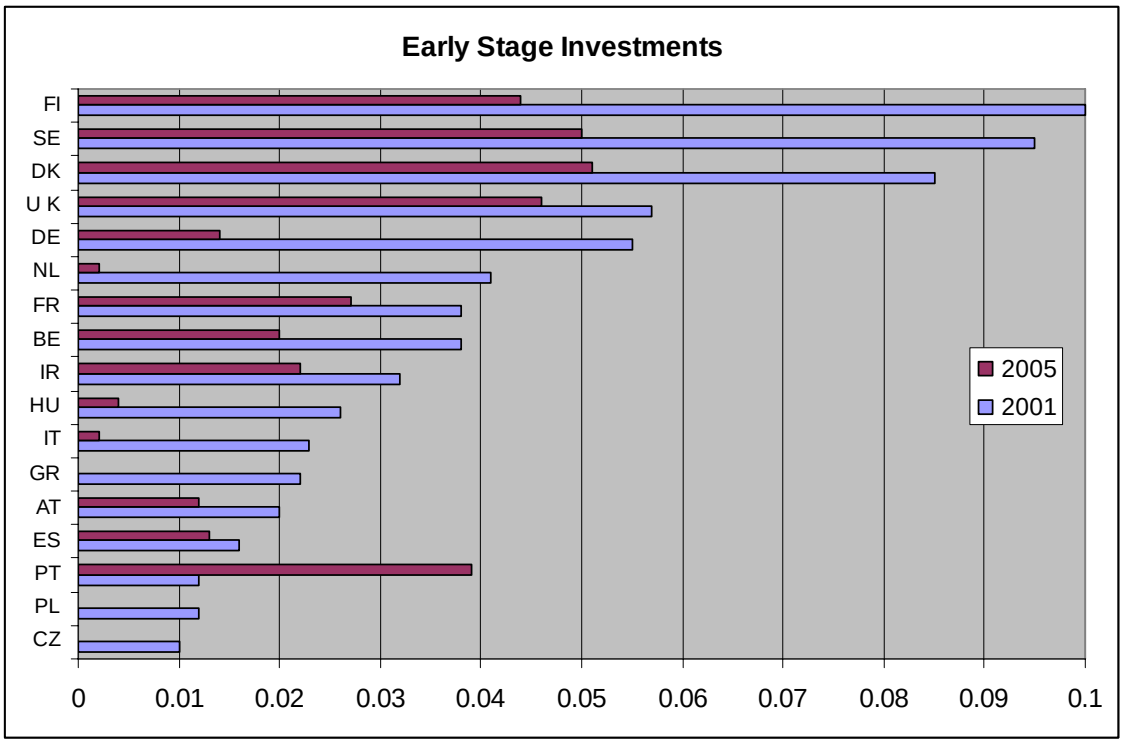
[31] Early stages include seed and start-up, everything else, including buy-outs and buy-ins, is included in the expansion category.

The angel investment sector is even less developed than VC in EU and so even though all our countries have some kind of 'angel network' it is still very unclear the extent of angels involvement in the financing of investments in these countries. These conditions have warranted more government involvement in the VC industry. In addition to paving the way for the proper functioning of the venture capital industry, governments actively participate through direct or indirect provision of resources especially in the seed stages and early stages of new technology based start-ups (OECD, 2005).

Figure 7.5b shows a decreasing trend in the financing of early stage investment from venture capital sources. This trend cuts across both managed and entrepreneurial economies. Of the countries[32] for which the data is available, only Portugal has seen an increase in early stage financing in 2005 when compared to 2001 levels. However in terms of the extent of the declines, entrepreneurial economies have experienced greater decline with Germany, Finland, Sweden and Denmark experiencing some of the largest levels of decline. A few managed economies, Czech Republic, Poland and Greece failed to attract any private venture capital investment in early stage deals in 2005.

[32] Data on venture capital activities is missing for Latvia and Slovenia.

Figure 7.5b: Venture capital investment in early stage deals in 2001 and 2005



Source: Self elaboration

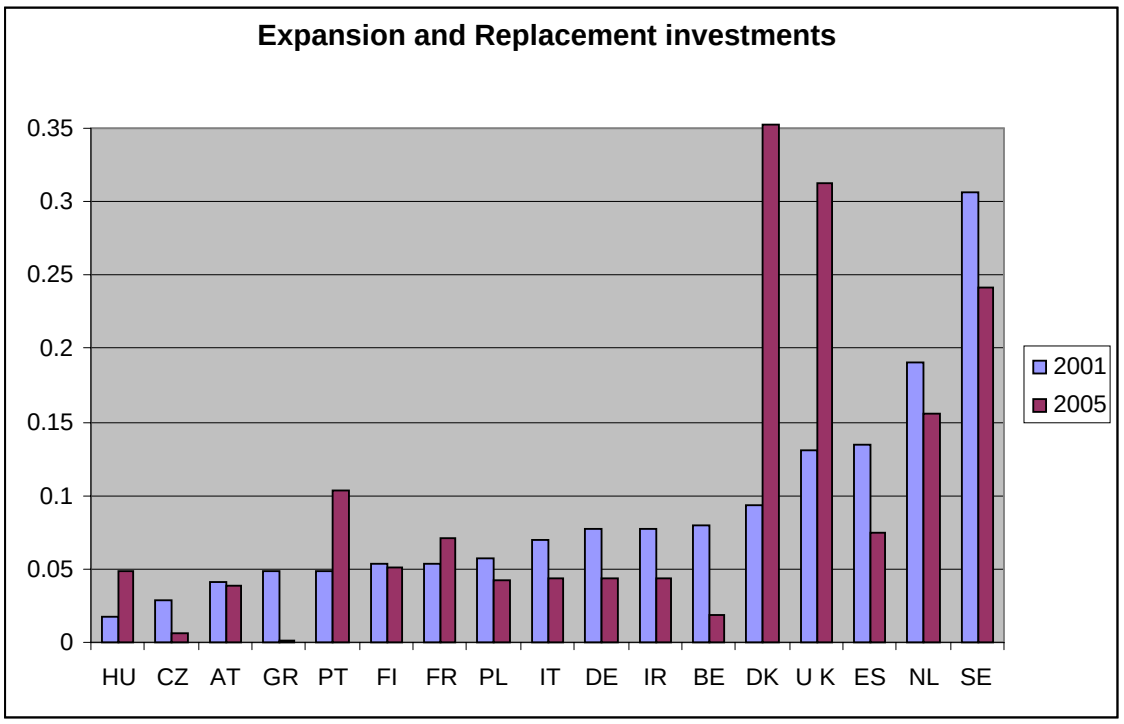
In the case of replacement and expansion stage[33] activities, figure 7.5c shows that investments percentage are indeed higher across the both types of economies. Compared with the early stage levels in figure 7b investments in expansion and replacement stage are ahead of that of early stage in all countries without exception in both years.

This would therefore seem to indicate that the trend that has been described as existing in the USA may have also happened in the EU. In the comparison of expansion investments in 2001 and 2005 in figure 7.5c, there appears to be a general increase in both managed and entrepreneurial economies.

[33] Information on buy-out activities is not included.

Denmark have experienced phenomenal increase in investments in expansion deals between 2001 and 2005, moving from .094 % in 2001 up to .325 % of GDP in 2005, an impressive 246 % increase Other countries that experienced growth included the UK also with impressive increases, and Hungary and Portugal. The biggest declines were in the cases of Spain, Sweden and Belgium.

Figure 7.5c: venture capital investment in expansion and replacement deals



Source: Self elaboration

It is important to note that a significant portion of investments in later stage deals represent funds that have been channelled into buyouts. Unfortunately the data from Eurostat does not include buyout investments.

Figure 7.5c therefore provides a less than perfect picture of the situation at this stage of the investment process, especially for countries where a significant portion of expansion and replacement investments are channelled into buyouts. For example in 2005 more than 70% of Spain and Hungary's investments at this stage went to buyouts while the amount was approximately 50% in the case of Germany (Private Equity in Europe, 2005, BVK). France, Netherlands the UK and Sweden also had high allocations to management buyouts in 2005 (EVCA).

Even considering the declining rates of investment as outlined in figures 7.7b and 7.5c, there is a rather strong difference in the level of investment or activities between the managed and the entrepreneurial economies. As proposed, there appears to be more vibrant risk capital activities in entrepreneurial economies. Although there is some activity in managed economies, the evidence provides strong support for P4.

7.3 SECTION SUMMARY AND CONCLUDING REMARKS

Based on the selected variables and excluding Luxemburg, it was possible to separate the countries into two groups of economies. Some variables were however more important in differentiating between the two groups. The most important variables were not surprising as they signify the adoption of a knowledge economic framework. These variables include knowledge jobs, investment in research and development and the number of patents granted. More importantly, these factors also represent strong public policy emphasis especially of targeting inputs, which is one of characteristics of the entrepreneurial economy. The other objective for this section of the study was to identify the four trade-offs, regulations versus stimulation, national versus local policy, targeting out versus targeting inputs and low risk versus high-risk capital, (specifically in public policy concerning Entrepreneurship and Innovation), that has being proposed. The general proposition is that the four basic trade-offs in public policy, that characterize and separate the managed and the entrepreneurial economic structure, can be identified in the two groupings of countries.

P1.Entrepreneurial economies will be less regulated than managed economies.

The data shows that in general managed economies have higher levels of regulations than their entrepreneurial counterparts. This is based on the aggregate ETCR which signal higher levels of public ownership, entry barrier and vertical integration in energy transportation and telecommunication sectors. The factors hinder competitiveness at the detriment of prospective entrepreneurs. There are some exceptions to this trend though as there are entrepreneurial economies such as France with relative high levels of regulations.

At the same time Spain as a managed economy have ETCR regulatory restrictions in line with entrepreneurial economies such as Belgium and Finland and doing better than France and Ireland[34]. Despite this there is a clear separation between managed and entrepreneurial economies which is strongest at the extreme ends of the spectrum. This is also the case in terms of the extent of internationalization, with lower FDI intensities in managed economies and higher intensity in the entrepreneurial one. The middle grounds become a little murkier however with high and low FDI intensities scattered across countries from both groupings of economies.

P2.Public policies are formulated at the local or regional levels in entrepreneurial economies and at the nationally in managed economies.

Public policies are generally likely to be developed, in more instances, at local or regional levels in the entrepreneurial economies than is the case in the managed economies. Some countries such as Germany, Spain and France have existing political divisions/organizations which are better equipped to facilitate this process. However, even among these countries there exist differences in the strength of the national and local or regional level policy development mechanism. France and the Netherlands can be considered to have well organized regions but do not show strong signs of regional public policy competences. On the other hand Sweden with less traditional political organizations, have been able to successfully create regional authorities with sufficient competences in public policy development.

[34] This is based on 2003 data, the latest year for which this data is available.

The former planned economies suffer from a lack of regional authority with the required competences for public policy development and implementation. Efforts to develop these capabilities began in preparation for their entry into the EU, and have continued as part of UE wide strategy. Newly created regional bodies are not as strong as their counterparts in places such as Germany due to its political federal system, or Spain with its autonomous regions, and therefore have less authority for public policy development and implementation. However, this supposed disadvantage is not obvious. The differences between the two groupings of economies are not that sharp even at the extremes based on the variable used. In terms of numbers however there are more managed economies with lower regional government spending than there are entrepreneurial economies. With the exception of Spain, they therefore continue to have their public policy objectives predominantly dictated by the national government.

As newly created regional authorities become more competent in public policy creation and implementation, this is expected to change giving more authority to regional governments. However as is the case with some entrepreneurial economies, national government may very well continue to dictate public policy objectives if only because they control the largest portion of the national budget and the political influence of local authorities remain weak.

P3.Public policies will targets inputs in entrepreneurial economies and will target outputs in managed economies.

R&D expenditure was used as the indicator of whether countries were targeting input in the form of knowledge creation and utilization or were concentrating on managing output. The entrepreneurial economies have higher overall levels of R&D appropriations than do the managed economies. This is in line with the expectation based on Audretsch and Thurik, (2001) proposal. Expenditure on R&D by industry also shows trends favouring entrepreneurial economies. The division is however less clear cut when R&D expenditure from abroad are analyzed. Here there is no clear difference between the two groups of economies. Although where the money comes from for R&D is important, it does not distract from the fact that entrepreneurial economies in general have higher R&D investments.

P4. Risk capital will be more readily available in entrepreneurial economies than in managed economies.

In the case of the system of finance, the analysis focused on venture capital investment activities. Government appropriations for R&D are generally higher in entrepreneurial economies than in their managed counterparts. The levels of venture capital investments are also higher for entrepreneurial economies than they are for those classified as managed with a few exceptions. Germany is the only entrepreneurial economy whose venture capital investments were lower than that of a managed economy (that of Spain). In terms of tax and other regulatory hurdles to venture capital investments, there is however less distinct demarcation between managed and entrepreneurial economies.

There are very clear differentiations between the managed and entrepreneurial economies for the tradeoffs. However these are strongest at the extremes. In the case of regulations against stimulations, the entrepreneurial economies with the lowest levels of regulations are well separated from the managed economies with the highest levels of regulations. There is however a set of economies that fall somewhere in the middle between these two extremes. These have neither the highest nor the lowest levels of regulations, and here there can be found both countries that are classified as managed as well as those that have been classified as entrepreneurial economies.

The situation with middle ground countries is a bit different in the case of the target of public policy for innovation and entrepreneurship, which look at expenditure on R&D; as well as regarding the system of finance where the venture capital situation of each country was analyzed. These two instances provide the strongest differences between the two groupings of economies. The location of public policy development, however, is not so clear cut since although the entrepreneurial economies have better regional competences in the area of public policy development, the size of their budget allocated to regions compared to the total national budgets remains fairly small which indicates that to a large extent it is the national priorities that take precedence.

Spain in several instances exhibit behaviours that are different from the other managed economies. This maybe attributed to this country's level of development. Although Spain maybe someway off behind the entrepreneurial economies in many factors, it is ahead of the other managed economies and is expected to move in that category in a few years at their present rate of development.

At the same time the European Commission is undertaking huge investments in infrastructures in the newer members including Poland, Hungary and the Czech Republic to bring about some kind of convergence in the economic structures among all member countries. This however will take many years to achieve although there may still be disparities among the member countries. While the formal institutions in the form of public polices may reach some level of convergence, the extent to which the informal factors will converge is not quite predictable. It is these latter factors which will probably make the greatest difference.

CHAPTER 8 QUANTITATIVE ANALYSIS

8.1 INTRODUCTION

Public policies in and of themselves do not create businesses nor produce innovations. They however help to create environments that provide opportunities for the business creation and avenues for innovation. They have the potential to affect both the supply and demand side of entrepreneurship and innovation. (See Verheul et al. (2002) for a detailed description of the supply and demand side of entrepreneurship). The public polices programs covered in this section include those in the previous section together with some new ones that will be described later. They however, are by no means the full set of interventions that are available to governments. They also do not include the full list of interventions that have been highlighted by Stevenson and Lundström (2001) and Lundström and Stevenson (2005) or the full set used in Hoffmann (2007)[35]. Instead the public policy programs included in this study is a unique set of interventions that deals with the trade offs in public policies that help to differentiate between managed and entrepreneurial economy as described by Audretsch and Thurik, (2001). The aim is to identify suitable proxies to these public policies and to determine if they have any measurable effect on the level of entrepreneurship and innovation as they have been operationalized.

[35] He has focused on the kinds of public policy that this thesis emphasized; Entrepreneurship policies rather than policies for SME.

8.2 MODEL & METHODOLOGY

The set up of this model is parallel to that of Van Stel et al. (2006), which they used to investigate the effect of business regulations on different measures of entrepreneurship for a sample of the countries that participated in the Global Entrepreneurship Monitor from 2002-2005. These authors developed models of the relationships using the variable, nascent entrepreneurship, as both dependent and independent in different specifications. We apply a similar approach with the variable, level of innovation, as both dependent and independent at different times. It is specified as a dependent variable in equation 2 after it appeared as part of the set of independent variables in equation 1. This is justified by the argument that the level of innovation activities as part of the 'entrepreneurial capital' that exists in a country or region will contribute to increase the rate of start-ups (Audretsch and Keilbrach, 2004).

Equations

1: $K = f(N, G)$

2: $N = f(G)$

K= Level of Entrepreneurship activity

N = Level of Innovation activity

G = vector of explanatory variables reflecting institutional effect in the form of public policy.

In equation 1, innovation is seen to be one of the factors influencing the proliferation of entrepreneurship in a way similar to the 'conversion effect' described by Van Stel et al. (2006). A country that demonstrates high levels of innovation activities is expected to have a high coefficient on this variable which is supposed to be a contributing factor for higher levels of entrepreneurship by proving more opportunities for persons to enter the entrepreneurial process. This however is not an automatic process. Countries such as Japan and Sweden which are considered high innovation countries with some of the highest investments in R&D do not have a corresponding high level of entrepreneurial activities (Acs et al ., 2005, Henrekson and Roine, 2007).

8.2.1 DEPENDENT VARIABLES

In the empirical application of the model, K, the level of entrepreneurial activity in a country is operationalize in two ways. It is operationalized as the entry rate of new firms as measured by Eurostat and EIM[36]. According to Eurostat, the entry rate of new firms is the number of enterprise births in the reference period (t) divided by the number of enterprises active in t. EIM define a new entry as 'new entrepreneurs who start a new 'activity' (company) or existing companies/entrepreneurs who start a new 'activity''. The number of new activities as described above divided by the total number of companies in a certain country gives their 'entry rate of new firms'.

[36] EIM data is substituted when the required data is not available from Eurostat.

The concerns raise in the literature about the lack of harmonization across countries regarding the registration of new firms is acknowledged. However regardless of why new businesses need to register, registrations signal the declaration of their official existence and in the absence of harmonized business start-up data base, provide decent indication of the rate of business start-up in a country (Hoffmann, 2007). The Eurostat database on business demographics is an effort to create such a harmonized database. However this database is in its infancy and is incomplete. The data from EIM is therefore used to supplement it as based on its description; they both are measuring the same thing despite the different expression.

The other indicator for entrepreneurial activity is the total entrepreneurship index (TEA) which is measured by the Global Entrepreneurship Monitor. TEA identifies the number of people who are entrepreneurially active in a given country. Entrepreneurially active is defined as '*adults in the process of setting up a business they will own (or partly own) and or currently owning and managing an operating young business*[37]' (GEM). It includes both nascent and young business rates (Reynolds et al., 2005, pp. 209). TEA therefore reflects not just initiating activities which are important in the entrepreneurial process, but more importantly it reflects the survival rate of new firms. It results from a standardized questionnaire administered in a large number of countries and therefore provides the advantage of reducing the problems involved in cross-country comparison. This data is taken from the Adult Population survey for 2001-2005. Details of the GEM methodology can be found in Reynolds et al (2005).

[37] A business less than 42 months old is considered to be a young business.

These two indicators for the level of entrepreneurial activity capture a large scope of all such activities that maybe taking place in an economy and fit with the definition of entrepreneurship adopted in this study. Total Entrepreneurship Index captures both nascent and young business entrepreneurship rate. However, it is possible that some of these businesses will not be formally registered and therefore are not counted in the 'official' number of enterprises that are registered in a country.

The entry rate of new firms is more likely to capture formally registered enterprises and therefore although there maybe some overlap between itself and the TEA index, the latter reflects another dimension. The enterprises that actually got started and registered in the country's registry of firms, represent part of the complex phenomenon of entrepreneurial activities and the one that is deemed to be more relevant in distinguishing between the managed and the entrepreneurial economies. They are also more likely to be the more innovative ventures or high-growth potential enterprises which Acs and Varga (2004) have suggested are most important for economic development.

N represents the level of innovation in a country and appears as both a dependent and explanatory variable as stated already. The amount of innovation activity can influence the availability of entrepreneurial opportunities in a country thus affecting total entrepreneurship levels. In the empirical application two representations of innovation are applied; the fastest growing technology companies and number of patent applications made by each country.

Fast growing technology companies is operationalized as the number of Technology Fast 500 companies produced by Deloitte Touché Tohmatsu (Deloitte) while patents is the number of patent applications[38] submitted to the European Patent Office as measured by Eurostat. Details on these variables are provided in table 8.1.

Table 8.1: Dependent variable descriptions and sources

Variable	Description	Source
TEA	The number of adults who are in the process of setting up a business they will (partly) own and or currently owning and managing an operating young business in a given country.	GEM
Entry rate of new business	The number of enterprise births in the reference period (t) divided by the number of enterprises active in t.	Eurostat, EIM
Patent application	The number of Patent applications submitted to the European Patent Office.	Eurostat
Technology Fast 500	The 500 fastest-growing technology companies in Europe[39]. Owners of proprietary intellectual property or proprietary technology that contributes significantly to the company's operating revenue, or devote a significant proportion of revenues to research and development of technology.	DTT

Note: GEM = Global Entrepreneurship Monitor

EIM = EIM Business & Policy Research (EIM BV), Netherlands

DTT= Deloitte Technology, Media & Telecommunications

Eurostat = European Commission Statistics

Source: Self elaboration

[38] This is different from the patent granted which was used in the clustering of the economies.
[39] They must have headquarters in a country in Europe

8.2.2 EXPLANATORY VARIABLES

Several variables make up the vector G in the empirical application of the model. These variables are taken from World Bank Doing Business, Eurostat, OECD, the Economic Freedom of the World 2007 Annual Report (Fraser Institute), the World Bank Development Indicators and various editions of the Global Competitiveness Report (GCR). These variables were selected to proxy the four tradeoffs areas in public policy that distinguished the managed and the entrepreneurial economies. They comprise six categories of variables, namely: Regulation including business, labour and regulations concerning internationalization; Regional Policy Development; Targeting Input through promoting Innovation and System of Finance. Table 4 provides detailed description of the individual variables that are used.

Regulation

The ETCR indicators measure restrictions to competition in five industries: electricity, gas, air passenger transport, rail transport, and telecommunications for the period 2001-2003. This is a subset of the full dataset which have been estimated at an annual frequency over the period 1975 to 2003 for 21 OECD countries. It is based on a number of published sources as well as on replies to the *OECD Regulatory Indicators Questionnaire* (for the 1998 and 2003 data points). The indicators cover transmission, distribution and supply in electricity and gas; infrastructure as well as passenger and freight services in rail transport; domestic and international routes in air passenger transport; long distance and mobile services in telecommunications.

In each industry (or industry segment), the indicators include the following low-level indicators: barriers to entry in all sectors; public ownership in all sectors; vertical integration in electricity, gas and rail transport; market structure in rail transport, gas and telecommunications. These are combined into an aggregate index as described in table 4a, which is used as an indicator for regulation.

Details on these variables are and the full spectrum of ETCR indicators is available at www.oecd.org/eco/pmr and in Conway & Nicoletti, (2006), Product Market Regulation in the Non-Manufacturing Sectors of OECD Countries: Measurement and Highlights. Economics Department Working Papers No. 530, www.oecd.org/eco/working_papers. The three indicators in this section are rated from 0-6 where higher values are indication of more restrictive regulations which are typical of managed economies and which should have negative impact on entrepreneurship.

Table 8.2a: Independent variables – Regulations (ETCR Regulations)

Variable	**Description**
ETCR aggregate	A composite index made up of a simple average of a, b and c described below. Higher values indicate more rigid regulations.
(a) Public ownership	Existing ownership structure in the various segments of electricity and gas ranging from fully private to fully public (including mixed ownership). The percentage of shares owned by government in the largest companies in rail and air transport and the extent to which government control the various post and telecommunication services.
(b) Entry barriers	Conditions for third party access and the extent of choice of suppliers for consumers. Free entry (with access fees paid to the rail network infrastructure), franchising to several firms and franchising to a single firm in the rail transport services. Liberalization of internal route and participating liberalization of access to regional routes and or the existence of an 'open skies' agreement with the Unites States in the passenger air transport sectors.
(c)All but public ownership	Market structure in gas, telecommunication and rail sectors- the market shares of the largest companies of the various segments of the industry; the market share of new entrants in each telecommunication service; franchising to several companies each operating as a local monopoly versus franchising to several firms who compete with each other in a given locale. Vertical integration in the energy and rail sectors- the degree of separation of activities ranging from full integration to separation into different companies owned by different shareholders.

Note continue: OECD= Organization for Economic Co-operation and Development

Source: Self Elaboration based on OECD data

World Bank Doing Business - Labour market regulation

This area measure the flexibility of labour regulations. It looks at the difficulty of hiring a new worker, the difficulties involved in firing a worker and rigidities that exist in the regulations regarding working hours. For a detailed description of these variables see Botero at al. (2004), available at (www.doingbusiness.org).

Higher values for these variables are indications of more rigid labour regulations which are expected in managed economies and which should contribute to lower levels of entrepreneurial activities.

Table 8.2b: Independent variables – (Labour regulations)

Variable	**Description**
Employment rigidity, Index	A composite index made up of a simple average of a, b and c described below. Higher values indicate more rigid regulations.
(a) Difficulty of hiring, Index	The difficulty/flexibility involved in hiring a new worker.
(b) Difficulty of firing, Index	The difficulty/flexibility involved in firing a new worker.
(c)Rigidity of hours	Restrictions on changes that can be made to the number of hours worked.
Cost of firing	The cost of advance notice requirements, severance payments and penalties due when terminating a redundant worker, expressed in weeks of salary.

Source: Self Elaboration

Based on World Bank Doing Business data (www.doingbusiness.org)

To supplement these two indicators of a country's regulatory conditions, a third indicator is used that of business regulations from the Economic Freedom of the World Report which is available at (www.freetheworld.com/release.html) and described in table8.2c.

Internationalization

The variable internationalization is intended to expresses the extent to which public policies are geared towards increasing the international activities of local enterprises on the one hand and encouraging the presence of foreign investors on the other. Through such policy initiatives, means are created to promote the growth and competitiveness of businesses. Three indicators are included in this area, FDI intensity and foreign and foreign ownership restrictions. The FDI data comes from Eurostat (www.eurostat.eu) and foreign ownership restrictions is from the Global Competiveness Report (www.weforum.org).

Regional Policy Development

This variable measures the extent to which local or regional government is involved in the making of public policy. This is a rather difficult area to assess. The percentage of the total general government expenditure which is assigned to state or local government expressed as a percentage of GDP is used as this indicator. A higher percentage is an indication of greater local/regional involvement in the process of governing and proxy the extent to which local or regional government is able to make policy decision. This is a new application to proxy the extent to which regional governments is involved in the making of public policy. However as outlined earlier, it is one indication of the level of responsibility that regions take on and give real indication of their involvement in the formulating of public policy.

Table 8.2c: Independent variables – Regulations and Regional policy development

Variable	Description	Source
FDI intensity	An average of inward and outward Foreign Direct Investment flows divided by gross domestic product (GDP). The index measures the intensity of investment integration within the international economy. Data are expressed as percentage of GDP to remove the effect of differences in the size of the economies of the reporting countries.	Eurostat
Business regulation	A composite index of 7 components to identify the extent that regulations and bureaucratic procedures and regulatory constrains limit competition and the functioning of the market. Higher score indicate a more market driven economy.	EFWR
Foreign ownership restriction	Foreign ownership of companies in your country is (1= rare, limited to minority stakes and often prohibited in key sectors, 7 = prevalent and encouraged).	GCR
Local/Regional public policy	Percentage of total government expenditure assigned to local or state government.	Eurostat

Note: EFWR= Economic Freedom of the World Report 2007, GCR= Global Competitiveness Report

Source: Self Elaboration

Targeting input

This topic addresses the extent to which the creation of new knowledge is a target of public policy. The indicators are government budget appropriations or outlays for R&D (GBAORD) as a percentage of GDP. GBAORD refers to budget provisions, not to actual expenditure and is a measure of government's support for R&D; Higher Education R&D expenditure (HERD); government expenditure on scholarship for all tertiary level studies (SCHL); and University/Industry research collaborations (UISC).

R&D appropriation and expenditure are taken from Eurostat, scholarship data is from the OECD and the university/industry research collaborations is taken from Global Competitiveness Reports. Higher values for all these indicators signal a public policy framework that is serious about promoting innovation through the creation of new knowledge as a way to increase economic activities thereby proving greater opportunities for entrepreneurship.

Table 8.2d: Independent variables – Targeting input/Promoting innovation

Variable	**Description**	**Source**
Government appropriations for R&D as % of GDP	Government budget appropriations or outlays on R&D (GBAORD) refer to budget provisions, not to actual expenditure expressed as a percentage of GDP.	Eurostat
Scholarship for tertiary studies	Financial aid from all levels of government expenditures (excluding loans), extended to students at all tertiary level in all educational programs.	OECD
Higher Education R&D expenditure	R&D expenditures include all expenditures for R&D performed within Higher Education sector on the national territory during a given period, regardless of the source of funds shown as a percentage of GDP.	Eurostat
University/industry research collaboration	In its R&D activity, business collaboration with local universities is (1= minimal or nonexistent, 7 = intensive and ongoing)	GCR

Source: Self elaboration

System of Finance

This topic explores issues related to the availability of risk financing. The perceived availability of venture capital financing, actual venture capital investments in different stages as well the capitalization of the stock market which serve as an exit root for venture capitalist are the indicators in this area. Higher values indicate that (it is perceived that) venture capital funds are 'readily' available to entrepreneurs/innovators and suitable exit routes are available to investors. Entrepreneurial economies are expected to have higher values which should therefore contribute to increased investments activities among these groups.

Table 8.2e: Independent variables - Financial Indicators

Variable	**Description**	**Source**
Venture capital (Seed & Start-up and Expansion and Replacement)	Private equity raised for investment in companies broken down into two investment stages: Early stage (seed + start-up) and expansion and replacement capital as a percentage of GDP (gross domestic product at market prices). Management buyouts, management buyins and venture purchase of quoted shares are excluded.	Eurostat
Capitalization of stock market	Market capitalization of listed companies as a percentage of GDP.	World Bank Development Indicators
Venture capital availability	Entrepreneurs with innovative but risky projects can generally find venture capital in your country (1= not true, 7 = true).	GCR

Source: Self elaboration

Control Variables

As we have stated in earlier sections, there is a myriad of factors that influence and affects the level of entrepreneurship and innovation activities in a country. In this study we focus on a small segment of these determinants.

To reiterate, we concentrate on those determinants that are good proxies for the four areas of public policy trade-off that form part of the differentiation between managed and the entrepreneurial economies. Since it is impossible to include all the control variables and in keeping with the aim of the study to analyze the relationships in the two groups of economies, regressions are performed on each group of countries independently. Two factors that remain diverse among the countries in each group and which have been highlighted in the literature, economic growth and population growth will however be included as control variables in the analysis (Van Stel, et al., 2006).

Economic Growth

Economic growth provides opportunities that lead to increase demand for goods and services and thereby creates a push factor for entrepreneurship (Reynolds, Storey, Westhead, 1994). Reynolds et al. (2002) have pointed out that fluctuations in the business cycle at least in the short term have important impact on the opportunities for new entrepreneurs to enter the economy. It has also been pointed out that economic growth and development contributes to increase income and stronger buying power of consumers in a society. This can have the effect of creating more discerning consumers who demand not just better quality products but also more advanced products creating a need for more innovation. This therefore suggests that economic growth should have a positive impact on the dependent variables.

Population Growth

Growing populations create increases in consumer markets which by themselves create opportunities for new economic activities thereby potentially having a positive impact on the level of entrepreneurship (Armington and Acs, 2002). An increasingly important part of population increase in many countries around the world, including those in Europe, is the result of immigration. This also have an additional potential impact on entrepreneurship activities as it has been documented that many immigrants turn to entrepreneurship as a way of creating employment for themselves in their adopted countries (Boissevain and Grotenbreg, 1988; Valenzuela, 2001).

Table8.3: Control variables

Variable	Description	Source
Population growth	Population growth rate or average annual rate of growth. This is the average annual percent change in the population, resulting from a surplus (or deficit) of births over deaths and the balance of migrants entering and leaving a country. The rate may be positive or negative.	US Census Bureau IDB
Economic growth	Annual change in GDP volume. Growth of GDP volume calculated using data at previous year's prices. This calculation of the annual growth rate of GDP volume allows comparisons of economic development both over time and between economies of different sizes, irrespective of changes in prices.	Eurostat

Notes: US Census Bureau IDB = United States Census Bureau International Data Base

Source: Self elaboration

It is important to point out that the variables described above and that will be used in this section of the analysis are not identical to those used to cluster the countries into managed and entrepreneurial economies. There remain however, many similarities between these two set of variables.

The idea is to use variable such 'Knowledge jobs' which represent a state that the economy have already reached in the clustering. For the regression analysis, realized objectives such as the entry rate of firms and patent application will be used as dependent variables. Spending on R&D and funding for tertiary studies on the other hand represent the efforts being made to achieve a particular state (whether be more business entry or more patent application) and so those become the independent variables.

8.3 METHOD OF ANALYSIS

The study aimed to estimate equations 1 and 2 using the explanatory variables that were described earlier for 19 European Union member countries for the period 2001-2005. The analysis was challenged by missing data and decisions on the best way to treat them. Several countries participated in the GEM survey only once or twice in this time period and at least one country, Luxembourg, has never participated. Data for the OECD ETCR regulations is only available up to 2003 and is missing for the most part for the newer members of the EU, including Czech Republic, Hungary and Poland as well as Luxemburg. This is however an important variable for this study as it systematically quantifies areas of regulations such as public ownership and market structure. These are important especially regarding the first of the four trade-offs which deals with regulation and which is not easily replaced. Despite the limitations, this variable is kept in the analysis and the values for both 2004 and 2005 are set equal to those of 2003.

One data point is available for the Czech Republic; this score is applied for all the other countries, (all of which are former planned economies) and for all the time periods. There are also other missing values for some variables relating to the system of finance for Luxemburg and Latvia and Slovenia. Luxemburg was removed from the cluster analysis in section one because of extreme values that distorted the analysis. It was also removed from this section of the analyses due to significant numbers of missing values on key variables including the dependent variables. Latvia and Slovenia were however kept in the analysis with the missing values simply ignored. The resulting data set of both time-variant and time-invariant variables resulted in a balanced panel of 95 observations whose distribution over the countries is presented as appendix A. The combination of factors relating to missing data means however that only 81 observations for the analysis involving the TEA score as dependent variable[40]. The correlation matrix for the variables is presented as Table 8.4. It shows that there are significant correlations among many variables. However, because of how the analysis is structured, a factor analysis was not deemed necessary.

The analysis departs from base regressions containing the control variables and the dependent variable represents entrepreneurship and innovation[41]. It proceeds with a series of preliminary regressions with each of the independent variables added individually.

[40] There is also a reduction in the number of observations in the regressions involving financial data.
[41] In the second model where patent is the dependent variable, population growth is not included as a control variable. Patent is measured per million of population therefore changes in the population would have already been captured by the nature of how this variable is measured.

From these first rounds of regressions, statistically significant variables, (significant in either group), are selected to represent each of the four areas of public policy; regulations, regional policy development, system of finance and targeting input, to be included in the final regressions. Final regressions were then created with the significant variables from the first round. In the full equations, the independent variables are tested for multicollinearity and where two variables test significant for multicollinearity effects and where both appears to have an impact on the relevant dependent variable, the one with the strongest level of significance is kept and the other eliminated from the regression.

A deliberate exclusion from the analysis is 'poor country' dummies or dummy variables representing former planned economies. This decision was guided by the following reasoning: The data used in this analysis is taken from the period 2001-2005. This is more than ten years after the collapse of communism and the adoption of a market economy framework by former planned economies. In their bid to join the European Union in 2004, these economies have undergone momentous transformation with significant contributions from the European Commission. They have experienced significant increases in for example the number of business start-ups.

GEM data (for participating countries) shows that these Eastern European states have shown in many instances even greater levels of entrepreneurship activities than some traditional market economies. Economic growth data also shows that these newer members of the EU have demonstrated higher levels of growth than older members. This also provides opportunities for entrepreneurship activities as stated earlier.

Also through the sorting of the analysis by group of economies, it ensured that more alike economies are compared with each other which should lessen if not eliminate any impact that their former economic structures may have on the outcome of the analysis.

Table 8.4: Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1.TEA	1.00																					
2. Entry rate of new firms	..35*	1.00																				
3. ETCR	.07	-.02	1.00																			
4. Business regulations	-.01	.15	-.51*	1.00																		
5 .Employment rigidity	-.20**	-.37*	.45*	-.19**	1.00																	
6. Cost of firing	-.12	.09	.21*	-.19**	.49*	1.00																
7. FDI intensity	.04	.13	-.33*	.31*	-.25*	.08	1.00															
8. Foreign ownership	.21**	.34*	-.48*	.59*	-.39*	-.02	.45*	1.00														
9. Reg Gov Expd	.08	.11	-.49*	.49*	-.21*	-.39*	.15	.31*	1.00													
10. Seed & Start-up	-.05	-.10	-.22*	-.06	-.02	-.13	.03	.19**	.04	1.00												
11. Expansion capital	.21**	-.16	.15	-.09	-.067	-.08	-.05	.22*	-.23*	.47*	1.00											
12.Capitaliation of stock market	.01	-.01	-.74*	.56*	-.22*	-.03	.52*	.49*	.36*	.18**	-.03	1.00										
13. Buy out	-.06	-.19**	-.55*	.21*	-.12	-.17	.19**	.31*	.36*	.29*	.28*	.61*	1.00									
14. Venture capital	.04	.20*	-.57*	.49*	-.26*	-.07	.34*	.51*	.36*	-.11	-.33*	.57*	.22*	1.00								
15. Patents	-.16	-.17**	-.70*	.61*	-.26*	-.36*	.34*	.35*	.55*	.16	-.09	.69*	.47*	.57*	1.00							
16. GOARD	.24*	.24*	.74*	-.48*	.14	.09	-.27*	-.24*	-.51*	-.25*	.01	-.74*	-.62*	-.43*	-.77*	1.00						
17. HERD	.15	.28*	.78*	-.68*	.21*	.39*	-.28*	-.47*	-.50*	-.21*	.01	-.68*	-.51*	-.58*	-.85*	.76*	1.00					
18. UIC	-.03	-.06	-.62*	.50*	-.32*	-.19**	.33*	.55*	.44*	.13	-.07	.59*	.39*	.69*	.77*	-.60*	-.73*	1.00				
19. Population growth	.24*	-.02	-.33*	.22*	-.26*	-.08	.39*	.32*	.04	.34*	.23*	.57*	.25*	.33*	.42*	-.39*	-.37*	.39*	1.00			
20. Economic growth	.28*	.33*	.51*	-.05	.09	.17	-.06	-.02	-.27*	-.44*	-.19**	-.38*	-.53*	-.16	-.50*	.71*	.52*	-.37*	-.33*	1.00		
21. Techno fast 500	.01	.11	-.33*	.20**	-.17**	.02	.08	..38*	-.03	.19**	.27*	.53*	.49*	.36*	.22*	.29*	.16	..32*	.34*	-.15	1.00	
22. SCH	-.20**	-.14	-.42*	.23*	.09	.11	-.11	-.00	.42*	.23*	.10	.15	.39*	.17	.57*	.43*	..35*	..32*	-.07	-.35*	..20**	1.00

* P<.05, ** P<.10

Three basic frameworks are proposed for estimating longitudinal or panel data. They are Ordinary Least Square (OLS) method; the fixed-effect approach and the random-effects method (Hill et al, 2008 chp 15; Hsiao, 1989). The random-effect model assumes the individual specific effect (μ_i) as well as the time specific effects (λ_t) to be randomly distributed. The fixed-effect model on the other hand assumes the individual specific effects (μ_i) to be constant across time and the time-specific-effects (λ_t) to be constant across individuals. Ordinary least square estimations do not assume neither individual nor time-specific effects.

The result of a Breusch and Pagan Lagrangian multiplier test however confirmed the poolability of the data. Very low F-values further attest to the poolability of the data resulting in the use of OLS estimations with robust standard errors. The relationships were analyzed based on clusters (or group) designating managed economies and entrepreneurial economies. Wooldridge test for autocorrelations in panel data was not rejected for any of the specifications of the two models. In the specifications of the models other functional forms of the explanatory variables such as square and natural logarithm are applied to ensure that variables were normally distributed. Each regression within both models pass Skewness-Kurtosis test of normality. In a test of the robustness of the results I also applied random and fixed-effects models[42] as well as OLS with panel corrected standard error.

[42] The inclusion of country dummies meant that degrees of freedom were lost which resulted in less ability to predict significance. Fewer independent variables showed significant impact on the dependent variables.

The main results are generally robust among the various methods of estimations with the major difference being slight differences in the size of the recorded standard errors. In the end a simple and parsimonious model was used, the results of which are presented here. In line with the aim of this study several hypotheses are tested based on the two clusters of economies. Once again the hypotheses as already stated in *chapter 5, (but separated into parts a and b here since they are evaluated separately)* are that:

H1a: Regulation will have positive effect on entrepreneurship in entrepreneurial economies

H1b: Regulation will have positive effect on innovation in entrepreneurial economies

H2a: Regulation will have negative effect on entrepreneurship in managed economies.

H2b: Regulation will have negative effect innovation in managed economies.

H3a: Regional government expenditure will have positive effect on entrepreneurship in entrepreneurial economies.

H3b: Regional government expenditure will have positive effect on innovation in entrepreneurial economies.

H4a: Regional government expenditure will have negative effect on entrepreneurship in managed economies.

H4b: Regional government expenditure will have negative effect innovation in managed economies.

H5a: Targeting input will have positive effect on entrepreneurship in entrepreneurial economies.

H5b: Targeting input will have positive effect on innovation in entrepreneurial economies.

H6a: Targeting input will have negative effect on entrepreneurship in managed economies.

H6b: Targeting input will have negative effect on innovation in managed economies

H7a: The system of risk capital will have positive effect on entrepreneurship in entrepreneurial economies.

H7b: The system of risk capital will have positive effect on innovation in entrepreneurial economies.

H8a: The system of risk capital will have negative effect on entrepreneurship in managed economies.

H8b: The system of risk capital will have negative effect on innovation in managed economies.

In addition, based on the specification of the model, it is expected that innovation will also have a positive effect on the level of entrepreneurship. This positive effect is however only expected in the entrepreneurial economies where innovation levels are expected to be higher. This therefore led to the final two hypotheses:

H9: Innovation will have positive effect on entrepreneurship in entrepreneurial economies

CHAPTER 9 RESULTS AND DISCUSSIONS

9.1 PRELIMINARY RESULTS

Model One – Entrepreneurship

The results for the preliminary regressions on the effect of government interventions in the form of public policy on the rate or level of entrepreneurship and innovation are presented in the following series of tables. Table 9.1 reports the results with ERNF (entry rate of new firms) as the dependent variable; in table 9.2, the dependent variable is TEA, both of which represent entrepreneurship. Tables 9.3 and 9.4 represent Equation 2 and show patent and technology fast 500 respectively, representing innovation. Each table has three parts (a, b, c) with each part representing one area of public policy, except regional policy development which is presented targeting with input in all instances.

Population growth shows a positive significant effect on ERNF in entrepreneurial and negative significant effect in managed economies. Economic growth also shows similar effects, positive in entrepreneurial economies and negative in managed economies, only these are not significant effects, table 9.1a. The positive effect in entrepreneurial economies is in keeping with expectation since, as was suggested earlier, population growth can provide opportunities for more firms to enter the economy to serve increasing demand. Positive effect was also expected from economic growth; however this turns out to not be a significant determinant of ERNF in entrepreneurial economies. And although its effect is negative in managed economies this also is not a significant deterrent.

In the areas of regulation, the focus of the first trade-off, three variables, ETCR (Energy, Transport, Communication and Rail aggregate score), employment rigidity and foreign ownership restriction, show the strongest impact on ERNF in both types of economies, figure 9.1a. ETCR coefficient is significantly negative at 1% and 5% significance level in entrepreneurial and managed economies respectively. This suggests that regardless of the structure of the economy, increases in the levels of regulations in ETCR sectors will limit the opportunities for new entrants. In other words, higher ETCR regulations limit the opportunities for new firm entry. The employment rigidity coefficient is negative and statistically significant in both groups of economies. It is significant at 1% significance level in entrepreneurial economies and 5% respectively for managed economies. This result is in line with what has been established in the literature and is shown here to permeate both types of economic structure. Restrictive labour regulations serve as deterrent to potential entrepreneurs entering the economy. The foreign ownership restriction coefficient, which was used as an indicator of internationalization, is positive and significant for ERNF, in both entrepreneurial and managed economies. This seems to support the suggestion that a country's openness to international activities help to create greater opportunity not just for business start-ups, but also for their growth and expansion (Audretsch and Thurik, 2001).

The three other regulation variables in table 9.1a, business regulations, cost of firing and FDI intensity, are only significant in managed economies. In all of these instances the effect is positive.

What is not clear is why they would be significant in managed economies and not in their entrepreneurial counterpart. In the case of business regulation, a higher score on this variable indicates a market driven economy which should provide more opportunities for entrepreneurship. Also it has been suggested that 'general' business regulations often do not act as deterrent to entrepreneurs as they find creative means of overcoming such restrictions (Capelleras et al., 2005; Van Stel et al., 2006). This result appears to indicate that this might be the case in both economies but that the effect for some reason is stronger in managed economies. The significant positive influence of FDI intensity means that more international activities provide greater opportunities for entrepreneurial activities at least in managed economies. The possible reasons for a positive impact from the cost of firing will be explored later, if it maintains significance in the presence of other variables.

Table 9.1b shows the results for regional government expenditure and indicators for targeting input as well as innovation. Regional government expenditure does not appear to have significant impact on ERNF in either grouping of economies. The 'conversion effect' for innovation did not show up as expected either since patent shows negative effect on ERNF in both economies. However this effect is only significant in entrepreneurial economies. This indicates that at least in entrepreneurial economies, as the number of patent applications increases, the ERNF decreases in significant amounts. This is not the relationship that was expected for the conversion effect. The expectation is that increasing patent activities provide opportunities for the establishment of new firms through which new ideas are commercialized (Audretsch, 1990).

Table 9.1a: Preliminary regressions explaining ERNF using regulations

Dependent Variable: ERNF														
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	1.99*** (41.9)	2.2*** (27.7)	2.3*** (46.0)	2.5*** (16.4)	1.89*** (4.9	1.1** 3.4	2.6*** (22.6)	2.7*** (13.2)	2.0*** (22.4)	2.0*** (29.1)	-4.7** (-3.5)	.56 (1.5)	2.0*** (27.5)	2.2*** (24.5)
Population growth	.32** (2.9)	-.53** (-2.7)	.55 (5.4)	-.57 (-2.9)	.33** (2.8)	-.50* (-2.6)	.31** (3.2)	-.52** (-2.9)	.32** (2.9)	-.67** (-3.7)	.49*** (6.1)	-.54** (-2.9)	.33** (2.8)	-.58** (-3.0)
Economic growth	.02 (.93)	-.02 (-.99)	.03 (1.5)	-.01 (-.51)	.02 (.72)	-.02 (-1.2)	.01 (.74)	-.02 (-.98)	.02 (.94)	-.03* (-1.8)	-.08 (-3.2)	-.03 (-1.7)	.02 (.95)	-.02 (-1.7)
ETCR			**-.57*** (-10.6)**	**-.22** (-2.1)**										
Business regulations					**.054 (.26)**	**.69** (3.6)**								
Employment rigidity							**-.17*** (-5.4)**	**-.13** (-2.2)**						
Cost of firing									**-.01 (-.19)**	**.08** (2.5)**				
FOR											**3.9*** (5.0)**	**1.1*** (4.3)**		
FDI													**-.01 (-.19)**	**.13** (2.7)**
R2	.22***	.28**	.65***	.31**	..22***	.40***	.49***	.30**	.22***	.37**	.52***	.46***	.22***	.35**

Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; *** P<.01, ** P<.05, * P<.10. Robust t-values in brackets

Table 9.1b: Preliminary regression with ERNF with regional government expenditure and targeting input

Dependent variable: ERNF												
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	3.1*** (5.4)	3.3*** (16.3)	1.8*** (9.6)	2.1*** (9.6)	1.9*** (41.7)	2.3*** (28.9)	1.8*** (25.9)	2.4*** (11.1)	1.69** (3.3)	2.11*** (6.5)	2.22*** (5.5)	2.2*** (15.3)
Population Growth	.17 (1.3)	-.53** (-.3)	.35** (3.3)	-.44 (1.2)	.23 (1.62)	-.62** (-3.3)	.09 (.73)	-.56** (-2.7)	.35** (3.1)	-.53** (-2.7)	.31** (2.7)	-.51** (-2.1)
Economic growth	.005 (.20)	-.02 (-1.9)	.02 (.97)	-.01 (-.24)	.01 (.63)	.0003 (.02)	.03 (1.22)	-.02 (-.83)	.02 (.71)	-.02 (-.94)	.01 (.67)	-.007 (-.33)
Patent	**-.20** (-1.9)**	**-.02 (-.7)**										
Regional gov expenditure			**.07 (1.2)**	**.07 (1.2)**								
Government R&D appropriation					**.21 (1.42)**	**-.19** (-2.5)**						
Higher Education R&D							**.37** (3.4)**	**-.09 (-.63)**				
University Industry Col									**.19 (.60)**	**.09 (.38)**		
Scholarship and grants											**-.03 (-.55)**	**.01 (.44)**
R2	.28***	.28**	.24***	.29**	.24***	.33***	.33***	.28**	.23***	.28**	.23***	.176

Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; *** P<.01, ** P<.05, * P<.10

- Robust t-values in brackets

Table 9.1c: Preliminary regression with ERNF and financial variables

Dependent variable: ERNF										
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	2.1*** (15.2)	2.3*** (18.6)	2.15*** (14.9)	2.34*** (25.8)	1.63*** (6.9)	2.0* (9.1)	2.0*** (15.4)	2.3*** (18.9)	1.2** (2.6)	1.8*** (5.3)
Population growth	.34** (3.1)	-.53** (-2.2)	.34** (2.98)	-.50** (-2.1)	.33** (2.9)	-.64** (-3.21)	.32** (2.8)	-.52** (-2.2)	.28** (2.3)	-.47** (-2.7)
Economic growth	.02 (.85)	-.01 (-.54)	.02 (.80)	.003 (.14)	.01 (.59)	-.02 (-.96)	.02 (.83)	-.01 (-.62)	.02 (.99)	-.01 (-.87)
Seed and Start-up	**-.03 (-.77)**	**-.01 (-.40)**								
Expansion and replacement			**-.06 (-1.14)**	**-.04* (-1.8)**						
Capitalization of Stock markets					**.09 (1.6)**	**.09* (1.71)**				
Buyout							**-.003 (-.12)**	**-.018 (-.73)**		
Venture capital availability									**.51 (1.7)**	**.34**
R^2	.23***	.18*	.25***	.21**	.26***	.30**	.22***	.19*	.28***	.32**

Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; *** P<.01, ** P<.05, * P<.10. Robust t-values in bracket

Continuing with table 9.1b, the variables for targeting input, government appropriation for R&D (GOARD), higher education R&D (HERD), university/industry collaboration (UIRC) and scholarship and grants for tertiary students (SCHL) show only mild effect on ERNF. The GOARD coefficient is positive and insignificant in the entrepreneurial economies and negative and only significant at the 10% significance level in managed economies. HERD is also positive and significant in entrepreneurial economies and negative and insignificant in the case of managed economies. Neither UIRC nor SCHL appears to have any significant effect on ERNF in either economic grouping.

The initial outputs for the variables representing the system of finance are presented in table 9.1c. Seed and start-up (SSU) and buy-out have negative insignificant coefficients in the two types of economies for ERNF. In the case of expansion and replacement (EXPRL), it has negative and marginally significant (10% level) effect on ERNF in managed economies. Capitalization of the stock markets has positive and only marginally significant effect on ERNF in managed economies. Venture capital availability (VCA) has a positive coefficient for ERNF in both types of economies but was surprisingly not significant in neither of these instances.

The next set of tables, 9.2a to 9.2c shows the effect of all the independent variables on entrepreneurship measured as TEA. The impact of regulation variables is presented in 9.2a. The coefficients for ETCR, business regulations, cost of firing and FDI intensity are not significant in neither entrepreneurial nor managed economies.

This suggests that regulatory activities in the ETCR sectors as well as business regulations and cost of firing, at least as they are measured here, do not have very strong influence on the kinds of businesses that are captured by the TEA index.

Employment rigidity on the other hand, has negative statistically significant coefficient in both groups of economies. It is significant at 5% for TEA in entrepreneurial and managed economies. This result is in line with what has been established in the literature and is shown here to permeate both types of economic structure (Van Stel et el., 2006). Restrictive labour regulations serve as deterrent to entrepreneurial activities which are captured by the TEA index. The foreign ownership restriction variable, which was used as an indicator of internationalization, also in Table 9.2a, is positive and significant for TEA in entrepreneurial economies. While it remains positive for managed economies, this was not a significant effect.

The 'conversion' effect for innovation is also not substantiated with TEA, table 9.2b. Although the effect of patents is positive in entrepreneurial economies, this is not a significant effect on TEA and while the effect is negative in managed economies, this too is not significant. Regional government expenditure however shows positive significance on TEA across both types of economies. The more of the national budget that regional authorities account for is indicated here to drive the entrepreneurial process. None of the variables representing the targeting of input, government appropriations for R&D, higher education R&D, university/industry research collaborations and scholarships and grants, showed any significant effect on the TEA in either of the economies.

The variables representing the system of finance also showed meagre impact on TEA as table 9.2c demonstrates. Seed and start-up (SSU) has negative coefficients in the two types of economies. It is only in entrepreneurial economies though that the coefficient is significant, at the 5% significance level. Expansion and replacement (EXPRL) together with capitalization of the stock markets have similar effects on TEA, negative in entrepreneurial economies and positive in managed economies, though neither is significant. Buy-out has negative and significant impact on TEA in the entrepreneurial economies. Its effect is not significant in managed economies. Venture capital availability (VCA) surprisingly showed only marginally positive impact on TEA in the entrepreneurial economies and negative insignificant impact in managed economies.

Table 9.2a: Preliminary regressions explaining TEA using regulations

Dependent variable: TEA														
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	1.4*** (17.6)	1.5*** (7.6)	1.53*** (18.8)	1.45*** (7.1)	1.03 (1.64)	2.18** (2.6)	1.77*** (11.2)	2.57*** (5.6)	1.5*** (12.9)	1.67*** (7.5)	-4.4** (-3.1)	.51 (.53)	1.54*** (12.9)	1.41*** (7.7)
Population growth	.28 (1.5)	.41 (.97)	.37** (2.1)	.41 (1.0)	.33 (1.6)	.32 (.79)	.27 (1.5)	.38 (.89)	.27 (1.4)	.56 (1.2)	.46** (2.8)	.41 (.91)	.32 (1.6)	.39 (.89)
Economic growth	.06 (1.5)	.06 (1.6)	.07 (-2.3)	.06 (1.4)	.05 (1.1)	.06 (1.7)	.06 (1.5)	.05 (1.3)	.07 (1.5)	.08* (1.9)	-.03 (-.65)	.05 (1.2)	.07 (1.6)	.05 (1.2)
ETCR			**-.20 (-1.4)**	**.003 (.02)**										
Business regulations					**.21 (.62)**	**-.43 (-.9)**								
Employment rigidity							**-.09** (-2.1)**	**-.27** (-3.0)**						
Cost of firing									**-.03 (-.76)**	**-.09 (-1.55)**				
FOR											**3.4*** 4.2**	**.60 .90**		
FDI													**-.10 (-1.52)**	**.09 (.60)**
R2	.23***	.10	.26**	.10	.23**	.10	.28**	.10	.24**	.12*	.35***	.10	.25***	.10

Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; ***P<.01, ** P<.05, * P<.10. Robust t-values in brackets

Table 9.2b: Preliminary regressions explaining TEA using regional government expenditure and targeting input

Dependent variable: TEA												
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	1.23* (1.71)	1.75*** (4.62)	.82** (2.82)	.89** (2.42)	1.41*** (16.86)	1.38*** (7.86)	1.31*** (11.19)	1.58** (3.43)	.63 (.64)	1.68** (2.64)	1.58*** (4.2)	1.69*** (4.4)
Population Growth	.31* (1.7)	.28 (.58)	.35* (1.98)	.78 (1.48)	.21 (.57)	.44 (1.05)	.15 (.71)	.39 (.92)	.38** (2.10)	.42 (.99)	.27 (1.4)	.31 (.57)
Economic growth	.07 (1.36)	.04 (.75)	.07 (1.54)	.09** (2.13)	.06 (1.39)	.04 (.88)	.07 (1.61)	.06 (1.52)	.05 (1.33)	.06 (1.5)	.06 (1.34)	.05 (1.09)
Patent	.04 (.29)	-.08 (-1.08)										
Regional gov expenditure			.21** (2.22)	.18** (2.21)								
Government R&D appropriation					.14 (.57)	.18 (1.05)						
Higher Education R&D							.22 (1.28)	-.10 (-.28)				
University Industry Collaboration									.49 (.82)	-.18 (-.38)		
Scholarship and grants											-.02 (-.40)	-.03 (-.62)
R2	.23**	.11	.30***	.12*	.23**	.10	.25***	.10	.24**	.10	.23**	.10

Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; ***P<.01, ** P<.05, * P<.10. Robust t-values in brackets

Table 9.2c: Preliminary regressions explaining TEA using system of finance

Dependent variable: TEA										
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	1.83*** (10.66)	1.72 *** (6.63)	1.43*** (9.50)	1.46*** (7.24)	1.56** (3.38)	1.29** (2.69)	1.83*** (10.58)	1.29*** (4.28)	.10 (.14)	1.88** (3.69)
Population growth	.38* (2.0)	.34 (.64)	.28 (1.47)	.31 (.58)	.28 (1.44)	.37 (.88)	.16 (.78)	.28 (.54)	.24 (1.20)	.45 (1.03)
Economic growth	.05 (1.26)	.04 (.97)	.06 (1.45)	.06 (1.20)	.07 (1.51)	.06 (1.52)	.04 (1.14)	.08* (1.98)	.07 (1.53)	.06 (1.59)
Seed and start-up	-.12** (-2.70)	-.04 (-1.10)								
Expansion and replacement			-.0008 (-.02)	.023 (.63)						
Capitalization of stock markets					-.03 (-.28)	.05 (.43)				
Buy-out							-.09** (-2.43)	.06 (1.27)		
Venture capital availability									.85* (1.78)	-.35 (-.90)
R^2	.29**	.10	.23**	.07	.23**	.063	.29***	.13	.29**	.074

Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; ***P<.01, ** P<.05, * P<.10. Robust t-values in brackets

Model Two – Innovation

In the second model, the dependent variable is innovation, measured first as the number of patent applications and then as the number of technology fast 500 firms. The same set of government intervention tools used in the first model (with entrepreneurship) is applied as independent variables here. The first round regression outputs with dependent variable patent applications are presented in table 9.3, which has three parts. Table 9.4, shows the output when technology fast 500s is the dependent variable and it also has three parts. Economic growth has significantly negative impact on patent applications in both managed and entrepreneurial economies which are surprising. The natural expectation is that economic growth would provide impetus for further efforts towards innovations that would fuel greater numbers of patent applications. This however does not appear to be the case, based on these initial results.

The output of the impact of independent variable representing regulation on patent is presented in table 9.3a. ETCR regulations show negative impact on patent in both types of economies, it is however only significant at the 5% significant level for managed economies. In these latter economies more restrictive regulations in ETCR sectors may contribute to significant decrease in the number of patent applications that are made. Possible explanations will be explored later in the analysis of the results. Business regulation on the other hand, has positive significant coefficients in the two groups of economies which at first appear to be counter-intuitive. However in keeping with the explanation of this variable earlier, higher value for this index is a signal of a more competitive market economy.

This therefore makes the identified effect plausible as it is an indication that a more market driven economy contributes to innovation activities in the form of more patenting activities.

Employment rigidity also has positive effects in both groups; however it is only significant in entrepreneurial economies. In spite of restrictive labour market regulations, entrepreneurial economies still experience high levels of patent applications. The effect is however not strong enough to be a significant force in the managed economies. The impact of the cost of firing is negative and significant only in managed economies with positive but non significant impact in entrepreneurial economies. Foreign ownership restrictions also in table 9.3a have negative coefficients, which is significant at the 1% significance level in managed economies and insignificant in entrepreneurial economies. One reason for this maybe that in managed economies, foreign entities introduce secondary technologies and this in some ways reduces efforts to engage in the creation of proprietary technologies thereby reducing the number of patent applications that are filed by these countries. The FDI coefficient is negative in both types of economies but neither of these impacts is significant.

Regional government expenditure in table 9.3b has positive and significant effect on patent applications in both economies. Regional governments that spend larger portions of their national budget contribute to a greater number of patent applications which appears to support the notion that innovation is a very regional phenomenon. Also in table 9.3b, the variables representing the targeting of inputs or promoting innovation, as expected, demonstrate strong effect on patent.

Government appropriations for R&D and higher education R&D both show significantly negative influence on patent applications in both types of economies. This though is not surprising as it speaks to the inability of countries to convert money spent or allocated to R&D into actual levels of innovation, in this case increasing their number of patent applications. University industry collaboration and scholarship and grants for tertiary education both have positive coefficients. These coefficients are also strongly significant with the exception of university industry collaboration which is not significant in managed economies.

The variables representing the finance systems in table 9.3c, also displayed low levels of impact on patent applications. Seed and start-up show no significant impact on patent applications. Expansion and replacement capital showed negative impact in both economies but is only marginally at 10% significance level in managed economies. Capitalization of the stock markets, together with buy-out has positive significant coefficients in managed economies and positive but insignificant effects in entrepreneurial economies. The effect of VCA is positive in entrepreneurial economies and negative in managed economies but neither of these are significant.

Table 9.3a: Preliminary regressions explaining patent using regulations

Dependent variable: Patent														
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	5.4*** (75.7)	3.0*** (8.3)	5.4*** (39.8)	4.5*** (8.2)	2.6*** (5.0)	-1.4 (-.80)	4.5*** (21.9)	2.3** (3.1)	5.3*** (63.9)	3.9*** (7.8)	6.5** (4.2)	9.9*** (6.4)	5.5*** (52.2)	3.0*** (5.9)
Economic growth	-.18*** (-5.7)	-.17** (-2.5)	-.18*** (-5.1)	-.09 (-5.1)	-.22*** (-8.4)	-.20** (-3.2)	-.16*** (-5.9)	-.17** (-2.5)	-.18*** (-5.8)	-.17** (-3.7)	-.17** (-3.7)	-.13** (-2.1)	-.17*** (-4.8)	-.17** (-2.5)
ETCR			**-.01 (-.06)**	**-1.5** (-3.4)**										
Business Regulations					**1.5*** (5.7)**	**2.7** (2.7)**								
Employment Rigidity							**.27*** (4.9)**	**.18 (.79)**						
Cost of firing									**.03 (1.0)**	**-.31** (-2.6)**				
FOR											**-.67 (-.46)**	**-4.37*** (-4.4)**		
FDI													**-.08 (-.92)**	**-.04 -.13**
R2	.35***	.12**	.35***	.23**	.54***	.23**	.57***	.13*	.36**	.21**	.36***	.30***	.37***	.13*

Note: Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; ***P<.01, ** P<.05, * P<.10. Robust t-values in brackets

Table 9.3b: Preliminary regressions explaining patent using regional government expenditure and targeting input

Dependent variable: Patent										
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	4.0*** (16.5)	1.6** (3.6)	5.6*** (78.6)	3.6*** (11.7)	5.9*** (70.4)	5.9*** (7.1)	2.3** (3.7)	1.9 (1.1)	4.1*** (12.1)	-.61** (-2.5)
Economic growth	-.15*** (-5.2)	-.16** (-2.5)	-.08** (-2.9)	.10 (1.2)	-.19*** (-4.5)	-.02 (-1.7)	-.18*** (-6.9)	-.16** (-2.1)	-.12*** (-4.14)	-.01 (-.41)
Regional gov expenditure	**.47*** (5.3)**	**.57** (3.1)**								
Government R&D appropriation			**-1.18*** (-7.6)**	**-2.01*** (-5.9)**						
Higher Education R&D					**-.86*** (-6.3)**	**-2.5** (-3.5)**				
University Industry Col							**1.9*** (4.9)**	**.79 (.64)**		
Scholarship and grants									**.18*** (4.0)**	**.62*** (17.5)**
R2	.56***	.21**	.64***	.44***	.62***	.34**	.53***	.13**	.46***	.88***

Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; ***P<.01, ** P<.05, * P<.10. Robust t-values in brackets

Table 9.3c: Preliminary regressions explaining patent using system of finance

Dependent variable: Patent										
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	5.6*** (24.7)	2.4*** (4.1)	5.5*** (25.5)	3.2*** (6.4)	5.1*** (14.1)	-.33 (-.37)	5.2*** (25.7)	2.1*** (4.7)	4.9*** (8.7)	2.9** (2.3)
Economic growth	-.18*** (-5.8)	-.12 (-1.0)	-.18*** (-5.9)	-.11 (-.92)	-.18*** (-6.1)	-.06 (-.87)	-.16*** (-2.2)	-.12 (-1.1)	-.18*** (-5.8)	-.17** (-2.5)
Seed and Start-up	-.06 (-1.04)	.08 (1.2)								
Expansion and replacement			-.05 (-.66)	-.15* (-1.8)						
Capitalization of Stock markets					.08 (.88)	.88*** (4.3)				
Buyout							.06 (1.2)	.21** (2.4)		
Venture capital availability									.31 (.82)	-.01 (-.01)
R^2	.37***	.10	.36***	.10**	.36***	.30***	.37***	.16**	.36***	.13**

Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; ***P<.01, ** P<.05, * P<.10. Robust t-values in brackets

Neither economic growth nor population growth showed any significant impact on techno fast 500 in either of the two groupings of economies. Other variables were however more impacting; in terms of regulation in table 9.4a, ETCR showed negative non significant impact in entrepreneurial economies and positive significant impact in managed economies. Business regulations had negative impact in both types of economies; however, this was only marginally significant for managed economies. The impact of regulations in the labour markets on techno fast 500 is mixed. Employment rigidity shows negative influence in both types of economies but it is only significant in managed economies. The other labour regulatory variable, cost of firing, also shows strong impact. The influence is however different depending on the type of economy; it is positive in entrepreneurial economies and negative in managed economies. While its impact is not detrimental in entrepreneurial economies, higher cost of firing appears to contribute to lower numbers of techno fast 500s in managed economies. The impact of FDI is negative and significant in entrepreneurial economies and positive without significance in managed economies. Foreign ownership restrictions on the other hand are positive in both economies but only significant in managed economies.

Patent applications show negative impact on the technology fast 500 variable in both types of economies, table 9.4b. This however is only significant in entrepreneurial economies. This again is not the relationship that was expected, but it points to the lack of significant conversion of research outputs into entrepreneurial ventures. Regional government expenditure also only appears to have marginal significant impact in entrepreneurial economies but like patent, this is negative.

The effect is not significant in managed economies. The variables GOARD, HERD, UIRC did not stand out in terms of their impact on the number of techno fast 500, also in table 9.4b. GOARD and HERD are only having significant impact in entrepreneurial economies. GOARD´S influence is however negative while HERD seems to contribute positively to the number of the fastest growing technology companies. UIRC on the other hand contributes to the proliferation of techno fast 500s only in managed economies. The other variable in this section on targeting input, scholarship and grants, did not show even the slightest bit of significant impact on the dependent variable in either category of economy.

Table 9.4c shows the variables used to proxy public policies concerning system of finance and their impact on techno fast 500. Seed and start-up up is not a significant variable in either group of economies. Expansion and replacement has negative significant impact in entrepreneurial economies while the impact is positive but insignificant in managed economies. Capitalization of the stock markets and buy-out both has significant positive impact, which is limited to entrepreneurial economies. Venture capital availability on the other hand shows negative significant impact in managed economies and positive but none significant impact in the entrepreneurial group.

Table 9.4a: Preliminary regressions explaining techno fast 500 using regulations

Dependent variable: Techno fast 500												
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	54.3** (3.0)	-2.6 (-1.1)	104.6 (1.3)	14.9** (2.8)	39.3 (.9)	31.4*** (5.9)	-3.7 (-.7)	7.3** (3.7)	48.0** (3.3)	4.5** (2.9)	-511.0 (-1.3)	-9.7 (-1.7)
Population growth	50.5** (2.3)	-2.2 (-.9)	26.3 (.95)	-3.8 (-1.5)	33.8 (1.4)	-3.1* (-1.6)	35.8 (1.5)	-1.9 (-.68)	40.3 (1.6)	-3.7 (-1.4)	46.1** (2.1)	-3.7 (-1.4)
Economic growth	-2.2 (-.4)	-.75** (-2.1)	-.82 (-.14)	-.5 (-1.4)	-2.9 (-.6)	-.5* (-1.9)	-4.2 (-.87)	-.34 (-.9)	-1.9 (-.4)	-.54 (-1.5)	-10.9* (-1.8)	-.62 (-1.7)
ETCR	**-40.8 (-1.4)**	**6.3** (3.2)**										
Business regulations			**-39.2 (-.9)**	**-6.2* (-2.0)**								
Employment rigidity					**-2.1 (-.2)**	**-6.9*** (-5.1)**						
Cost of firing							**14.7*** (6.2)**	**-.98** (-2.1)**				
FDI									**-14.4* (-1.7)**	**. 32 (.28)**		
FOR											**314.8 (1.3)**	**9.0** (2.4)**
R2	.11**	.19*	.10	.10*	.10	.36***	.16***	.11*	.10	.04	.10	.10*

Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; ***P<.01, ** P<.05, * P<.10. Robust t-values in brackets

Table 9.4b: Preliminary regressions explaining Techno fast 500 using regional government expenditure and targeting input

Dependent variable: Techno fast500												
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	121.2* (-1.9)	-.20 (-.1)	316.9** (2.7)	6.2** (2.7)	39.8*** (4.1)	4.5** (2.8)	2.6 (.22)	-2.3 (-.5)	164.3 (1.7)	-7.7 (-1.3)	21.2 (.22)	8.5** (3.3)
Population growth	24.3 (1.0)	-1.2 (-.4)	-5.2 (-.2)	-3.8 (-1.4)	62.3** (2.1)	-3.5 (-1.3)	-.88 (-.03)	-1.8 (-.6)	19.3 (.75)	-3.4 (-1.4)	34.8 (1.2)	-10.9** (-3.1)
Economic growth	-3.3 (-.7)	-.24 (-.5)	-7.1 (-1.6)	-.6 (-1.6)	-.8 (-.15)	-.6 (-1.3)	-1.9 (-.38)	-.7 (-1.7)	-.99 (-.20)	-.39 (-1.3)	-2.4 (-.59)	-.4 (-1.0)
Regional government expenditure	**-30.6* (-1.9)**	**1.7 (1.6)**										
Patent			**-.51** (-2.5)**	**-.5 (-1.0)**								
Government R&D appropriation					**-63.8** (-2.3)**	**.35 (.18)**						
Higher Education R&D							**56.8** (2.6)**	**5.2 (1.6)**				
University/industry Collaboration									**-82.4 (-1.2)**	**9.5** (2.0)**		
Scholarship and grants											**1. 5 (.11)**	**-.58 (-1.7)**
R2	.12*	.10*	.16**	.10	.10*	.10	.11**	.11	.10	.13*	.04	.27**

Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; ***P<.01, ** P<.05, * P<.10. Robust t-values in brackets

Table 9.4c: Preliminary regressions explaining Techno fast 500 using systems of finance

Dependent variable: Techno fast500										
	Entrep Econ	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**	**Entrep Econ**	**Man Econ**
Intercept	47.7** (2.1)	4.3 (1.6)	78.3** (3.2)	3.5 (1.7)	-108.7** (-2.8)	7.7** (2.4)	-59.0* (-2.0)	3.6* (1.8)	-35.7 -.51	12.2 3.2
Population growth	36.6 (1.5)	-10.5** (-3.0)	38.5 (1.6)	-10.9** (-3.1)	37.2 (1.6)	-2.5 (-.94)	59.4* (1.9)	-10.6** (-2.9)	30.1 1.1	-4.6* (-1.9)
Economic growth	-3.2 (-.62)	-.16 (-.42)	-3.8 (-.74)	-.47 (-1.2)	-5.8 (-1.2)	-.53 (-1.4)	1.5 (.32)	-.15 (-.41)	-2.7 (-.53)	-.58 (-1.6)
Seed and start-up	**-4.5 (-.87)**	**.16 (.37)**								
Expansion and replacement			**-17.7** (-2.3)**	**.69 (1.2)**						
Capitalization of stock markets					**34.5** (3.4)**	**-.91 (-1.2)**				
Buy-out							**21.2** (3.3)**	**.51 (1.2)**		
Venture capital availability									**44.8 (.96)**	**-5.8** (-2.5)**
R^2	.04	.23**	.11**	.27**	.19**	.10	.26**	.26**	.10	.10*

Note: Entrep Econ= Entrepreneurial Economy; Man Econ= Managed Economy; ***P<.01, ** P<.05, * P<.10. Robust t- values in brackets

9.2 FINAL REGRESSIONS

By adding each variable separately to the basic specification (control variables) in the first round, the strength and direction of impact of each on entrepreneurship and innovation was identified. The variables that demonstrated significant impact on the dependent variables, in either or both economies, are selected for inclusion in a combined regression for each of the dependent variables. Next, those variables that shows no significance, (lose their significance in the presence of others), are removed to create a final model with independent variables that shows significant impact on the dependent variables in the presence of other variables and the control variables in either or both of the clusters of economies. The results from these 'complete' regressions are presented in tables 9.5-9.8. Not all the variables in previous tables 9.1 to 9.4 are reported in the latter tables. Those that show no significant impact on any of the dependent variables for entrepreneurship or innovation when combined with other explanatory variables are removed. An example of this is employment rigidity and TEA. This variable had significant effect on TEA when it was added by itself in table 9.2a. However in the presence of the other variables it lost this significance and so is not included in table 9.6. Several of the variables are obviously related. As stated earlier *(page157)*, where more than one variable from a policy area showed significance, they were tested for multicollinearity to ensure that they could all be included in the same regression. For this reason some variables are also not included in the final regressions.

ERNF

One baseline variable, population growth, shows significant impact on the dependent variable ERNF. Its effect is positive in entrepreneurial economies and negative in managed economies table 9.5. As was pointed out earlier this effect could be either on the demand side or on the supply side (Verheul et al., 2002).

Table 9.5: Final regression with ERNF

Dependent variable: ERNF		
	Entrepreneurial Economy	**Managed Economy**
Intercept	1.3** (2.8)	.59 (.46)
Population growth	.33** (5.5)	-.46** (-2.2)
Economic growth	.007 (.44)	-.02 (-1.1)
ETCR	-.46*** (-7.4)	-.20 (-1.4)
Business Regulations	.52** (2.5)	.73** (3.2)
Employment rigidity	-.06** (-2.3)	-.16** (-2.2)
Higher education R&D expenditure	.45*** (4.8)	.21 (1.1)
R^2	.793***	.461***

Note: *** Significant at 1% level, **Significant at 5% level. Robust t-values in bracket.

On the demand, increasing populations create more needs to be met and the meeting of these can create opportunities for entrepreneurship. On the supply side, the increasing population creates more people that need employment, some of whom may have to enter self employment to realize any gainful employment. There is not an obvious explanation to why the effect is negative in managed economies. Population increase is either natural or through immigration. In the case of natural population, improving economic conditions may allow families to have more children. The increase in demands is met by existing companies as an anticompetitive environment may deter new entrants. In the case where population increases is the result of immigration, these immigrants maybe going to work for existing companies rather than striving to establish their own firms. The latter scenario exists for example in Spain. It has experienced significant in-migration; however the majority of immigrants work for existing firms. Economic growth however is not a significant determinant of ERNF in neither managed nor entrepreneurial economies.

The result in Table 9.5 also shows the impact of several government interventions on entry rate of new firms (ERNF), one of two representations of entrepreneurship employed in this study. In full regression, three variables measuring regulation, ETCR, business regulation and employment rigidity shows strong impact on ERNF. All three have strong impact in entrepreneurial economies but only two, business regulation and employment rigidity shows significant impact in the managed economies. Higher education expenditure on R&D maintained its positive significant impact on the ERNF in entrepreneurial economies. In managed economies the effect is also positive but this is not a significant effect.

It is not possible to establish significant relations between ERNF and any of the variables representing neither the system of finance, nor regional government expenditure. In the case of system of finance, these results are consistent with what has been found elsewhere. Stock market capitalizations were shown to be insignificantly correlated to entrepreneurship while the effect of other areas including venture capital availability was indeterminate. While it is intuitive that the availability of risk finance would mean that more ideas can be commercialized, the results do not support that intuition (Hoffmann, 2007). Higher incidences of patent applications do not have sufficiently strong impact on ERNF. The conversion effect which we hoped to have demonstrated therefore could not be established with this data. This further highlights the concern that high expenditures on R&D and by extension higher levels of patent applications do not translate into higher levels of business activities (Acs et al., 2005; Henrekson and Roine, 2007).

TEA

When entrepreneurship is expressed as total entrepreneurship index (TEA), the relationships with the independent variable are rather weak as table 9.6 attests to. The baseline variable, population growth, has a positive and significant impact on TEA in entrepreneurial economies. An increasing population may act to push people into self employment either for necessity reasons or through genuine opportunity exploitation. This effect is however not significant in managed economies.

Table 9.6: Final regression with TEA

Dependent variable: TEA		
	Entrepreneurial Economy	**Managed Economy**
Intercept	-4.4** (-2.1)	2.9** (2.2)
Population growth	.34** (2.1)	.19 (.46)
Economic growth	-.05 (-1.3)	.10** (2.4)
Foreign ownership restrictions	3.5** (2.9)	-1.0 (-1.2)
Buy out	-.09** (-2.6)	.05 (1.2)
R^2	.422***	.161

Note: *** Significant at 1% level, **Significant at 5% level. Robust t-values in bracket.

The other baseline variable, economic growth shows non significant negative effect in entrepreneurial economies while its effect in managed economies is positive and significant. In these latter economies, economic growth may create opportunities for people to engage in the entrepreneurial process. These kinds of activities are captured as opportunity entrepreneurship which is one of the components of the TEA.

Foreign ownership restriction also shows a positive and fairly strong impact on entrepreneurship in the form of TEA but only in entrepreneurial economies, table 9.6. As outlined earlier, this maybe due to increases in opportunity entrepreneurship as identified by Van Stel et al (2006). This means that as countries open up their economies to international activities this may create more opportunities for entrepreneurship resulting in higher TEA levels. This effect however does not extend to managed economies where the effect is negative and insignificant. Buy-out, also in table 9.6, is the only other variable that showed any significant effect on TEA. Increases in the percentage of buyout expenditure in entrepreneurial economies act as a hindrance to the growth of TEA. It however has positive effects in managed economies although it is not a significant effect.

There is no indication of the 'conversion effect' for neither of the dependent variables presented in the above tables, ERNF and TEA. The result from the regressions for the second model, where the impact of government interventions on the level of innovation in an economy is assessed, is presented in the next sections.

PATENT

The impact of economic growth on patent is negative signifying that as the economic growth increases there is a corresponding decrease in number of patent applications made in that country. This effect is however only significant in entrepreneurial economies, table 9.7.

Table 9.7: Final regression with Patent applications

Dependent variable: PATENT		
	Entrepreneurial Economy	**Managed Economy**
Intercept	5.8*** (4.4)	10.9*** (4.7)
Economic growth	-.08** (-3.1)	.03 (.52)
ETCR	-.27** (-2.6)	.35 (.85)
Business regulation	.09 (.29)	2.9** (3.4)
Employment rigidity	.26*** (7.1)	-.68** (-3.0)
Foreign ownership restriction	-1.9** (-2.5)	-6.7*** (-7.0)
Regional Gov expend	.26** (3.3)	.63** (4.5)
University/Industry research collaboration	.92** (3.2)	1.5** (2.5)
Higher Education R&D expenditure	-.28** (-2.1)	-2.7*** (-5.3)
R^2	.865***	.826***

Note: *** Significant at 1% level, **Significant at 5% level. Robust t-values in brackets

This is not an obvious relationship; rather the opposite would have been expected where as economies grow they would engage in more research and development activities that result in greater numbers of patent applications for new innovations through which further growth can be achieved.

The regulatory variables ETCR and foreign ownership restriction act as significant obstructions to the number of patent applications in entrepreneurial economies. While the ETCR does not have any significant effect in managed economies, foreign ownership restriction shows the same effect as in entrepreneurial economies as table 9.7 shows. The employment rigidity index has positive effect in entrepreneurial economies but the effect is negative in managed economies. On the other hand, as expected, regional government expenditure shows positive impact on patent and this is for both managed and entrepreneurial economies. The targeting input variable, university industry collaboration, is an enhancing factor and again this effect is the same for both economies. Higher education R&D expenditure also has similar effect in both types of economies, only this time the effect is negative.

Techno fast 500

The result shows that population growth as well as economic growth does not have any significant impact on techno fast 500 in neither entrepreneurial nor managed economies figure 9.8. In fact any significant impact of any of the variables was mostly restricted to entrepreneurial economies, with only university/industry collaboration showing a significant impact on techno fast 500 in managed economies. This showing maybe a consequence of the very small numbers of these firms that is present in this grouping of economies.

In the area of regulations, employment regulations (employment rigidity and cost of firing) are the only ones that proved significant.

Both of these variables have positive impact on the number of techno fast 500. This implies that high employment rigidity and high cost of firing do not encumber the proliferation of fast growing technology companies in entrepreneurial economies. The fastest growing technology based companies are able to find creative means around these regulatory regimes.

Capitalization of the stock market and buy-out also show positive significant impact on this dependent variable. A heavily capitalized stock market together with a well financed buy-out market provides means of exit for investors which would serve as encouragement for investing in fast growing enterprises which may explain this relationship. The impact of regional government expenditure is also positive and significant suggesting that the more of the national budget that is allocated to regional or local government, allows them to create an infrastructure often times referred to as the 'regional innovation system' that support the creation of techno fast 500s in their regions. Two variables relating to the policy area of targeting of input; higher education R&D expenditure and university industry collaboration, also demonstrate significant negative impact on techno fast 500.

It is not clear why targeting input, which may also be interpreted as promoting the incorporation of knowledge and technology into the economic process, should have negative impact on the number of techno fast 500 companies. On the contrary the normal expectation is for these variables to have positive impact on the presence of technology innovation and by extension the emergence of fast growing technology companies especially in entrepreneurial economies.

An interesting result is that patent shows negative and highly significant impact on techno fast 500. This is a further exhibition of the lack of the expected 'conversion effect' that was expected. If techno fast 500 is considered to represent 'high-growth potential entrepreneurship', even there, the conversion effect does not show up. In fact it is the opposite that is seen, increasing patent activities contribute to lower incidences of techno fast 500 firms.

Table 9.8: Final regression with techno fast 500

Dependent variable: Techno fast 500		
	Entrepreneurial Economy	**Managed Economy**
Intercept	101.1** (2.8)	3.1 (33)
Population growth	-.24.6 8-1.3)	2.8 (.54)
Economic growth	-1.1 (-.32)	.24 (.59)
Employment rigidity	1.2** (2.1)	-.19 (-1.59)
Cost of firing	.84** (2.6)	-.008 (-.20)
Capitalization of Stock Market	.57** (3.2)	-.009 (-.12)
Buy out	.52** (2.1)	.02 (.98)
Regional government expenditure	2.7** (2.9)	.04 (.19)
Patent	-.63*** (-4.1)	.01 (.18)
Higher Education R&D	-.81.1* (-2.2)	-18.8 (-.68)
University/Industry research collaboration	-15.9* (-2.3)	3.4** (2.6)
R^2	.744***	.659***

Note: *** Significant at 1% level, **Significant at 5% level. Robust t-values in bracket

The only significant effect in the managed economies is the effect of university/industry research collaboration. This effect is positive and points to the role that university and industry working together plays in helping to commercialize knowledge that would otherwise gather dust in the back of cupboards in the laboratories of universities in these economies.

9.3 DISCUSSION OF RESULTS

If there is a general trend emerging from the result tables above, it is that the selection of dependent variables tends to have stronger and therefore more significant impact in entrepreneurial economies than they do in managed economies. The exception to this happens in the case of patents, where there are strong effects in both types of economies.

9.3.1 Entrepreneurial Economies

Entrepreneurial economies, by classification, represent a collective of factors that support the entrepreneurial and innovation processes. As the hypotheses indicated, it is expected that the variables used to proxy public policies in these economies will have positive effects on the entrepreneurship and innovation activities in these settings.

Regulations – H1a & H1b

Regulation variables for the most part have significant impact on ERNF in entrepreneurial economies. ETCR, labour regulation, and business regulations are shown to have an overall strong effect on entrepreneurship in the form of ERNF.

The effects are similar on innovation (both patent application and techno fast 500) while there is extremely limited impact on TEA. In the final regression, table 9.5, ETCR demonstrated significant negative impact on ERNF. Higher levels of regulations in the ETCR sectors represent more restrictive regimes and less competition which many times carry over into the general economy with negative consequences for entrepreneurship. At the same time however, it should be pointed out that while lower regulatory restrictions in ETCR provide opportunities for more entry into these sectors, these are still relatively high capital investments which may deter new entrants. In addition the carrying capacity of the markets in each country may also deter entry. ETCR also shows negative but significant impact on patents, table 9.7. In speculating about this negative impact, it is argued that an opening up of the ETCR sectors does not by itself contributes to increasing patenting activities. This maybe due to the ability of these industry sectors to thrive on mature technologies. Also the sectors covered by the ETCR variable may negatively affect patenting since patent protections are not often taken out for new developments for any number of reasons.

Business regulations only appear as a significant determinant in entrepreneurial economies in the case of ERNF where its effect is positive, table 9.5. As pointed out earlier, higher scores on this variable signify a free market economy where the market guides activities and determines prices resulting in a more competitive economy. It is therefore not surprising that it would have a positive influence on ERNF, suggesting that greater market competition provides opportunities for new entrants. The strongest impact comes from employment rigidity which has significant impact on ERNF, patents as well as techno fast 500s.

It acts as a deterrent to the entry rate of new firms suggesting the labour rigidity, even in entrepreneurial economies, prevents many potential new firms from forming. However it is not a deterrent to innovation, since its effect is positive on both patent and techno fast 500. The cost of firing, another employment regulation, only shows significant positive impact on techno fast 500, and therefore does not appear to be a deterrent to these kinds of firms.

This result further supports the importance of employment regulations in the creation of an infrastructure that supports and fosters entrepreneurship. It has been suggested, for example that the labour regulations in European countries, compared with the USA, are very restrictive and are not conducive to stimulating entrepreneurship (Siebert, 1997). Interestingly, employment rigidity does not deter patent activities nor techno fast 500, these latter activities strive in spite of the restrictions. That patent activities are not affected by the labour regulatory regime maybe due to the role that universities play in this area. It could be argued that researchers, especially graduate and postgraduate people in universities, are important contributors in this area and that they are less constrained by the labour regulations of a country. For techno fast 500, it maybe that these kinds of firms are better able to withstand the demands placed on them by restrictive labour regulations in return for the high quality of labour that they require.

Foreign ownership restrictions, as the only surviving variable representing the internationalization aspect of regulations, appears to open up opportunities for TEA, table 9.6.

Allowing foreign organizations to set up operations locally can provide 'spin off' opportunities for more people to create business in areas of services or by acting as subcontractors to larger multinationals. It however has negative impact on patents. While low foreign ownership restrictions encourage foreign owned enterprises to establish themselves locally, this may negatively impact the local level of innovation activities, if such companies perform their R&D activities to their home countries. In other cases even where they conduct R&D in the foreign countries, at the time of patent application, these are registered based on the nationality of the patentees and not on where the development of the idea actually took place.

Regulatory reforms have created opportunities in several sectors in entrepreneurial economies. These have resulted in private enterprises producing goods and services that were once the domain of the government. Reforms continue also in other business regulations to make them more supportive to enterprise. Although some restrictions have been removed from the labour market, there still remain conditions that serve to deter especially the entrepreneurial process. The relationships described above however, reflect the ever evolving interface between enterprise and public policy that are facilitated by changing institutional framework in these economies. This mixed bag of effects (some positive some negative) therefore only provides partial support for both H1a and H1b.

Regional Public Policy – H3a & H3b

Regional government expenditure shows no meaningful or significant impact on any of the forms of entrepreneurship in entrepreneurial economies. Recall that one characterization of entrepreneurial economies is that public policies are developed and created in regions or at local political levels. It was therefore expected that this variable would have had a positive significant impact on entrepreneurship especially in these economies. This was however not confirmed. What showed up however is that regional government expenditure has a significant positive impact on both measures of innovation. This is interpreted to be an indicator that any effect on actual entrepreneurship will be through the 'conversion effect'. Although this cannot be substantiated in this study even if techno fast 500 was to be considered as evidence of technology entrepreneurship as in table 9.8.

The positive impact of regional government expenditure on patent activities, table 9.7 as well as on fast growing technology enterprises, table 9.8, provides support for its importance in creating a regional innovative system. Regional government expenditure appears to contribute to the production of new knowledge or facilitate new combinations of existing pieces of knowledge. These are important factors in building a regional system which can incorporate the regional idiosyncrasies into the process and in that way create public policies that meet the development needs of local areas (Audretsch and Thurik, 2001, Guth, 2005).

Hypothesis 3a is not supported based on the evidence discussed above. However there is strong support for H3b. In the creation of a national innovation infrastructure, it is suggested therefore that a good approach is to create individual regional systems. Within these systems, new ideas are created and patented. It also provides an 'innovative milieu' as a spawning ground for fast growing technology firms.

Targeting Input

Entrepreneurial economies differentiate themselves to a large extent by the importance of knowledge as an input in the economic process. By extension innovation and the infrastructure that facilitate knowledge creation play significant roles in these kinds of economies. This particular trade–off speaks to the efforts that have direct effect in supporting knowledge creation such as spending on research and development. Especially since the Barcelona Declaration greater emphasis has been placed on promoting innovation through research and development. This target is at the forefront of policies for development for EU members. The countries that make up the entrepreneurial economies have the highest expenditures in this area. R&D expenditure is also one of the most significant variables in separating the two groupings of economies. It was therefore expected that here among entrepreneurial economies, positive effects would have been seen both in direct and for 'conversion effects' for the list of variables. The effect however depends considerably on how entrepreneurship is measured and even then there are many negative and unexpected impacts.

Higher education R&D expenditure is the only group of variables that showed significant positive impact on ERNF. This is a probable indication of the strength of the role of spin-outs from universities and other higher education institutions in influencing the number of new firms that are entering the economy. This single positive impact on entrepreneurship thus provides support for H5a although this is a weak support.

Higher education R&D expenditure also demonstrated significant effect on patent applications and techno fast 500. The impact however is negative in both instances, which goes against expectation. It is expected that the more that universities and other higher education research institutions spend on research and development activities, the greater would be their discovery of patentable ideas. Also, that these higher incidences of R&D spending will generate ideas for the creation of fast growing technology firms. This however cannot be substantiated with the present data.

University/industry research collaboration shows a significant enabling effect on patent. This kind of collaboration can serve to focus research activities which may contribute to the discovery of ideas that are protected by patenting. This kind of protection becomes important to industry as it aims to commercialize these ideas. Its impact on techno fast 500 is however significantly negative. Patents also showed significantly negative impact on techno fast 500. This is opposite to what was expected as pointed out above. More patents are expected to contribute to greater opportunities for the creation of fast growing technology companies.

The results however show the opposite that these factors actually contribute to a reduction in the levels of techno fast 500 even in entrepreneurial economies. In considering all of these relationships, only partial support can be said to be provided for H5b.

System of Finance – H7a & H7b

Existing views and evidence of the effect of financing on entrepreneurship are mixed (Capelleras et al., 2005; Hoffman, 2007). Popular opinion holds that the availability of risk finance in the form of venture capital or less formal sources such as business angels is crucial to the development of entrepreneurship and indeed for the development of the entrepreneurial economy. Indeed the ready availability of a system of risk finance helps to define the entrepreneurial economy. However the literature has not provided any strong empirical support for the significant impact of venture capital on entrepreneurship. Indeed, Hoffman, 2007, was only able to point out that venture capital was prioritized by the top performing countries in his study.

This study is no different. Venture capital was an important separator of the two groupings of economies in the earlier analysis in line with Hoffman. However in terms of actual impact on entrepreneurship especially in more traditional measurements of ERNF or TEA, there is not much support. Buy-out shows significantly negative impact on TEA and is the only case of significant effect on entrepreneurship. It is speculated that strong buyout markets maybe a sign of a vibrant economy which creates less incentive for low level entrepreneurship or ‘necessity entrepreneurship’ which is a component of the TEA index. Hypothesis 7a is thus not corroborated.

The system of finance variables also does not show any significant impact on patenting. This is interpreted as support for the belief that most of the financing at this early stage of the knowledge creation process comes from government or other public sources. These latter sources are not necessarily reflected in the numbers which tend to concentrate on the private markets.

Capitalization of the stock market and buy-out both has significant positive impact on techno fast 500 in entrepreneurial economies. It is these impacts which are interpreted as providing partial support for H7b. Both of these variables represent exit options for venture capitalists and point to the importance of exit opportunities in the development of the venture capital market (Barry, 1994). This is an important aspect that must be considered in the promotion of innovation or high technology entrepreneurship. The lack of exit options have been blamed for the under development of the venture capital markets in places like Germany and also other European countries.

The Conversion Effect – H9a

The expected 'conversion effect' therefore cannot be substantiated since patent does not show any significance impact on either ERNF or TEA. There is an effect however when 'advanced entrepreneurship' is considered, as in the case of techno fast 500 as table 9.8 shows. This is however a negative relationship. There is no conversion of patents[43] into fast growing businesses to drive the economic growth that countries are expecting. Hypothesis 9a is therefore not supported.

[43] Although it is patents applied for and not patents granted.

This never the less is an important effect, especially in light of the suggestion that it is only high-growth potential entrepreneurship which will contribute to economic development (Acs and Varga, 2004). It may help to explain why some of these countries with high patent activities have experienced less than stellar economic growth in recent years (Eurostat).

This is a worrying sign but not necessarily a new finding. It suggests that there is still an existing set of institutions that are hindering that important transformation from research results to actual useful products and services that benefit society. It further supports what has been established in the literature that efforts at targeting inputs, such as increasing R&D spending do not correspond to increasing entrepreneurship. The countries that have the highest expenditures in areas such as R&D do not demonstrate correspondingly high rates of entrepreneurship (Acs et al., 2005; Henrekson and Roine, 2007).

There is therefore the need for modification of public policies that are concerned with the targeting of input. In addition to creating new knowledge and generating innovation, emphasis on commercialization of innovation must be emphasized. For as Wessner has outlined, the innovation process is an intricate web of loops and interconnectedness that involves several actors working together. Having succeeded in increasing the R&D expenditure to some commendable amounts[44], efforts must now be made to connect the different loops.

[44] In many of these countries, at least.

These results may help to explain why many countries in the entrepreneurial economies group, with higher levels of patent applications, have experienced low levels of economic growth for the period under consideration. Their growth levels have been much lower than those countries that fall in the managed economies group and which have lower levels of patent applications. Of course the results could also be due to the fact that patent applications and not actual patents granted are used in the analysis.

9.3.2 Managed Economies

Managed economies are presumed to exist at the other end of the spectrum from entrepreneurial economies. In terms of the four trade-offs concerning public policy they therefore have more restrictive regimes that generally do not provide the necessary support for neither entrepreneurship nor innovation. As the hypotheses indicated, negative relationships are expected between the proxies for public policy and entrepreneurship and innovation measures. As noted back on page 189, in terms of the baseline variables, population growth shows negative impact on ERNF in managed economies while economic growth shows positive impact on TEA.

Regulation – H2a & H2b

None of the regulation variables showed any significant impact on TEA in managed economies. Business regulations and employment rigidity did however show significant impact on ERNF in these economies. The directions of these impacts are the same as in entrepreneurial economies, in that business regulations have positive impact and employment rigidity has negative impact.

In providing partial although weak support for H2a, this further points out that these variables are vital to the entrepreneurial process and that their impact transcends the economic structure. In addition it suggests that business regulations and employment rigidity are not that different between these two groupings of economies.

In the case of innovation measured as patent applications, table 9.7, some of the same regulation variables which showed significant impact in entrepreneurial economies display similar impact in the managed economies. Business regulation which is insignificant in entrepreneurial economies shows significant positive impact on patent application in managed economies. Employment rigidity which is positive in entrepreneurial economies shows negative impact in managed economies. The effect of foreign ownership restrictions remains negative as in entrepreneurial economies. Regulation variables do not show any significance in determining the number of techno fast 500s in managed economies.

One way of interpreting this is that these kinds of firms will exist regardless of the regulatory structure due to special incentives that are provided by government. It however, may also be that the regulatory and other aspects of the economy prevent these kinds of firms from existing in sufficient levels to establish any significant relationship between their existence and the regulatory structures. Although both interpretations are likely, the latter is probably more plausible. The support for H2b based on patenting is also a mix bag of positive and negative impacts which can be considered as partial although weak.

Regulation reforms have taken place at much the same pace, at least in the last decade, in these managed economies as they have in the entrepreneurial economies as part of the general EU strategy. Many of the existing differences however, stem from the fact that many of the countries classified as managed economies were starting from a different point (more restrictive) than their entrepreneurial counterparts. So that even though they have experienced remarkable improvements in several policy areas they still remain generally behind their entrepreneurial counterparts. It should be pointed out though that as we discussed in section one, the strongest differences remain at the extremes and there are several countries in the middle where the demarcation is not so clear-cut. It is these countries, I suspect, that contribute to any positive relationships that have been captured.

Regional Public Policy – H4a & H4b

Regional government expenditure is not a strong determinant of either ERNF, TEA and does not provide any way of verifying H4a. It also does not demonstrate any significant effect on techno fast 500 in managed economies. It has significant positive impact on patent however, which is similar to that shown for the entrepreneurial economy. This is evidence which does not support H4b, refuting it instead. This again supports the belief that efforts at increasing the innovation capacity are better served or are more effective when a regional or local approach is taken. In addition, the effect on the level of entrepreneurship, even in managed economies, is not necessarily direct but may come in the form of conversion effects as we have tried to demonstrate in this study. There is the need for greater efforts in commercializing innovative ideas that are generated from research to make the conversion effect positive and strong.

Targeting Input - H6a & H6b

The variables that represented the targeting of input also show no significant (direct) impact on either ERNF or TEA in managed economies and do not provide any way to corroborate H6a. Any impact on entrepreneurship will have to be by 'conversion' through patents, or even through techno fast 500. The identified effects on patents are similar to those observed earlier in the entrepreneurial economies. University/industry research collaboration has positive impact on patent applications. This collaboration can provide resources to engage in research work that may lead to the discovery of ideas that can be patented. The relationship between higher education R&D expenditure and patent applications is also negative, as is the case in entrepreneurial economies. The dynamics that exist between efforts to target inputs or to create knowledge appear to be the same in both groupings of economies.

Unlike in the entrepreneurial economies however, it is only university/industry research collaboration that showed any significant impact on the level of techno fast 500s, which is positive unlike the negative impact in entrepreneurial economies. One way to interpret this effect is that unlike in entrepreneurial economies, greater collaboration between university and industry is more important in the creation of fast growing technology companies, possibly in the form of university spinouts or through the licensing of university created technologies by firms. The relationship may also come from the funding of specific research projects by businesses who subsequently commercialize the results from these projects. This of course is the relationship that is expected in entrepreneurial economies. However, the results as pointed out earlier do not support this.

The negative effect on both patent and techno fast 500 by some of the variables provide some support for H6b although as is becoming obvious, this is weaker than in the entrepreneurial economy.

System of Finance – H8a & H8b

It was hypothesized that system of finance variables would have negative impact on entrepreneurship and innovation in managed economies since risk financing is not readily available in these kinds of economies. These results show no significant positive effects on either entrepreneurship or innovation in managed economies and can neither support nor refute either H8a or H8b. While there is a negative effect, in the case of capitalization of the stock market on techno fast 500, this is not a significant effect. However as the results for the entrepreneurial economies show that there aren't any really strong impact from the system of finance variables even in entrepreneurial economies. The fact that there are no real strong effects for the managed economies is therefore not very surprising.

Venture capital is expected to be less available in managed economies than it is in entrepreneurial economies. As such entrepreneurs and innovators will have to find other sources of financing their ventures and their research. Government financing programs either nationally but increasingly at the EU level are crucial for early stage funding of research in both groupings of economies. Another source of funding is from business angels, whose importance have been documented especially in the USA (Freear & Wetzel, 1990; Acs & Tarpely Jr, 1998).

Business angels are also active in the represented European countries, however, they are generally not very well organized[45] and therefore reliable data on the extent of their activities is extremely limited. The development of stock markets and their capitalization is also generally less in managed economies and therefore does not offer an attractive exit route for venture capitalists.

This does not help in the development of the venture capital market. This however is a chicken and egg scenario where the presence of an active venture capital market supports the existence of a well capitalized stock market. At the same time, a well capitalized stock market appears to be needed to support the creation of a vibrant venture capital market. The overall expectation was that the relationships identified in the managed economies would have been negative. These would have been reflections of a public policy regime that impedes the entrepreneurial and innovation processes. While some negative impacts were identified, these were generally not significant impacts. In some instances the negative impacts were the same as in entrepreneurial economies as is the case of employment rigidity.

The majority of the impacts in managed economies were therefore not significant ones. The results point to the need for still more reforms in public policies in these economies, to make them more supportive of entrepreneurship. Reforms are needed across both types of economies especially in terms of transforming patents into new products and services and labour regulations.

[45] With the exception of the UK which has the best organized angel network outside of the USA.

However there are changes which are necessary in managed economies that will make them more accommodating to the entrepreneurial and innovation processes.

Table 9.9: Status of hypotheses

Hypothesis	Status
H1a: Regulation will have positive effect on entrepreneurship in entrepreneurial economies. H1b: Regulation will have positive effect on innovation in entrepreneurial economies	Partially supported Partially Supported
H2a: Regulation will have negative effect on entrepreneurship in managed economies. **H2b: Regulation will have negative effect on innovation in managed economies.**	**Partially supported** **Weakly supported**
H3a: Regional government expenditure will have positive effect on entrepreneurship in entrepreneurial economies. H3b: Regional government expenditure will have positive effect on innovation in entrepreneurial economies.	Not supported Strongly supported
H4a: Regional government expenditure will have negative effect on entrepreneurship in managed economies. **H4b: Regional government expenditure will have negative effect innovation in managed economies.**	**Not supported** **Not supported-refuted**
H5a: Targeting input will have positive effect on entrepreneurship in entrepreneurial economies. H5b: Targeting input will have positive effect on innovation in entrepreneurial economies.	Weakly supported Partially supported
H6a: Targeting input will have negative effect on entrepreneurship in managed economies. **H6b: Targeting input will have negative effect on innovation in managed economies**	**Not supported** **Weakly supported**
H7a: The system of risk capital will have positive effect on entrepreneurship in entrepreneurial economies. H7b: The system of risk capital will have positive effect on innovation in entrepreneurial economies.	Not supported Partially supported
H8a: The system of risk capital will have negative effect on entrepreneurship in managed economies. **H8b: The system of risk capital will have negative effect on innovation in managed economies.**	**Not supported** **Not supported**
H9: Innovation will have positive effect on entrepreneurship in entrepreneurial economies	Not supported

Source: Self Elaboration

In summarizing the hypotheses in table 9.9, a rather negative picture is painted, in that only one hypothesis is supported and others are partially confirmed. However, as outlined in the preceding discussion there are multiple factors at play. The discussion allows me to deal with each factor separately, but this is not so easily accommodated in a table. Because more than one indicator is used to represent some variables, the impacts are not always as clear cut and uniform for each of these indicators. Indicators of regulations include for example ETCR, business regulation, employment rigidity. Employment rigidity shows negative impact on entrepreneurship while the impact of business regulation is positive, therefore in summing the overall impact of regulation, only a partial support can be claimed. The specific impact that is seen therefore depends a great deal on the indicators used which have implication for how research results are interpreted or compared with other results.

The one hypothesis that is clearly supported for example is the location of public policy where only a single variable, regional government expenditure, is applied. Not withstanding this, I believe that the application of several measures of a particular variable strengthens the research and its overall findings are therefore not considered as being weak.

CHAPTER 10: CONCLUDING REMARKS, IMPLICATIONS AND LIMITATIONS

10.1 INTRODUCTION

This thesis studies public policy as one group of characteristics that separate countries into managed and entrepreneurial economies. It was presumed that a sample of EU member countries embodied the characteristics of managed and entrepreneurial economies. Based on the consideration that technological transformation is driving the divide between the two economic structures, evidence of this transformation is assumed to be able to separate the countries accordingly. It was further supposed that by looking at public policies of the two groupings of economies four specific trade-offs could be identified. These trade-offs represent a changing institutional profile that is geared towards promoting entrepreneurship and innovation as the way to sustain economic prosperity, for those who presently enjoy prosperity. For the member countries which presently experience lower levels of economic success, it is seen as a way to achieve economic success to create a more even distribution of wealth within the EU.

Three main questions addressed in the analysis are: (i) Can a sample of EU members be separated into managed and entrepreneurial economies and what are the factors that will be most important in making this separation; (ii) Can the trade-offs in public policy be identified in the two groupings of economies. And,

(iii) What are the relationships between public policy programs representing the trade-offs and the level of entrepreneurship and innovation in these economies. The analysis is based on the Institutional Theory specifically the version by North. Several propositions and hypotheses were derived based on a combination of theory and literature which are assessed through qualitative and quantitative analyses.

10.2 RESULTS

The empirical analysis demonstrates clearly that, based on the factors employed, the countries can be separated into two groups. These factors are indicators of technology transformation which is at the heart of the entrepreneurial economy. These two groups were labelled managed and entrepreneurial. The former demonstrated the lowest levels of the variables representing innovation and technology transformation, while the latter is the group with the highest levels of each variable. Knowledge workers, research and development expenditure, Internet access and patents granted were the most significant variables in separating the countries into the two groups. Managed economies are not restricted to the newest members which also happen to be former planned economies. Instead, long standing members who are considered developed economies such as Spain and Italy are also classified as managed economies.

The analysis of the two newly formed groups to identify the trade-offs in public policy revealed several things. It is possible to strongly support the existence of three of the four trade–offs, namely stimulation versus regulation, targeting input versus targeting output and risk versus low risk finance, in the two grouping of economies. These are however are most prominent when the extreme cases are considered. So that the countries with the lowest levels of regulations fall in the entrepreneurial group while those with the highest levels of regulations fall into the managed economy group.

There is however a few countries that do not consistently fall at either of these two extremes which is interpreted to mean that the differences in the public policies of these countries are not so well divided. Spain readily comes to mind but Brussels, Ireland and France are also examples, depending on the particular trade-off. For the other trade-off, regional versus national public policy development, the distinct separation between the two groups while obvious is less strong than in the other three trade-offs. This could be from the fact that many countries just do not have well developed regional competences in formulating public policy, which is not limited to the managed economies. It is also possible that this result is a reflection of a poorly operationalized variable.

An important conclusion based on the showing from the middle-ground countries, is that rather than two very polar groups, at least among the countries analyzed in this study, there is a continuum from the least entrepreneurial (most managed) to most entrepreneurial (least managed) along which countries fall.

When these results are interpreted in terms of the Institutional Theory, they indicate the presence of institutional frameworks which, especially in the extreme cases, are markedly different from each other. At the high end are the kind of institutions that enable the entrepreneurial and innovative processes and which have been credited as being responsible for the economic progress that the developed world have experienced. As the opposite end are the kinds of institutions that have not changed with the times and remain restrictive and altogether deterrents to entrepreneurship and innovation. The presence of these middle ground countries maybe interpreted in many ways. The interpretation preferred though is that it is a promising sign evident of changes that are taking place which will create more favourable institutional structures in managed economies. The other side of the coin though is that even in the entrepreneurial economies of the EU, there is still work to be done to better support the entrepreneurial and innovation processes. In a sense this shows that there are actually degrees of entrepreneurial and innovativeness rather than distinct groups.

The statistical analysis shows that public policy efforts and programmes related to the four trade-offs do impact the level of entrepreneurship and innovation. However the strength of the impact depends a great deal on the indicator used both for entrepreneurship and innovation. It also shows that the effects are more pronounced in the entrepreneurial economies than in managed economies as was expected.

Additionally the policies have more effect on measures of innovation over those of traditional entrepreneurship and this has implication for how these results are interpreted. Considering more traditional methods of gauging entrepreneurship are no doubt going to raise arguments about the results from this research. However as the previous discussions have shown the incidences of significant impact on TEA are almost very few.

The results specifically show that;

In entrepreneurial economies,

a) ETCR regulations have negative impact on both ERNF and patent applications.
b) Labour regulations (employment rigidity) shows negative impact on ERNF and positive impact on both patent applications and techno fast 500.
c) Cost of firing also shows positive effect on techno fast 500.
d) Business regulations' only impact was on ERNF where it is positive
e) Foreign ownership restrictions show positive impact on TEA and negative effect on patent applications.
f) Regional government expenditure has positive impact on both measures of innovation (patent applications and techno fast 500).
g) Higher education R&D has positive impact on ERNF, and negative effect on patent applications and techno fast 500.
h) University/industry research collaborations have positive effect on patents and negative effect on techno fast 500.

i) Patent applications, higher education R&D, university/industry research collaborations all have negative effects on techno fast 500.
j) Capitalizations of the stock market and buy-outs both have positive effects on techno fast 500.

In managed economies the following effects were observed.

k) Employment rigidity shows negative impact on ERNF and patent applications but positive impact on techno fast 500.
l) Business regulations only impact ERNF and patent applications and both effects were positive.
m) Foreign ownership restrictions show negative effect on patent.
n) Regional government expenditure shows positive impact on patent.
o) Higher education R&D demonstrated negative impact on patent applications.
p) University/industry research collaboration showed positive effect on both patent and techno fast 500.

These results therefore demonstrate that the entrepreneurial economies have an institutional profile, in terms of these limited public policy trade-offs, that is more supportive of entrepreneurship and probably more so of innovation. This is based on the positive relations that were proposed and that were observed. It is not a perfect setting, however as there are still deterrents to the entrepreneurial and innovative processes as can be assumed from the negative impacts that are depicted.

The most striking finding in this regard is the negative relations between efforts to promote innovation, such as higher education research and development spending, university/industry research collaboration and the number of techno fast 500 firms.
This however maybe a reflection of the nature of the data especially for techno fast 500, and suggests a reassessment with other sources or kinds of data. Nevertheless, the presence of several negative relations, where positive relations were presumed to be, signifies the need of continued efforts to improve the institutional environment. Institutions in the form of public polices that will not just create opportunities for entrepreneurship and innovation but will also facilitate the conversion of these opportunities into growing and prosperous economic units.

The institutional profile to support entrepreneurship and innovation in the managed economies appears to be weaker than that of entrepreneurial economies. It is not a total washout however with some enabling policies for traditional measures of entrepreneurship and even stronger signs in terms of innovation. The identification of positive relationships, where negative ones were expected, attests to this. However as was identified earlier there are some countries in the managed economies that stand out in terms of specific policy trade-offs. For example countries like Greece that fall extremely low in some trade-offs. Greater efforts must therefore be made to improve the institutional structure of these countries if they are expected to achieve economic growth and experience the kind of economic prosperity that places like Denmark, the UK and Finland have experienced. This, however, is not to identify these three as perfect settings for either entrepreneurship or innovation activities.

10.3 IMPLICATIONS

Research

This thesis looks at four trade-offs concerning public policy that separate the managed and the entrepreneurial economies. It utilized some old ways as well as a few new ways of operationalizing public policy. The results set the stage for further analysis into the potential effect of public policy on levels of entrepreneurship and innovation. They highlight the importance of selecting appropriate indicators for both entrepreneurship and innovations. This have implication for the effects that are discovered which have consequences for further policy development or amendments to existing public policies. It will also influence the formulation of policy evaluation mechanisms.

There are also avenues for extensions of this study, in the first instance to increase the sample size to include countries outside of the Euro zone for example the USA and Japan. It remains the responsibility of the research community to analyze the other groups of trade–offs that separate managed and entrepreneurial economies, as proposed by Audretsch and Thurik. I think that within these other trade-offs are implications for how entrepreneurship and innovation can be stimulated to support economic growth in both types of economies both here in Europe as well as the rest of the world.

Policy

It has been observed that there are economic policies that are not conducive to the expansion of entrepreneurship and innovation in the countries of the EU. While these kinds of public policy appear to be stronger in managed economies, they also exist in entrepreneurial economies. One policy area that stands out is that of labour regulation, which has shown to be a deterrent especially in managed economies where it impacts both entrepreneurship and innovation. Wage setting institutions and other labour related legislations discourage the hiring of workers which will hinder both the start and growth[46] especially in managed economies. In addition these legislations may push these kinds of firms to move to other places like the USA, where there are more agreeable legislations. It is however necessary to point out that it does not have the same effect on innovation in entrepreneurial economies. This therefore means that policy objective cannot be the same in both types of economies.

There has been much emphasis placed on increasing R&D spending. However it appears that while there are remarkable efforts being placed on research, the development aspect of the duo is often less emphasized. Increasing spending on R&D is not contributing to increases in fast growing firms which are the best way to realize real benefits from the investments in the process. Greater efforts must now be placed on commercializing the result from research, preferable through paving the way for the creation of high-growth potential new firms with complimentary legislations.

[46]Even though it did not show any impact on techno fast 500.

Regional government spending is not one of the strongest ways that the two grouping of economies can be separated. However it has been substantiated as having positive impact especially on the innovation process. This suggests that there is still the need to increase efforts to develop regional public policies. The development of competencies in articulating public policy objectives will endure that the areas that are most crucial to the growth and regeneration of regions will be emphasized. The results will be a collection of effective regional innovation systems that contribute to the transformation of countries and the entire EU area.

There have been remarkable efforts to create financial systems that favour small young and innovative firms. However the lack of any strong impact of these efforts should be considered as indications that there still needs to be greater efforts in this area in both types of economies. Although governments, both nationally and EU wide have established programs to provide financing to high-growth potential firms, this is not the most efficient way to address this issue. What is needed is an environment of taxes and of financial legislations that will make the accumulation of individual wealth an attractive gesture. This will help to create a more active environment of start-ups.

The results have demonstrated that the many institutional changes that have taken place prior to the 2001-2005, as well as those during that time, have helped to create a supportive infrastructure for entrepreneurship and innovation in the EU. But even as the effects of these are taking root, the current financial crisis is threatening to undo some of the gains that have been realized especially in the systems of finance. There are increased calls for more regulations by governments especially in the financial markets. While these are no doubt necessary, caution is required not to extend these calls for greater regulation to other areas of the free market economy. It will be interesting to see how events progress. Will entrepreneurship and innovation be what gets the worlds' economies out of the present crisis or will the crisis put a cap on the burgeoning entrepreneurial and innovative spirit in these European countries?

10.4 LIMITATIONS

The thesis focuses on public policies programs that are specifically targeted towards promoting innovation and entrepreneurship activities. Assistance and services that are provided to establish small and medium size enterprises (SMEs) as well as those provided by private organizations are not singled out. These policies occur within the overall economic context of a country. However, they are analyzed as separate public policies and not as mere extensions of the national economic policies.

The data used for the analysis of the effect of public policy programs on actual levels of entrepreneurship and innovation is collected over the entire period 2001-2005[47]. Several of the European Union's declarations on the renewed importance of entrepreneurship and innovation as the way forward to economic growth were implemented in 2000 although preparation for many of these programs and projects began in earlier years. It however required some time for meaningful changes to be effected signalling this new focus, especially in those countries that had not undertaken major efforts in this area prior to these declarations.

The five years from 2001 to 2005 were selected for two main reasons. Five years provide some time in which measurable impact from public policy programs would have been seen and documented by the relevant agencies. At the same time this is recognized and acknowledged as a limitation. The conditions in which polices are being implemented differ and this influences the time in which their effects are measurable. Most importantly however is that the time frame for this thesis dictates that there is a cut-off date. A time period in which the relevant data to make meaningful analysis is available is also crucial.

Another most important limitation that must be acknowledged is the difficulty (or impossibility) to isolate the effect of specific public policy programs when such programs are not implemented in isolation. Their effect are therefore bound to be affected by the existence of other programs all targeted at the same phenomenon as well as more general economic polices.

[47] In some instances data is not available for the entire time period and substitutions are made. These are described in the sections of the study where they occurred.

In addition the interactions among even those public policy programs that have been considered are also difficult to isolate. The results should therefore be interpreted with these in mind.

Finally, there are limitations concerning the separation of these countries into groups of managed and entrepreneurial economies as pointed out on page 88. It is practically impossible to get groups that are purely entrepreneurial or purely managed economies since countries have elements of both managed and entrepreneurial economies. This factor will no doubt have implications for the relationships that are depicted.

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Danish Competition Authority: http://www.ks.dk/english/

Institute of Competition law: http.//www.concurrences.com/article

APPENDIX A: Components of ETCR aggregate score- Taken from OECD

1. Sectoral Indicator of regulatory reform: Passenger air transport

Entry regulation

Does your country have an open skies agreement with the United States?

Is your country participating in a regional agreement?

Is the domestic aviation market in your country fully liberalised? That is, there are no restrictions on the number of (domestic) airlines that are allowed to operate on domestic routes?

Public ownership

What percentage of shares in the largest carrier (domestic and international traffic combined) is owned by national, state or provincial authorities?

2. Sectoral Indicator of regulatory reform: Telecom

Entry regulation

What are the legal conditions of entry into the trunk telephony market?

What are the legal conditions of entry into the international market?

What are the legal conditions of entry into the mobile market?

Public ownership

What percentage of shares in the PTO are owned by government?

What percentage of shares in the largest firm in the mobile telecommunications sector are owned by government?

Market structure

What is the market share of new entrants in the trunk telephony market?

What is the market share of new entrants in the international telephony market?

What is the market share of new entrants in the mobile market?

3. Sectoral Indicator of regulatory reform: Electricity

Entry regulation

How are the terms and conditions of third party access (TPA) to the electricity transmission grid determined?

Is there a liberalised wholesale market for electricity (a wholesale pool)

What is the minimum consumption threshold that consumers must exceed in order to be able to choose their electricity supplier?

Public ownership

What is the ownership structure of the largest companies in the generation, transmission, distribution, and supply segments of the electricity industry?

Vertical Integration

What is the degree of vertical separation between the transmission and generation segments of the electricity industry?

What is the overall degree of vertical integration in the electricity industry?

4. Sectoral Indicator of regulatory reform: Gas

Entry regulation

How are the terms and conditions of third party access (TPA) to the gas transmission grid determined?

What percentage of the retail market is open to consumer choice?

Do national, state or provincial laws or other regulations restrict the number of competitors allowed to operate a business in at least some markets in the sector: gas production/import?

Public ownership

What percentage of shares in the largest firm in the gas production/import sector are owned by government?

What percentage of shares in the largest firm in the gas transmission sector are owned by government?

What percentage of shares in the largest firm in the gas distribution sector are owned by government?

Vertical Integration

What is the degree of vertical separation between gas production/import and the other segments of the industry?

What is the degree of vertical separation between gas supply and the other segments of the industry?

Is gas distribution vertically separate from gas supply?

Market structure

What is the market share of the largest company in the gas production/import industry?

What is the market share of the largest company in the gas transmission industry?

What is the market share of the largest company in the gas supply industry?

5. Sectoral Indicator of regulatory reform: Post

Entry regulation

Do national, state or provincial laws or other regulations restrict the number of competitors allowed to operate a business in at least some markets in the sector: national post - basic letter services?

Do national, state or provincial laws or other regulations restrict the number of competitors allowed to operate a business in at least some markets in the sector: national post - basic parcel services?

Do national, state or provincial laws or other regulations restrict the number of competitors allowed to operate a business in at least some markets in the sector: courier activities other than national post?

Public ownership

What percentage of shares in the largest firm in the sector: national post - basic letter services are owned by the government?

What percentage of shares in the largest firm in the sector: national post - basic parcel services are owned by the government?

What is the extent of public ownership in the courier (activities other than national post) sector?

6. Sectoral Indicator of regulatory reform: Rail

Entry regulation

What are the legal conditions of entry into the passenger transport rail market?

What are the legal conditions of entry into the freight transport rail market?

Public ownership

What percentage of shares in the largest firm in operation of infrastructure sector is owned by government?

What percentage of shares in the largest firm in passenger transport sector is owned by government?

What percentage of shares in the largest firm in freight transport sector is owned by government?

Do national, state or provincial government holds equity stakes in business company : Railways

Market structure

What is the maximum number of operators that compete in the same area / rail district in the passenger transport market?

What is the maximum number of operators in the freight transport market?

Vertical Separation

What is the degree of separation between the operation of infrastructure and the provision of railway services (the actual transport of passengers or freight)?

7. Sectoral Indicator of regulatory reform: Road

Entry regulation

In order to establish a national road freight business (other than for transporting dangerous goods or goods for which sanitary assurances are required) do operators need to obtain a license (other than a driving license) or permit from the government?

Are criteria other than technical and financial fitness and compliance with public safety requirements considered in decisions on entry of new operators?

Does the regulator, through licenses or otherwise, have any power to limit industry capacity?

Are professional bodies or representatives of trade and commercial interests involved in specifying or enforcing entry regulations?

Are professional bodies or representatives of trade and commercial interests involved in specifying or enforcing pricing guidelines or regulations?

Price controls

Are retail prices of road freight services in any way regulated by the government?

Does the government provide pricing guidelines to road freight companies?

Countries are scored (0 - 6) least restrictive - most restrictive.
The aggregate indicator (which is used in this study) is calculated as the simple average of the seven sectoral indicators.

APPENDIX B: THE SAMPLE

Table B1: Number of observations and classification of countries

Country	Number of observation periods	Classification
Austria, AT	5	E
Belgium, BE	5	E
Czech Republic, CZ	5	M
Denmark, DK	5	E
Finland, FI	5	E
France, FR	5	E
Germany, DE	5	E
Greece, GR	5	M
Hungary, HU	5	M
Italy, IT	5	M
Ireland, IR	5	E
Latvia, LA	5	M
Netherland, NL	5	E
Poland, PL	5	M
Portugal, PT	5	M
Slovania, SL	5	M
Spain, ES	5	M
Sweden, SE	5	E
United Kingdom, UK	5	E

Note: M = Managed Economy
E= Entrepreneurial Economy

Source: Self elaboration

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