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Institutional Foundations of Varieties in Entrepreneurship

A Case Study of Hungary and Slovenia

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Abstract

Nowadays, a commonly held belief in capitalist economies is that innovative entrepreneurship is a precondition for sustained economic growth. In response, policy-makers have devised a multitude of entrepreneurship policies, aiming to stimulate this type of economic activity. Because the effectiveness of these efforts is not as expected, this study aims to provide insights into the influence of the institutional environment on tentative entrepreneurial efforts. It is thereby hypothesized that the influence of the economy at large is more important than the individual inhabitant's circumstances. Due to the fact that capitalist economies' inner workings can differ profoundly from one another, the Varieties of Capitalism framework is introduced to differentiate between these different types of economies. A rich method of data collection is chosen to sensitize the results for individual circumstances and attitudes. This amounted to 11 interviews with innovative individuals active in the Hungarian and Slovenian ICT industry. It is found that the influence of the institutional context is profound in guiding both the type of innovations upon which new ventures are based and the motives of individuals when opening their own firms. Nonetheless, it does not seem to explain micro-level tendencies conclusively, as entrepreneurial skill acquisition methods of interviewees do not match theoretical expectations. Furthermore, the influence of individual characteristics is discernable at the micro-level. Institutional and individual explanations of entrepreneurship are therefore not found to be mutually exclusive, warranting analyses sensitive to multiple influential factors, upon which entrepreneurship policies could be more effectively based.

1. Introduction

Policy-makers on supranational, national, and regional levels seem to collectively recognize the importance of innovative entrepreneurship for continued growth and optimal performance of industries (Schumpeter 1934; Audretsch and Thurik 2001; Collins *et al.* 2004; Acs and Szerb 2007). This belief is rooted in the entrepreneurship research of the past decade; for instance, Collins *et al.* argue in line with Schumpeter (1934) that “the encouragement of successful innovations and entrepreneurship is beneficial for the continued health and long-term growth of a nation’s economy” (Audretsch and Thurik 2001; Collins *et al.* 2004: 95).

Current entrepreneurship policies, however, seem biased in predominantly catering to people that *want to* become entrepreneurs. This is done by providing the input factors needed to facilitate nascent entrepreneurship, e.g. by providing subsidies. Nevertheless, Europeans still prefer employment over self-employment (EC 2003), and entrepreneurial activity did not increase significantly since the late 1990s (Eurostat 2008), which indicates only limited success of these policies. The assumed ‘voluntary’ entrepreneurship therefore does not seem to be all-encompassing. This belief is nonetheless also rooted in entrepreneurship research of the past decades, as shown in the vast body of literature that has been created in an attempt to establish the determinants of entrepreneurial activities (see e.g. Cooper and Dunkelberg 1986). Indeed, one of its dominant strands focuses on the input factors and individual characteristics required for entrepreneurial activities to commence – and primarily deals with positively motivated, voluntary instances of entrepreneurship. It therefore seems to be incomplete as well, in that the provision of *incentives* for entrepreneurial activities, or *pull* factors, does not seem to be sufficient to stimulate these activities in itself (Hessels *et al.* 2008; Van der Knaap 2009).

As a result, entrepreneurship policies, including measures such as the provision of subsidies, funding of research and knowledge networks, and the facilitation of access to relevant information, are plentiful in the majority of economically prosperous countries – but are not necessarily effective (see also Storey 2003). In providing these measures, as mentioned before, European policy makers seem to focus explicitly on the encouragement of those people that *want to* become entrepreneurs and are waiting for their chance to take this step towards self-fulfillment. They aim to stimulate these individuals in their efforts by providing a ‘beneficial entrepreneurial climate’ in order to allow them to start their own business (e.g. EC 1999; Burke *et al.* 2002; EC 2003; OECD 2003). These measures are often similar across countries, particularly when encompassed within the European Framework Programs. Nevertheless, it remains to be seen whether similar measures prove to be efficient across countries and, therefore, across varieties of capitalism, for not all economies have identical features. In focusing on a one-fits-all policy, the opportunity to stimulate (crucial, high-tech) entrepreneurship across different types of economies may be lost.

This combination of biases, in both the entrepreneurship literature of the past decade as well as policy making, seems to reflect a general conception of entrepreneurs as individuals fulfilling their destiny (McClelland *et al.* 1958; McClelland 1961; Shane and Venkataraman 2000; Collins *et al.* 2004) in a free market economy that does not differ much across countries. The present study rejects this notion in favor of a more nuanced stance on the origins of entrepreneurship and the environments within which potential entrepreneurs operate. Institutional circumstances are thereby hypothesized to be the driving force behind entrepreneurial efforts. This more nuanced stance is taken by using the Varieties of Capitalism (VoC) approach, as introduced by Hall and Soskice (2001) and developed, most notably, by Hancké *et al.* (2007). Using the aforementioned framework will allow for making a distinction between different national economic environments, which is important in order to be able to answer the research question:

To what extent do institutional circumstances influence innovative individuals with regards to opening their own firm?

The countries studied in this report include Slovenia and Hungary, following Mill's Method of Difference (see e.g. Ragin 1987: 38-39). Because both of these countries have transitioned from a centrally planned to a free market economy since the early 1990s, the observable influence of institutions on entrepreneurship are particularly evident. Institutional foundations are present from the very start and routed in pre-transition class systems (Feldmann 2007; Hancké *et al.* 2007; King 2007). The triggers of entrepreneurship experienced by individual potential entrepreneurs, meanwhile, are both recent and vibrant. These transitioning countries therefore prove to be particularly telling cases to study the way in which institutions shape the prevalence and focus of entrepreneurship. Entrepreneurship is thereby defined as the legal foundation of a business, being actively involved in its start-up and operations, in line with Aidis and Van Praag (2007). The differences between individuals are accounted for by conducting in-depth interviews with a sample of potential entrepreneurs, who are in the possession of a viable business idea in the (relatively easily accessible) ICT industry.

The remainder of this article is organized as follows: section 2 provides an overview of the theory upon which the current study is built. From this, several hypotheses are derived. The research method and case selection is described in section 3. Section 4 outlines the results and tests the respective hypotheses. Finally, section 5 and 6 provide a conclusion and discussion.

2. Theory

The present study draws from both institutional approaches to entrepreneurship, that assign power to institutions primarily in inducing entrepreneurial efforts through the distribution of a fixed set of input factors, and entrepreneurship literature insights that suggest individuals are independent in their choices and behaviors – and are therefore able to secure their own input factors. The study hypothesizes that institutional factors have great value in predicting the prevalence and focus of entrepreneurial efforts in any particular economy.

This section outlines the VoC framework first and foremost, which constitutes the most comprehensive institutional framework currently available in the political economic literature (Herrmann 2009). In section 2.2, some insights derived from individual explanations are presented, as well as some criticism on the methodological approach commonly found within this strand of literature. Section 2.3 will derive hypotheses from these bodies of literature.

2.1 The Varieties of Capitalism (VoC) Framework

The Varieties of Capitalism framework, as developed by Hall and Soskice (2001) and expanded upon by Hancké *et al.* (2007), introduces an approach most notably used to understand institutional variations across nations, as commonly studied in comparative political economy. It is used in the present study because it is able to provide us with potent hypotheses regarding institutional influences on entrepreneurship. The power of VoC lies in the fact that it is presently the most well-established framework addressing differences between economic circumstances in an explicit, institution-based fashion. These circumstances comprise the environment within which firms operate and thus, within which innovative individuals decide whether to open their own firm or not. It is thereby assumed that circumstances are largely identical for all individuals within the economy,

causing them to make similar decisions. Also, specifically in the context of the transitioning countries studied, recent work has shown the framework's suitability for the analysis of these economies.

Although the VoC literature is often criticized for its rather static analyses, it can nevertheless be used to map a transitioning economy's development towards either of its two ideal archetypes, as outlined below. In this respect, the VoC approach is both evolutionary and flexible in character, allowing for some degree of systemic change to take place, through a possible variation in responses available to firms and individuals active in the economy, but within the confinements of the system as a whole – this prevents profound systemic change. Meanwhile, initial institutional configurations are said to be rooted in pre-existing class structures. After an initial period of transition, during which institutions are established and consolidated along the lines of these pre-existing class structures, institutional circumstances can therefore be considered to be stable, as is customary in the VoC literature dealing with (other) developed capitalist economies (Hancké *et al.* 2007).

The VoC approach uses five economic subsystems - or, rather, spheres of interaction - as building blocks for the analysis of varieties of capitalism (VoC). The better these spheres complement one another, the more efficiently the system as a whole performs. Through analysis of the characteristics of a particular economy, in terms of resolving coordination problems in all of these spheres of interaction, the type of VoC present can be determined. Firms are always at the center of attention as the main unit of analysis. The five spheres are the following:

- *Industrial relations.* This entails employers' bargaining over wages and working conditions with the workforce. Effectiveness of coordination in this sphere is reflected directly in wage and productivity levels and indirectly in firms' success, employment levels, and inflation.
- *Vocational training and education.* The (mis)match between the skills required by employers and skills invested in by the workforce.
- *Corporate governance.* This sphere is defined by firms' access to financial capital and the assurance of returns on investors' investments.
- *Inter-firm relations.* This sphere determines a particular economy's competitiveness and technological progress. Successful interactions here should lead to enhanced access to technology, the establishment of a stable demand side, and the appropriation of required supplies.
- *Employees.* The effectiveness of mechanisms of cooperation (and thus information sharing) in a particular firm. In order for these to be effective, potential problems like moral hazard and adverse selection need to be overcome (Hall and Soskice 2001).

Various ways of coping with conflicts and coordination in these spheres result in (a variation on) either of the two archetypical types of economies identified by Hall and Soskice (2001) – the liberal market economy (*LME*) or coordinated market economy (*CME*), as outlined in the forthcoming paragraphs. In practice, the aforementioned spheres of interaction can be condensed to three indicators that are most telling in distinguishing between these two ideal types – inter-firm relations with regards to standard setting, labor relations, and corporate governance (Herrmann 2008). Useful indicators, that aid in distinguishing between the archetype most accurately describing a particular nation's economy, therefore include top management authority, competitive or collaborative standard-setting, and labor market relations. For the purpose of the present study, the latter indicator is particularly important due to its direct and profound influence on the livelihood of individuals within a particular economy.

To describe the first ideal-type of economy, it can be said that the archetypical *LME* operates along the lines of neoclassical ideology. In practice, this means that supply and demand determine prices, there is profound competition between firms, and formal, enforceable contracts are used to oversee inter-

firm relations. The LME is governed by institutions that support this type of contracting. Since the market is the governing factor in this type of economy, firms will usually be hesitant to cooperate extensively, for this might forfeit their competitive advantage. Instead, technological progress is often achieved through the employment of scientists and engineers (mobility is stimulated) and licensing or sale of patentable inventions. Continuous competition is assured through antitrust legislation. This constant competition is also discernible in standard setting, for these are set through “market races” rather than cooperative behavior at the industry level. Access to financial capital is governed by current earnings and share values of a particular firm, while mergers and acquisitions are very acceptable, even if these are hostile. Top management has the authority to make decisions unilaterally. Due to the (as a result) highly fluid labor markets, the workforce invests in general skills that can thus be applied in multiple jobs and is weakly coordinated, as are employers. Additional, but minimal, training is then offered in-house. Due to the focus on current cash flows in financing, flexible labor markets, and its firms’ ability to adapt quickly when managed decisively, the LME is particularly suitable for radical innovation, while not “patient” enough for incremental innovations (Hall and Soskice 2001; Hancké *et al.* 2007).

Meanwhile, the archetypical CME uses industry-wide coordination or relational contracting to govern economic exchange through non-market interactions. This type of economic conduct is supported by institutions that reduce the amount of uncertainty to be faced by actors in the economy. This can be done through e.g. monitoring the exchange of information and firm behavior, with the ability to sanction defection from the cooperative norm. Business associations, trade unions, and cross-shareholding are therefore more predominant in this VoC as compared to their importance in LMEs. Within this system, firms are firmly tied together through either a set of business associations or trade units, or “families” of firms with a multitude of inter-firm ties in a reputation based network. Investment models are often based on firms’ reputations rather than the firms’ current balance sheets. Meanwhile, the firms’ top management is granted little authority – it has to go through supervisory boards to make major decision and therefore focuses mainly on consensus building rather than unilateral leadership. For technological improvement, CMEs rely on publicly funded strengthening of firm competencies and jointly financed R&D, often in collaboration with public research institutes. Standards are also decided upon in a cooperative manner, usually by industry organizations. The labor market is highly rigid in the archetypical CME, with wages and working conditions often controlled at the industry level. Labor forces are therefore highly specialized and are, often through in house apprenticeships, provided with skills needed by a particular firm. These apprenticeships are offered as part of the publicly subsidized training system in which general skills are also obtained. Mainly due to their “patient” finance schemes, well-developed collaborative R&D networks, and rigid labor market, CMEs are particularly suitable for the development of incremental innovations (Hall and Soskice 2001). A robust welfare system is often provided by the state (Hancké *et al.* 2007).

Because the manners of cooperation in the respective types of economies are so firmly set in existing institutions and deeply entrenched within the cultural values of nations, the VoC found in any particular nation is self-reinforcing and rather resistant to profound change. The type of conduct culturally expected when dealing with a particular situation shapes corporate strategy, along with resource endowments, market settings, and management practices - albeit the latter is also (at least partially) entrenched in predominant cultural values. Corporate strategy can therefore be expected to differ across countries, although the increased competitive pressures unleashed by globalization will force convergence upon economies in at least some of its most basic functionalities. These developments include the increasing importance of ‘balance sheet based’ international capital flows as well as international mergers and acquisitions (Hall and Soskice 2001). In addition, these (and other) changes in one particular sphere are able to “snowball” throughout several of VoC’s spheres, profoundly changing the system as a whole as a result. This, however, will take a substantial amount

of time (Hancké *et al.* 2007). For the purpose of the present study, it can therefore be assumed that the conditions under which individuals operate will stay the same during the timeframe of the study.

2.2 Individual Explanations of Entrepreneurship

Although the Varieties of Capitalism (VoC) analytical framework, as introduced in section 2.1, is at the center of the current study's analysis, the study also draws insights from entrepreneurship studies focusing on the individual (tentative) entrepreneur. The brief overview of this body of literature is guided by the sequence of prerequisites adhered to, and events gone through, by an individual opening his or her own firm, as presented in figure 1 below.

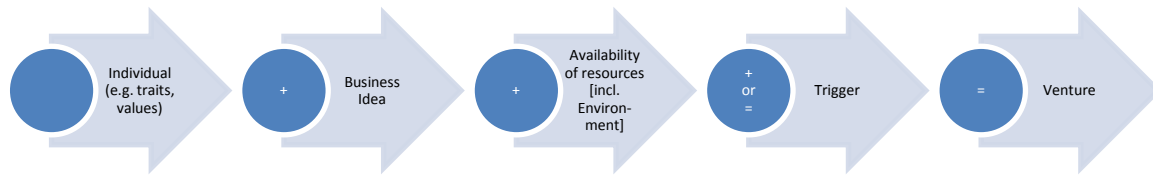


Figure 1 – Sequence of new venture formation (*Source: own illustration, based on Tidd *et al.* (2005) and Audretsch *et al.* (2002).*)

First of all, it is commonly assumed in the entrepreneurship literature, dealing with individual explanations of entrepreneurship, that certain traits, values, and drives need to be present before an individual makes the decision to venture (see e.g. Schumpeter 1934; Cooper and Dunkelberg 1986; Shane and Venkataraman 2000). This strand of literature has thereby traditionally tended to overestimate the *pull* factors involved in the *decision* to become an entrepreneur, disfavoring the *push* factors that *necessitate* entrepreneurship. Consequently, this reflects the literature's conception of individual potential entrepreneurs as being free in their choices and behavior, driven by their perceived need to acquire input factors. In accordance, commonly identified influential factors include, but are not limited to, autonomy^[2], challenge, status^[3], achievement^[4], power^[5], perceived entrepreneurial skills^[6] and prior entrepreneurship^[7], which both seem to be mediated by self-efficacy^[8], positive interpretation of opportunities^[9], and the highly contested factors of wealth^[10] and risk-taking behavior of entrepreneurs^[11]. In addition, innovation as such, defined as the will to do something new or different, is often cited^[12]. The characterized Schumpeterian *opportunity entrepreneurship* alludes to those entrepreneurs that employ "existing means of production differently, more appropriately, more advantageously. They have 'carried out new combinations'" (Schumpeter 1947: 132) and showcase their 'Unternehmergeist'. As such, these individuals force 'creative destruction' upon existing markets and industries as (other individuals') inventions are turned into innovations (Schumpeter 1947).

^[2] (Cromie 1987; Amit *et al.* 2000; Burke *et al.* 2002)

^[3] (Hessels *et al.* 2008)

^[4] (McClelland *et al.* 1958; McClelland 1961; Cromie 1987; Amit *et al.* 2000; Collins *et al.* 2004)

^[5] (McClelland 1975)

^[6] (Cooper *et al.* 1989)

^[7] (Carroll and Mosakowski 1987)

^[8] (Zhao *et al.* 2005)

^[9] (Cooper *et al.* 1989; Busenitz and Barney 1997; Amit *et al.* 2000)

^[10] (Cromie 1987; Amit *et al.* 2000)

^[11] (Knight 1921; Khilstrom and Laffont 1979; Xu and Ruef 2004)

^[12] (Amit *et al.* 2000)

In order to tap into an individual's entrepreneurial potential once a business idea is present, it is commonly assumed that the required input factors need to be supplied to *pull* these individuals into entrepreneurial activities. The studies predominantly conducted, however, suffer from several methodological flaws that support this notion, possibly without actual basis in reality. One of these problems is the following: to determine the "required input factors", most empirical studies *focus on cases of successful entrepreneurship* and determine its causes. In doing so, instances of nascent entrepreneurship that fail and business opportunities that are not used are ignored.

The combination of entrepreneurial traits, an exploitable business idea, and (perceived) availability of resources is then usually perceived as fulfilling all the prerequisites for an attempt to venture to occur. In the case of an *opportunity* driven entrepreneur this may, indeed, be the case. Another methodological problem associated with present studies, however, is its *predominant quantitative nature*, which often uses questionnaires comprised of closed questions to gather data (see e.g. the Global Entrepreneurship Monitor (GEM)). This could cause negatively stimulating factors to be ignored, as these are less likely to be brought up by entrepreneurs (!) that prefer not to point out negative circumstances, or *push* factors, as a driver for their activities for fear of being perceived as unsuccessful. Nonetheless, several studies (e.g. Ray and Turpin 1990; Reynolds *et al.* 2002; Bretznitz 2005; Bhola and Verheul 2006; Hessels *et al.* 2008; Thurik *et al.* 2008) indicate that these negative factors, including unsatisfactory working conditions or job loss, could stimulate entrepreneurship out of sheer necessity to generate an income. This conception fits previous work by Knight (1921) and Oxenfeldt (1943, qtd. in Thurik *et al.* 2008), but most notably the environmental approach. This approach states that entrepreneurs venture due to either positive role models (*pull*), e.g. parents that are entrepreneurs, stimulating *opportunity* entrepreneurs, or rejection models (*push*) that cause *necessity* entrepreneurs to venture when they are rejected by family, work, or society, or are frustrated by a "perception of limited opportunities for advancement, job frustration, boredom, or an unreasonable boss" (Lituchy and Reavley 2004: 66). This is also in line with the finding that people are generally willing to take risks in 'loss' situations, but prefer certain profit over risk-taking to gain even more (Faragó *et al.* 2008). Necessity entrepreneurship could therefore tentatively explain a large portion of entrepreneurial ventures in developed countries, where associated risks are usually well known (EC 2003). Therefore, in some cases a *necessity* trigger may also be crucial for the stimulation of a venture.

In this study, it is hypothesized that individuals operating within the same institutional environment will make similar decisions, because the availability of different input factors is determined by the institutional environment. The way in which the available business ideas are (not) developed into a venture are therefore necessarily assumed to depend on (legal) institutions and cultural values instilled within the individual, as governed by the present VoC. Although a 'Business Idea' is crucial and strictly individual characteristics and perceptions of available resources will differ between individual potential entrepreneurs, the influence of the institutional environment will be more pronounced on every isolated decision whether to venture or not. People are therefore hypothesized to open different types of firms in different types of economies and, furthermore, to differ in their motivation for doing so.

2.3 Hypotheses

The same conditions and restrictions hold for individuals deciding upon whether to open a firm or not – all spheres of economic interaction as analyzed by the VoC approach, influence these people in forming their view on the (dis)advantages and desirability of entrepreneurship. The tentatively opened firm will have to operate within this economic and institutional environment as well. Also, the type of institutions present within a particular country will affect the ease of access to the market and resources of a new venture. Should it be the case that individuals are primarily influenced by their

institutional environment rather than their own free will, it will be conceivable that entrepreneurs set up different kinds of firms, with different motivations, in different types of economies. For this reason, the following hypotheses can be proposed:

- I. Company types established in an LME-type economy differ significantly from those established in a CME-type economy.
 - A. In an LME-type economy, new ventures will be based on, and specialize in, radical innovations.
 - B. In a CME-type economy, new ventures will be based on, and specialize in, incremental innovations.

To test these hypotheses, a clear-cut definition of the concepts of radical and incremental innovations is needed. For the present purpose, these concepts will be defined as follows:

- an *incremental innovation* is an innovation that “introduces relatively minor changes to the existing product, exploits the potential of the established design, and often reinforces the dominance of established firms” (Henderson and Clark 1990: 92), whereas
- a *radical innovation* is based on “a different set of engineering and scientific principles and often opens up whole new markets and potential applications”, often creating “great difficulties for established firms” and can be “the basis for the successful entry of new firms or even the redefinition of an industry” (Henderson and Clark 1990: 92-93)

The unilateral and possibly swift decision making on the part of a firm’s management, fluid labor markets, as well as the intense competition in fast-paced markets, which characterize LME-type economies, make them particularly suitable for radical innovations. These are also the types of innovations that can generate the large cash flows which are aimed for by firms active in these economies – they are, after all, dependent on their current cash flows when it comes to finance. At the same time, these substantial amounts of financial capital are needed to transform inventions into radical innovations. This is therefore a potentially self-reinforcing process of specialization in (ventures based on) radical innovations.

CME-type economies, on the other hand, are characterized by cooperative, slower paced decision-making in firms due to their consensus-seeking management, inflexible labor markets, reputation-based contracting and, although increasingly to a lesser extent, finance systems. Due to this focus on reputations (that can be gradually improved and, once established, need to be kept intact), “patient” finance schemes, well-developed R&D networks, and inflexibility, these types of economies are particularly suitable for the in terms of reputations less risky incremental innovations. The latter are less risky because their outcome is more predictable than the outcome of radical innovations. In addition, incremental innovations typically require lower investments. In the rigid finance systems of CMEs, more substantial investments are usually difficult to secure. All institutions therefore seem to support incremental innovation in CMEs.

Should this difference in product type specialization indeed be observable in practice, then this will serve as evidence reinforcing at least the basic insights provided by the VoC framework. Assuming the distribution of characteristics commonly associated with entrepreneurship is equal across populations, the institutional context will be the most important factor in distinguishing between nations and their (potential) entrepreneurs’ behavior.

- II. Entrepreneurs active in an LME-type economy will differ in their motivations for becoming self-employed from those active within a CME-type economy.
 - A. In a CME-type economy, entrepreneurs will be *necessity* driven more often.
 - B. In an LME-type economy, entrepreneurs will be *opportunity* driven more often.

Due to the reputation-based finance schemes and rather rigid inter-firm ties, as well as highly rigid labor markets, barriers to entry will be perceived as being high in the CME-type economy, while perceived possibilities for (monetary or professional) gain are limited. Therefore, innovative individuals will not be inclined to open their own firm, unless driven by a *necessity* motive.

Meanwhile, in LME-type economies, barriers to entry are perceived as being relatively low, with current (potential) cash flow-based finance schemes and highly flexible labor markets. Perceived possibilities for (monetary or professional) gain are plentiful. At the same time, the highly flexible labor markets that allow entrepreneurs to hire and fire employees when needed also fail to provide a sufficiently adept social security system. Innovative individuals will therefore be inclined to seize their *opportunity* to become self-employed whenever possible, take matters into their own hands and secure a stable income for themselves.

The possible factual basis of this difference in tentative motivations for venturing would once more reinforce the viability of basic insights gained from a VoC analysis – and, therefore, the importance of the institutional environment as a prime explanation of differences in entrepreneurial tendencies, rather than individual differences. Consequently, this implies a fundamental need for differential entrepreneurship policies across economies, seeing as the incentives that will entice innovative individuals to open their own firm will differ as well. This possible need for differentiated policies ties in with the third premises tested in the current study as well (outlined below).

- III. Entrepreneurial skills are obtained in different manners in a CME-type economy as compared to an LME-type economy.
 - A. In a CME-type economy entrepreneurial skills will be obtained through (often government subsidized) training and education.
 - B. In an LME-type economy entrepreneurial skills will be obtained “on the job” and through traineeships.

Due to the well-regulated and publicly financed education system in CME-type economies, as well as direct rewards for (specific) skills in the comparatively secure labor market, people are more inclined to invest in specific skills by means of attending an educational institution. In LME-type economies, however, general skills are rewarded in the labor market, more so than specific skills. Whenever entrepreneurial skills are needed in the context of a particular job, individuals will acquire these “on the job” – either through (informal) training in small and medium sized enterprises (SMEs) or through possibly more elaborate training schemes provided by multinational corporations (MNCs).

3. Data and Research Method

To test these hypotheses, the following case selection promises to provide the most revealing insights.

3.1 Industry Selection

First and foremost, the present research is delimited by a focus on the ICT industry. This is due to the relatively accessible nature of this industry for start-ups, which is attributed to the relatively limited amount of capital needed to commence entrepreneurial activities (hence low start-up costs). Therefore, should inventors not be inclined to venture in this industry, they can be expected to be even less likely to do so in other, less easily accessible, industries. Next to this, the ICT industry is an innovation-intensive industry, which is therefore particularly adept at stimulating a particular nation's economy, making this an important industry to study in its own right.

3.2 Spatial Delimitation

Second, a delimitation of the present study is the spatial one. In this case, the study focuses on Hungary and Slovenia. These Central European countries have both been part of the former communist bloc, and are now EU member states. Both nations have always maintained cultural ties with Western Europe in general and, historically, Germany in particular. This allows for cross-country comparison while maintaining a similar historical, economic, political, and social background. Historically, Central Europe includes Hungary, Poland, Slovakia and the Czech Republic (Kundera 1984). Using Okey's distinction based on predominant and persistent ties with Germany (Okey 1992), however, also Slovenia can be included. This is in line with other definitions, which include these five countries in addition to Austria, Liechtenstein, and Switzerland (CIA 2008).

As can be seen in the 2008 data presented in table 2, these countries are fairly similar in terms of welfare, economy, and religion in addition to their shared history. Still, Germany is the main trade partner in all cases.

Table 1 – Some Key Figures for the Central European Countries (*Source: CIA 2008*).

Country	Median age	Main religion	GDP/capita (US\$, 2007)	Agriculture (% GDP)	Industry (% GDP)	Services (% GDP)	Unemployment (% labor force)
Czech Republic	39.8	Roman Catholic	24500	2.7	38.7	58.6	6.6
Hungary	39.1	Roman Catholic	19300	2.8	31.5	65.8	7.3
Poland	37.6	Roman Catholic	16200	4.1	31.6	64.4	12.8
Slovakia	36.5	Roman Catholic	20200	2.6	22.5	63.9	8.4
Slovenia	41.4	Roman Catholic	28000	2.1	34.4	63.5	7.7

Central Europe is a particularly interesting region to study because entrepreneurship has been severely limited or forbidden during its communist years. Hence, legal entrepreneurial activities are a recent phenomenon (Aidis and Van Praag 2007), so that the impact of institutions or, possibly, purely individual decision-making on entrepreneurship is particularly well discernable. Democracy was reinstated in Central Europe in 1989-1990, after which a rapid transition to a capitalist economy took place (Kundera 1984; Okey 1992; CIA 2008). Entrepreneurship has thereby been "the key element in economic development and fundamental to the successful transition of these economies" (Lituchy and Reavley 2004: 62) and accounts for significant portions of GDP and labor force occupation. The development of entrepreneurship can therefore be studied right from its conception – without a multitude of firms that serve as capitalist role models already in place. In this uncertain and new

environment, individuals and firms then had to make up their minds on how to coordinate their activities.

From this group of countries, Hungary and Slovenia are opportune cases to study for two reasons. First of all, these are the two countries within ECE that have performed best in terms of patent registrations per employee at the European (EPO) and American (USPTO) patent offices between 1993 and 2003. Innovative entrepreneurship can therefore be assumed to occur most frequently in these countries. Second, these are two quite different VoCs, Slovenia generally characterized as a CME-type economy (Feldmann 2007) and Hungary as a LME-type economy (King 2007). Given the similar recent historical background of these countries, it is interesting to study their path towards these quite distinctively different types of economies and its effect on entrepreneurship.

3.2.1 Country Selection: Hungary (LME) vs. Slovenia (CME)

As said, Hungary can be characterized as an LME-type economy, a point already developed by King (2007), while Slovenia can be characterized as a CME-type economy, following Feldmann (2007). This section sketches an institutional key element which – according to the VoC model – strongly influences entrepreneurial decisions. This particular dimension, labor relations, is chosen because it influences individuals' lives as well as business practices both profoundly and directly^[13].

3.2.1.1 Labor Relations

It can, first of all, be said that Hungary's labor market institutions are relatively flexible, which characterizes LMEs. Although wages (in state-owned enterprises, or SOEs) were controlled by the Hungarian government by means of taxes on excessive wages during the economy's transition, MNCs and privatized firms were exempted from these measures from the start. These were measures supported by the relatively organized technocrat-led state at the time. As these measures were abandoned in the mid-1990s, the SOE sector steadily decreased in size. Because labor is not, or poorly, organized^[14], employers do not have to bargain over wages and working conditions with the workforce on a higher level – only the minimum wage is set. Contracts are often negotiated with employees at the plant or individual level (King 2007), although collective agreements nevertheless covered about 50% of total contracts in the early 2000s (Feldmann 2007).

In the 1990s, wages were therefore far lower than in EU-15 countries, while productivity steadily increased to eventually approach the EU-15 level through the widespread replacement of obsolete production technologies. This, in combination with Hungary's relatively well-educated labor force, explains the 90s' allocation of multinationals' research labs to Hungary. From the early 2000s onwards, the Hungarian government started to stimulate higher wages, translating into higher unit labor costs as productivity growth per cost unit stagnated. Subsequently, simple manufacturing activities of MNCs were increasingly relocated to new low wage countries, but new, more knowledge intensive activities were started – albeit on a limited scale (Domolki 2002; Szanyi 2004; Veres 2007; EC 2008).

^[13] Another dimension's characteristics are explored in appendix I. In doing so, some insights in the ICT industry's practices in terms of standard setting are provided alongside.

^[14] The labor force's lack of organization had several reasons. First of all, the work force's common enemy (the party system) had all of a sudden disappeared. Second, laborers saw no viable alternative to the new situation of seemingly virtually unbridled capitalism. Third, the increasingly numerous foreign Greenfield investments and inflow of MNCs and their subsidiaries caused additional de-unionization – these usually have non-unionized workforces. Lastly, they simply had more immediate issues to attend to – with the loss of guaranteed full employment and about a third of all jobs, many struggled to secure an income for themselves. Vacancies were filled swiftly – no questions asked (King 2007). In the early 2000s, unionization rates amounted to about 20% (Feldmann 2007).

This has, in practice, translated into a structural problem of unemployment much akin to the situation in most other CEE countries (Dunford and Smith 2000). The unemployment and productivity data presented in figure 2 shows that problems of structural unemployment have persisted in Hungary until this day. Rising unemployment has thereby coincided with increasing productivity. This is a direct result of the nation’s poorly organized labor force, unable to negotiate favorable working conditions for its individual workers.

These are all characteristics of the ideal-type LME. If VoC theory is, indeed, correct, this would influence entrepreneurial behavior in several ways. Most importantly, firms would be able to negotiate wages with individual employees, to be set at levels acceptable to the firm at that particular point in time. It would also be relatively easy for them to hire and lay off personnel as they please, making it less risky for them to hire employees. This allows them to act swiftly in periods of profound change, for instance allowing them to play a prominent role in the fast paced service sector. Because employees are recruited with primarily general skills, however, employers will be likely to educate them further on the job – but only so far as their position really requires. At the same time, these general skills are particularly suitable for radical innovations. In their behavior towards other parties, firm management is more likely to focus on influencing the regulatory framework to retain its favorability towards their preferred management style, rather than compromising with labor. It is not necessary for individual firms to seek joint membership in employers’ organizations because, again, collective bargaining is not catered for. This is reflected in low membership rates on both the employees’ and employers’ part, as outlined above.

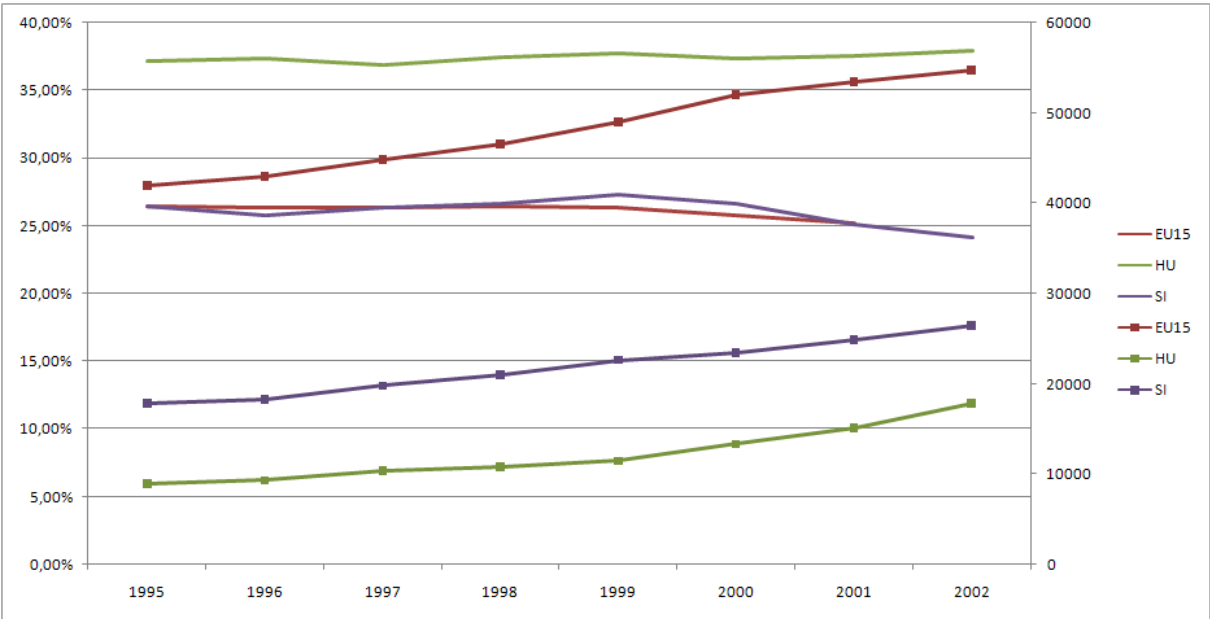


Figure 2 – Unemployment (% population aged 20-65, left y-axis – smooth lines) and productivity (GDP per employed person, right y-axis – lines with markers) – Hungary, Slovenia, and EU-15; 1995-2002 (Source: Eurostat 2009).

In Slovenia, the situation was and is quite different. Because privatization and liberalization were much less sudden and, particularly, much less drastic, the labor force’s bargaining position was affected far less. This is a direct consequence of the manner in which privatization occurred and legislation developed in the nation. With social dialogue at the forefront of these efforts, it was decided upon that workers should be granted some shares in their companies during privatization. Next to this policy, strengthening worker involvement, the Co-Determination Act has granted the labor force additional representation in works councils and management as well as supervisory

boards. As a last example of this extensive tendency towards co-determination, it has to be pointed out that labor and employers' organizations are also represented in the Second Chamber of the parliament in Slovenia. This enables them to delay (but not veto) legislation, adding to the social dialogue component in the Slovenian society (Feldmann 2007; Hancké *et al.* 2007).

Although union membership nevertheless plummeted since the early 1990s, this was mainly due to the change in focus of these unions. While these organizations were the ones simply administering benefits during the communist era, they transformed into genuine interest groups during and after the transition. Even so, 42.8% of the workforce was a union member in 1998 still, with approximately 50% of membership in the communist-era ZSSS. Other, mid-sized unions like KNSS-Neodbisnost and sectoral unions also gained in importance in the late 1990s. These are very high unionization rates, especially by CEE standards (Feldmann 2007).

Also employers are more organized in Slovenia when compared to their Hungarian counterparts. Not only is membership in the Slovenian Chamber of Commerce mandatory for every operational firm, other employers' organizations have also become more important during the 2000s. The former is also the principal agent in centralized wage bargaining, which commences after national-level, legally binding bargaining agreements are decided upon in the Economic and Social Council. Eventually, these are then developed into sector- or firm-level agreements with an eventual coverage rate of almost 100%.

As a result, Slovenia has been able to maintain relatively low unemployment levels, similar to the EU-15's average, and productivity levels significantly higher than Hungary's. Additionally, the nation was able to *decrease* unemployment while *increasing* productivity. The apparent trade-off between employment levels and productivity was therefore not observable in Slovenia. Slovenia's productivity levels nevertheless remained far below the EU-15's average (Eurostat 2009). All of this evidence indicates a strongly organized labor force, able to negotiate favorable working conditions for its individual workers.

These are all characteristics of the ideal-type CME. In case VoC theory is correct, this has several implications for entrepreneurship in the Slovenian economy. The inflexible labor markets and high level of consensus-seeking in the economy as a whole, and labor market in particular, results in stable employment and long job tenures. Employees can therefore be recruited in an apprenticeship-like fashion, equipping them with a highly specific skill set from the onset in order to make them particularly suitable for the company as such. This high level of specialization and inflexibility in the labor market increases the nation's prospects in competing in highly specialized, relatively slow paced industries, particularly including specialized manufacturing and (incremental) technical development. At the same time, it is relatively risky for nascent entrepreneurs to hire new employees in the long run, facing relatively high and highly rigid wage regimes and relative difficulty in laying off employees whenever these are no longer needed. Also in the short run, however, these collectively bargained wages and working conditions may prove to be prohibitive for new ventures. At the same time, the highly institutionalized economic environment is in the best interest of established, larger firms. These will consequently dominate the economic environment and increase the difficulty of new venture entry into the market.

3.2 Research Method

To avoid the methodological problems that are commonly found in the present entrepreneurship literature (as outlined in section 2) and allow for in-depth insights in individual cases of entrepreneurship, the present study ensures a more comprehensive view through several means.

- 1) First of all, the sampling method is adjusted to include entrepreneurs as well as innovative (!) non-entrepreneurs. To do so, a sample of inventors holding a patent in the realm of information and communication technology (ICT) was drawn from the PATSTAT database - the most comprehensive worldwide patent database available. It was accessed by employees of the Dutch Patent Office (NPO), who extracted the patents eligible for this study from the database along the lines of the approach outlined by the OECD (2006, 2008). The timeframe taken into consideration runs from 1999 to the end of 2003 as determined by patent priority dates in terms of these individuals coming up with a (patentable) business idea. This allows for sufficient time for inventors to commercialize their invention if this is desired, but is not too long ago to be unable to contact a substantial amount of these inventors. The timeframe taken into consideration in terms of possible commercialization of these inventions runs from 1999 to 2009. The inventors were required to have lived in either Slovenia or Hungary at the time the invention was patented.

This sample was first drawn including only those patents that were referenced at least once in other patents, assuming that these patents are most potent in their commercial applicability. Additional inventors from an extended sample were contacted based on *either* a randomized sampling method *or* them holding several patents filed within the outlined priority date timeframe. A total of 64 invitations was sent out. 11 inventors expressed their willingness to participate.

By choosing to interview inventors that hold a patented invention instead of entrepreneurs, empirical biases as outlined in section 2 are avoided. Furthermore, patented inventions are by definition commercially applicable, so this sampling method ensures a relatively homogeneous sample of individuals that have the required characteristics to come up with a viable business idea. This should lower the barrier in place for them to initiate a start-up, as their “new combination” (Schumpeter 1934: 132; Shane and Venkataraman 2000) is already made. This warrants a sole focus on the determinants of subsequent exploitation, as they may or may not have exploited their find.

- 2) Secondly, a rich method of data collection is chosen. Instead of opting for a quantitative large-*n* study, as is common practice in the present entrepreneurship literature, in-depth interviews of about an hour were carried out with the inventors that were willing to participate. These interviews were administered using either Skype (for videoconferences) or the telephone. They were guided by a specifically for this project developed 8 page questionnaire, although the interviews often took on a more conversational character. Some characteristics of the participants are presented in table 2.

The interviews were recorded and, afterwards, summarized. This summary entailed both the filling out of the questionnaire and the provision of an approximately one page narrative, describing the overall impression the interviewee had given with regards to entrepreneurial efforts, views (on entrepreneurship), values, and personality. The thus gathered data was then used to test insights gained from literature and statistical data.

Table 2 – Some characteristics of interviewed inventors

Participant	Country	Gender	Age	Currently employed in	Patent owned by
1	Slovenia	Female	48	Academia Public Research Institute	Public Research Institute
2	Slovenia	Male	47	Industry	SME
3	Slovenia	Male	53	Industry	SME
4	Slovenia	Male	46	Industry	SME/Own
5	Hungary	Male	40	Industry	MNC
6	Hungary	Male	36	Academia	MNC
7	Hungary	Male	41	Industry	MNC
8	Hungary	Male	36	Academia	MNC
9	Slovenia	Male	36	Academia	SME
10	Hungary	Male	47	Academia	Public Research Institute
11	Hungary	Male	44	Academia & Industry	SME/Own

- 3) Thirdly, and most notably, a keen eye is kept on the environment within which entrepreneurs operate through usage of the VoC approach to analyze the economic environment within which individuals operate.

4. Results and Analysis

This section will present the empirical evidence found in support of and refuting the hypotheses presented in section 2.2.

First of all, it should be emphasized that concerns with regards to the legitimization of entrepreneurship in CEE, as expressed in early 1990s academic literature, are no longer an issue. During the centrally planned period and the years during the initiation of the transition to a market economy, the market was apparently seen as “the domain of black marketers and former Communists”, because of which only people lacking other opportunities would “be willing to bear the stigma associated with entrepreneurship” (Tyson *et al.* 1993: 177). In addition to this culture that was far from in favor of entrepreneurship, crucial skills were lacking immediately after the transition to a market economy. Nonetheless, entrepreneurship has been called “the key element in economic development and fundamental to the successful transition of these economies” (Lituchy and Reavley 2004: 62). Judging from the conducted interviews, and contrary to what the quote by Tyson *et al.* (1993, above) suggests, entrepreneurship is indeed not looked down upon at all. One Hungarian participant, for example, states that both the field of research and entrepreneurship are respected areas to work in – both are purely merit based and the former has “always been separated from politics”. The only line of work he views as being less respectable is being involved in the military. This is a direct consequence of the 1956 Hungarian Revolution, in which revolutionaries were killed by (Soviet and Hungarian Soviet-controlled) troops. Only a limited number of participants (n=3) indicated that they did not associate entrepreneurship with status or a certain sense of achievement per se. Only one participant rejected the idea of the entrepreneur as a well-doer altogether, indicating his dislike for marketing and sales-related activities instead. This aspect should therefore not be of importance in deterring entrepreneurship.

Additionally, a lot of the preconditions for successful entrepreneurship are met in both Hungary and Slovenia. The appropriate input factors (including natural resources, labor, capital goods, and human capital) were and are available. Furthermore, not only are there support mechanisms in place for (nascent) entrepreneurs in both nations, the appropriate institutions, intellectual property right provisions (Fabry and Trimborn 2007) and legislation are also in place. The educational system is up to par in both countries, with all levels of education being offered, internationally accredited degrees being attainable and entrepreneurship courses being available. Individual skills and a skilled labor force are therefore not a serious problem in this respect (Domolki 2002; Schlamberger *et al.* 2003; Feldmann 2007; King 2007; Péceli 2007; Veres 2007; JAPTI 2008). When taking into account that the historical background and onset of market economies in both countries is fairly similar across CEE nations, it can therefore be assumed that the different types of capitalist economies present in both countries are indeed most profoundly influencing the tentative differences in (types of) entrepreneurial activities.

4.1 Hypothesis I

The first hypothesis, as first devised in section 2.2, was the following:

Company types established in an LME-type economy differ significantly from those established in a CME-type economy.

- *In an LME-type economy, new ventures will be based on, and specialize in, radical innovations.*
- *In a CME-type economy, new ventures will be based on, and specialize in, incremental innovations.*

The rich anecdotal evidence from the eleven interviews conducted in the present project support this hypothesis. In terms of inventors living in Hungary at the time of patenting of an invention, a total of six individuals were interviewed. Of these six inventors, one patented and commercialized a truly radical innovation. An existing product, the microscope, was adapted and adjusted in such a way that a new range of applications was found. This was done by combining the traditional product with modern technology to allow for digital high-speed, high resolution replication of studied specimens that can subsequently be studied on remote desktops anywhere in the world. Incumbent firms experienced a great deal of difficulty while attempting to develop a similar technology, because it was a true novel combination, incorporating the lesser developed concept of the automated microscope, high-resolution digital imaging, and ICT. This was the only truly radical innovation in the sample of interviewees.

The inventor that founded a firm based on this radical invention furthermore seemed to operate within an environment particularly conducive to this type of ventures. He, for instance, stressed the ease with which he was able to hire his employees, particularly so because it was a highly science-based venture, and emphasized the degree of control he was able to exercise over the venture and its future as a whole. By investing time and capital into the venture, he managed to be successful in setting up his business and reacting to the market and diverse possibilities timely and continuously. This particular inventor, much like other inventors from Hungary that were among the interviewees, expressed his belief that it is very well possible to make a difference and start a firm specializing in a worthwhile product when coming up with a suitable business idea and taking matters into your own hands, despite the fierce competition that is to be expected from MNCs active within the same market segments. Funding in general nevertheless remains somewhat of a problem for entrepreneurship in Hungary due to its discontinuous nature, while several interviewees also mentioned the notoriously

high taxes (or the “Swedish taxes with Albanian earnings”, as one interviewee put it). As these are problems common to entrepreneurs in several other CEE economies as well – and the environment is still particularly conducive to radical innovations, these findings can therefore nonetheless serve as evidence supportive of conventional theory, stating that LME-type economies are conducive to radical innovations.

One might, however, point out the remaining five cases where innovations were neither radical nor commercialized, even in this low barrier LME-like setting. Although no firm conclusions could possibly be drawn from a sample as limited as the one used here, it should be noted that the remaining interviewees in Hungary included four inventors that invented for MNCs active in telecommunications with research labs in Hungary, and one scientist active within the context of an industrial post-doc at a German public research institute at the time. Neither of their “novel combinations” is suitable for commercialization in itself, because these patents require a substantial body of additional knowledge to be exploited. One particular case, for example, constituted of a minor protocol improvement for mobile text messaging services. This type of knowledge, exemplifying the type of inventions usually patented by the telecommunication MNCs active in Hungary, is only exploitable within the context of an established (mobile) telecommunications network and is incremental in nature due to the organizational context within which it originated. These innovations thus mainly strengthen these MNCs’ competencies and competitiveness. MNCs, meanwhile, are very large and usually slow to adapt whilst featuring long job tenures, in-house apprenticeship-like education systems, profound information sharing (instead of competition) amongst departments, and intra-firm workforce organization. One could therefore state that these MNCs have all the characteristics of a traditional CME, with the added problem of being extremely resistant to change. This explains their propensity to patent incremental innovations rather than the radical innovations expected in LME-type economies.

By contrast, out of the five people interviewed that resided in Slovenia at the time of patenting their invention, only one patented and commercialized an invention that could with some stretch of imagination be classified as being radical. Coincidentally, this interviewee was employed at the corporation that was characterized as being “highly innovative” by the Slovenian government as well. This invention entailed the improvement of existing liquid chromatography practices through the development of a new adhesive material improving separation specificities. Because no truly novel combination was made, this invention is therefore more accurately classified as being incremental. The remaining four patent applications aimed to protect IPR in the realm of medical test sets, automated locks for e.g. swimming pool locker rooms, a gas metering technology, and an improvement of an extant (internet) security protocol. These are all incremental innovations.

Inventors from Slovenia, accordingly, regularly reported their concerns with regard to entrepreneurship in the context of their environment. This would for instance include the unavailability of funding with reasonable restrictions and conditions, difficulty in providing for and sustaining capable employees due to inflexible labor markets (and hence them rather refraining from hiring them at all), and difficulties with regards to breaking into the market. Also, the inability to fight off (patent based) attacks by vested interests in particular markets was often cited as a complicating factor, next to the perceived inability to liquidize funds (other than venture capital). One interviewee, for instance, emphasized that it was virtually impossible to follow up on outstanding invoices through legal channels in a fast and effective manner, enabling debtors to hold off payment for extended periods of time. Management was often (self-)reported to be consensus seeking rather than unilateral in its decision making. This study therefore supports conventional theory, in that the CME-type economy does not seem conducive to radical innovations.

To conclude this sub-section, it can be stated that the institutional context indeed seems to frame product market tendencies according to the VoC theory. Even though there will undeniably be a degree of variety in individual skills and dispositions towards entrepreneurship within any given economy, the economic environments within which the interviewees operated differed significantly from one another and influenced these individuals both directly (in terms of available resources) and indirectly (in terms of perceptions) in their decisions. This was not only apparent in the cases where entrepreneurial activities were undertaken – also interviewees that did not open their own firm expressed differential views on types of firms to be opened, should the need to do so arise. While in Slovenia, the economy exemplifying coordinated markets in the present study, interviewees generally expressed their desire to open a business in services or tourism (e.g. a hotel) should they (be forced to) open their own firm, Hungarian interviewees stressed the importance of what one participant termed ‘a really good business idea’ - alluding to a radically new, strong product, yielding clear perspectives on economic gain. Therefore, LMEs seem to encourage radical innovation, while CMEs are conducive to incremental innovations. It should nevertheless be noted that MNCs active in LMEs seem to stimulate incremental innovations as well – this explains the relatively high percentage of incremental innovations patented by inhabitants of Hungary within the studied timeframe.

4.2 Hypothesis II

The second hypothesis is the following:

Entrepreneurs active in an LME-type economy will differ in their motivations for becoming self-employed from those active within a CME-type economy.

- *In a CME-type economy, entrepreneurs will be necessity driven more often.*
- *In an LME-type economy, entrepreneurs will be opportunity driven more often.*

In the total sample of eleven inventors interviewed for the present study, three managed to start their own firm based on their invention. A fourth inventor indicated to have made several attempts to initiate entrepreneurial activities, but to have refrained from following through on these due to unreliable business partners. Another inventor attempted and (partially) succeeded to commercialize an invention with an *opportunity* motive, but did not succeed to start up a venture in the end. This anecdotal evidence supports the second hypotheses partially.

First of all, there is no doubt that the only true, successful *opportunity* driven entrepreneur in the sample originated from and inhabited Hungary at the time of the invention upon which his firm was based – this was also the interviewee reporting on the only truly radical invention amongst the sample of interviewees, as already outlined in the previous sub-section. This particular interviewee was an individual driven by a *want* to solve problems at the core of medicine, rather than treating a seemingly endless amount of patients with the tools handed to him by others. Citing his desire to provide for comfortable living conditions for his family as another driving force, something in which he has succeeded, this is indeed a true *opportunity* entrepreneur that seized the chance to fulfill his desires as soon as it arose. At the time of his venture, he knew his way around the academic funding system and built his company upon academic research and PhD positions as well as his own investments rather than pure venture capital, acquiring the desired skills partially on the go. Although the entrepreneurial environment in Hungary was not ideal-typical at the time, apparently there was plenty of flexibility and there were sufficient opportunities for driven individuals to become self-employed. Other than this individual, Hungary’s sample of interviewees included one foreigner living there at the time – another individual in the sample that planned to initiate entrepreneurial activities

because he *wanted* to, although this was before the patent, based upon which he was contacted for, was applied for.

Contrary to what could be expected, there were no additional *opportunity* driven entrepreneurs in the sample that actually made the decision to venture. This is possibly due to the fact that all other interviewees were either securely employed in an MNC or active within the fields of academics at the time of their invention – and up to this day.

The three Hungarian interviewees that went straight from university to an MNC’s research laboratory, were reportedly quite content^[15]. One of these interviewees, for instance, spoke adamantly about his positive experiences within the particular MNC’s research department he was active in. Pointing out selling points like the encouraging work environment, friendly staff and co-workers, possibilities for personal development, research being performed at the cutting edge of communications, and informal and consensus-seeking management style, he really saw no reason to leave the company at all – in fact, in the unlikely case he would get fired, he indicated to be wanting to look for a job in another MNC first and foremost. He asserted: “I do not see any reason not to be happy [in this company] – I can be creative, bear responsibility, and develop my competencies continuously”. With regards to the informal management style, another interviewee active within the same company enthused that “it is really a very nice company – everybody tends to avoid conflicts and no decisions that affect an employee directly are ever made without consulting him or her first”. These sentiments were echoed by the other Hungarian interviewees employed by an MNC. Due to the MNC’s relatively stable employment conditions, as compared to the conditions in the country at large, people employed within this type of firms are then, indeed, seemingly safely ‘embedded’ within the organization, often both in terms of job security and in terms of aspirations and personal development. At least one individual did not actively pursue entrepreneurship anymore, after an initial period in which he *did* try to open his own firm, because he became firmly embedded in a large MNC.

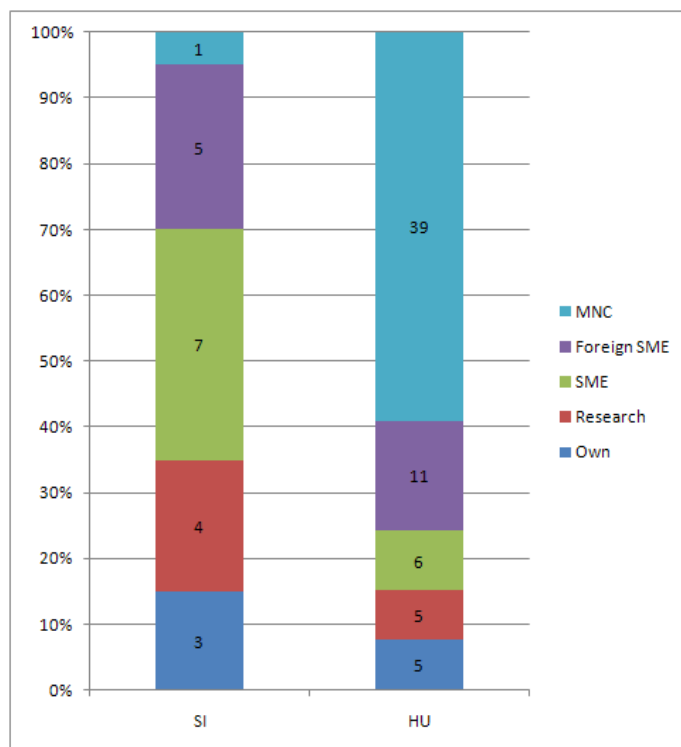


Figure 3 - Percentage of patent applications 1999-2003 by type of applicant per country (Source: PATSTAT).

^[15] One interviewee reported being less satisfied with the inner workings of the MNC that employed him. Nonetheless, this was the case only after he was seemingly forced into a management course, almost got fired after he refused to stop doing research and was eventually re-employed as a leading researcher only to be laid off upon closure of his department. He then pursued his career elsewhere, but did not consider self-employment due to him being extremely knowledge driven.

These characteristics counteract the job security problems that were anticipated to be responsible for a portion of *opportunity* driven entrepreneurs, alluding to those individuals wanting to (independently) secure their source of income. This could also explain why no additional Hungarian inventors were found that ventured because of *opportunity* reasons. The work environment within these MNCs could also tentatively explain why a lot of Hungarian inventors ended up working for MNCs during the transition phase. The academic researcher that was also part of the Hungarian sample also enjoyed stable employment, namely within a research center of one of Hungary's major universities. The same line of reasoning therefore applies to him. In this respect, this reinforces the point already briefly mentioned in the previous sub-section, namely that MNCs can serve as a CM-type economy replacement within an LME. As can be seen in figure 3, these MNCs are also plentiful and influential in Hungary, employing many of the country's innovative individuals - as opposed to the situation in Slovenia.

In Slovenia, *necessity* driven entrepreneurs were, as the VoC analysis theoretically expected, plentiful. Out of five Slovenian interviewees, two reported to be self-employed, while one other interviewee reported attempts to exploit an already (not patented) licensed idea further after patenting, but failing to do so. The remaining two interviewees were extraordinarily knowledge-driven: one was employed in academia, while the other was working in a(n incremental) knowledge-driven Slovenian metering company. Because neither of these individuals had been in a position where they were forced to look for employment in the absence of suitable job vacancies, neither of the two was or had attempted to become self-employed. The two interviewees that *did* become self-employed, however, did so out of sheer *necessity* motives initially. In one case, this was abundantly clear, as the inventor decided to take on a leading role in the newly founded, but struggling, venture of two of his friends upon termination of his PhD funding just after the early 1990s economic transition. In the absence of other viable job opportunities and needing to secure an income, this particular inventor eventually went on to set up and front a spin-off based on a novel idea in liquid chromatography. The other self-employed inventor in the sample of Slovenian interviewees first ventured on his own in the early 1990s as an architect due to the low quantity of jobs available. When he got the chance to start a limited liability firm specializing in automated locks with business partners, he jumped at the chance because this actually provided him with more stability.

Even though these cases of *necessity* driven entrepreneurship directly support this hypothesis, it is perhaps even more striking that the only observable case of *opportunity* entrepreneurship should fail to result in a viable venture. The prospective *opportunity* entrepreneur referenced her attempt to initiate a start-up based on a biomedical invention, but reportedly failed to do so due to opposition in the field, jealousy of colleagues, difficulty in acquiring essential funding, and struggling to employ suitable people. Throughout the interview, it became increasingly clear that this particular inventor in fact was not particularly aware of how and where to get the help and support needed to enable her to open her firm. Even though the venture did not prove to be her primary interest, it was a deliberate, *opportunity* driven effort that got cut short due to the unavailable support structure. The only *opportunity* entrepreneur therefore did not succeed, likely due to the fact that Slovenia's institutional environment is not suitable for entrepreneurs per se.

Even though a difference in motivations of (potential) entrepreneurs is therefore observable across these two nations, supporting the tested hypothesis, there also seem to be some more universal barriers in place towards entrepreneurship. A major problem for potential *opportunity* entrepreneurs in the area is a lack of resources. The majority of interviewees (n=7) indicated that, in their opinion, some degree of financial aid would stimulate entrepreneurial efforts in their countries significantly. The requested aid could range from assisting in patent applications of particularly commercially viable technologies to the provision of venture capital with reasonable conditions. One CEO mentioned the prohibitively high interest rates asked for by the EU venture capital banks in particular,

indicating that those high periodic payments had been incredibly tough on his nascent business. As one Hungarian inventor put it: "I would not dare to venture, because the high interest rates of venture capital would prevent me from spending sufficiently in the start-up phase... and the Hungarian system is not as forgiving as the American system if you fail". This fear of failing seems to be a general one, as ten out of eleven participants indicated a lack of (financial) security to be one of the main disadvantages of being self-employed. Several mirrored this Hungarian inventor's concerns that, once an attempt to venture was made and this did not turn out to be a success, the ability to provide a stable (financial) background for their family would be lost to them forever. As several Hungarian inventors indicated patent-based attacks on their businesses or patents to have occurred, this fear of failure (and its implications) does not seem irrational. SMEs will, after all, not be able to fight MNCs in these disputes. These circumstances cripple the potential efforts of *opportunity* driven entrepreneurs in the region, as the associated risks are simply too profound. This leaves *necessity* entrepreneurs as the major source of potential entrepreneurship. Generally speaking, it therefore seems that *necessity* motives have to be plentiful in order for more individuals to venture. Alternatively, a move towards more forgiving and accessible (venture) capital schemes could be considered, along with what one interviewee called "the instilment of entrepreneurial traits and values from a very young age onwards". This particular inventor, active in research, pointed this lack of entrepreneurial spirit in his society at large out as one of the main reasons why entrepreneurial efforts were not as widespread as policy-makers would have liked them to be.

4.3 Hypothesis III

To address the third and final hypothesis, then, it is once again useful to repeat the hypothesis first and foremost:

Entrepreneurial skills are obtained in different manners in a CME-type economy as compared to an LME-type economy.

- *In a CME-type economy entrepreneurial skills will be obtained through (often government subsidized) training and education.*
- *In an LME-type economy entrepreneurial skills will be obtained "on the job" and through traineeships.*

In this case, statistical data seems to support this statement, as it would be expected that participation in formal higher education (by employed people) is higher in the Slovenian economy when compared to the Hungarian economy. Indeed, a total of 14.8% of the working population (14.2% of the total population) participates in formal education on the tertiary level in Slovenia, while only 6.5% of the working population (6.6% of the total population) participates in this level of education in Hungary^[16] (Eurostat 2009).

Nevertheless, participation in formal education and "on the job" training programs providing participants with entrepreneurial skills was low across both nations in the interviewed sample of inventors. Also, there was no apparent difference between both nations in terms of the preferred manner of acquiring the necessary skills. Only two of the interviewees reported to have taken part in formal education in order to acquire management skills, one of which did so before coming to Hungary within the context of his job with an MNC and one of which started this course long after he started his own business. This was, however, done on his own accord, in Slovenia. One other, Hungarian, individual was forced to take management courses by his former employer, which was an

^[16] Percentages in the year 1997.

MNC. One other, Slovenian, self-employed interviewee acquired his skills “on the go” as he was forced into self-employment due to *necessity* circumstances and had to ‘make things work’. The method of acquisition of entrepreneurial skills therefore seems to depend on what is more suitable for the *individual* at any given moment, rather than on the institutional context.

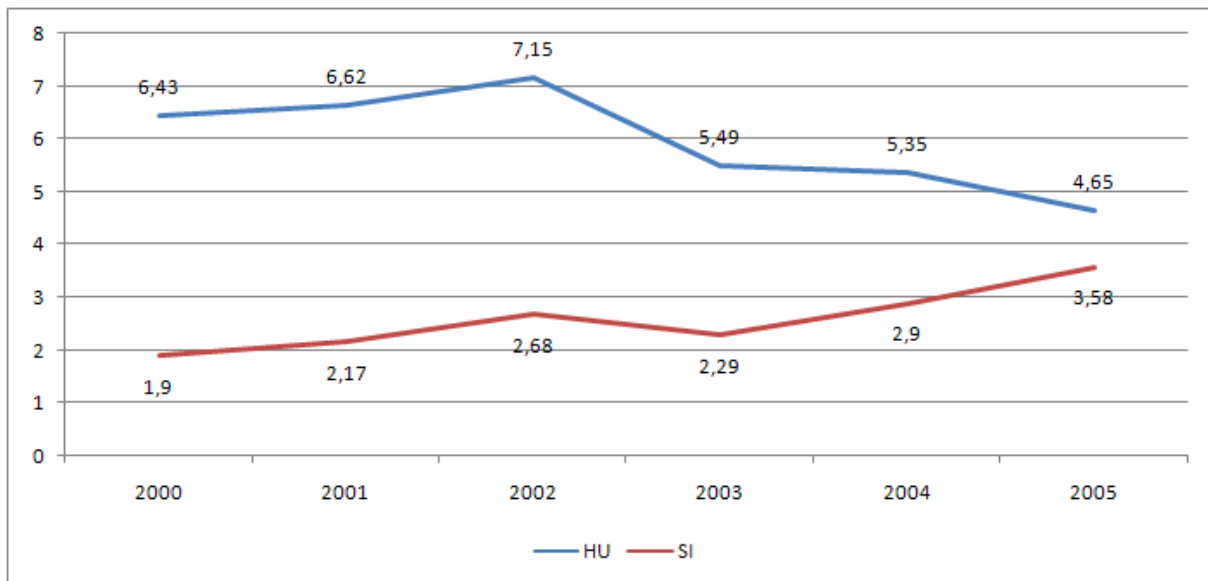


Figure 4 – Number of ICT-sector enterprise births in Hungary and Slovenia per 10000 inhabitants (aged 20-59) between 2000 and 2005 (Source: Eurostat 2009).

Simultaneously, all save one inventor reported to possess the required skills to open their own business, or reported to know where to get these. Alternatively, these interviewees indicated to know how and where to recruit people to take care of particular issues for them instead. This incites the conclusion that entrepreneurial skills are either readily available or thought of too lightly. Three separate pieces of evidence point in the latter direction:

- First of all, one (young) Hungarian inventor suggested that (all necessary) entrepreneurial skills could be offered as a more integral part of any type of education. Right now, this inventor perceived the educational system to focus too much on teaching people to do as they are told – the creative mind is not sufficiently stimulated. Surely, however, these specific skills could not be taught integrally in the standard curriculum, nor would this be desirable. This would merely provide people with an incomplete set of skills that should be part of a larger, more sophisticated skill set in order to be useable. Nonetheless, this does not negate the need to instill individuals with a combination of values and attitudes conducive to entrepreneurship in order to enhance the entrepreneurial aptitude of any given population – as well as the potential effectiveness of entrepreneurship policies.
- Second, two out of three entrepreneurs in the sample indicated that they (had to) commence their entrepreneurial activities quite suddenly and had to develop their commercial and managerial skills on the go. Neither of them was able to hire people with the skills they were lacking due to the small start-up size of their ventures and limited budgets. Both of them emphasized that this had been tough and took quite a lot of time and effort. Both of them, however, managed. The third entrepreneur in the sample initiated his entrepreneurial efforts in a much more well-planned fashion and prepared accordingly, citing far fewer basic difficulties in developing his business. Entrepreneurial skills are therefore neither omnipresent nor easily acquirable (without external aid).

- Third, as can be seen in figure 4, Hungarian enterprise birth rates were quite high in the early 2000s. To provide a frame of reference: average firm birth rates in the ICT sector in the UK in the same timeframe were 5.97-6.38 (per 10.000 inhabitants aged 20-59), while Finland showed birth rates of 3.67-4.15 (per 10.000 inhabitants aged 20-59). Firm survival, growth, and competitiveness rates (data not shown) were nevertheless significantly lower (Eurostat 2009). This could, indeed, indicate that starting up and leading a firm could be underestimated.

In any case, as stated before, there seems to be no clear differences in tendencies to acquire entrepreneurial skills either through formal education or through training on the job amongst the two types of economies studied here. Nonetheless, this could be due to the fact that most entrepreneurial skills had to be learned from scratch upon the occurrence of the region's economic transition – although for instance Ritter (1998) pointed out that planned economies might unintentionally stimulate people to develop entrepreneurial skills, behavior, and attitudes due to the constant shortage of goods that has to be dealt with, previous research has shown that critical understandings of prices and markets were initially lacking in the newly democratized economies, necessitating education (Aidis and Van Praag 2007). The timeframe chosen for the present study might therefore be too early in these economies' transition for a clear pattern to emerge.

5. Discussion

The current study has several limitations, which are important to outline before arriving at a conclusion. First of all, it should be mentioned that the current study uses a small sample of innovative entrepreneurs, selected based on them having attempted patenting an invention in the ICT industry between 1999 and 2003. Due to the small sample size of eleven individuals and focus on a singular industry, this study is therefore necessarily explorative in nature. Additional interviews should take place to test the validity of findings.

Furthermore, cross-checking with inventors active in other fields should take place to eliminate any influence the choice of industry may have had on the findings. A problem with the ICT industry might, after all, be that it is relatively difficult to penetrate by means of a radical innovation at the moment, as the market is relatively rigid and market positions are generally well-established. New entry might for SMEs therefore be primarily possible in the market segments that are less innovative, including peripherals and ICT services. This type of firm was not included in the present study due to its sampling method, because usually no patents are applied for in these less high-tech subsectors of this high-tech sector.

Even if a patent is applied for, however, this need not have direct commercial potential in itself. Although this study attempted to ensure all participants held at least one patent, assuming this would provide them with at least one viable business idea to tentatively be exploited, in practice this assumption was not correct. Although patents should by default have commercial *potential*, a problem is that many patents are actually embedded within a larger body of knowledge. Out of the eleven patents held by the interviewees, only six were indicated to have commercial value for a small start-up on their own. One patent protected only a marginal improvement of an existing, heavily in other patents embedded, technology, while the remaining four patents also required extensive additional knowledge or knew prohibitively high start-up costs. The three patents that were not commercialized in a start-up, but *were* said to have significant commercial value, were held by a research institute, an MNC, and an SME respectively. These were therefore not able to be commercialized by the inventor by default.

This points towards another problem with patents as a manner of identification, as they are particularly prone to originate from larger firms and, particularly, MNCs. This is due to the fact that the patenting process is both costly and complicated, while smaller firms would also not be able to survive the multitude of lengthy, costly infringement procedures to be expected from colossal MNCs. This therefore unintentionally skewed the sample of the present study towards people employed by MNCs and other large(r) corporations. This was most notably the case in Hungary, as became evident in figure 3 (see section 4.2). Nonetheless, there is no other clear-cut way to identify innovative individuals within an economy. An alternative would be to resort to interviewing a sample of the entire (working) population.

Lastly, institutional explanations are able to indicate general tendencies in economies, but do not take micro-level, individual factors into account. The interviews conducted in the context of the present study nonetheless show that these factors cannot be disregarded. Examples of traits that were explored in this study included risk-taking and assuming responsibility. In all cases of entrepreneurial behavior (n=3), these inventors indicated that they were calculated risk-takers and that they enjoyed taking on responsibility, even if it was just to ensure getting the job done appropriately. Inventors that indicated not to be willing to take risks (n=4) and/or indicated that they did not want to work overtime (> 40 hours/week, n=3) never opened their own firm. In the absence of necessity trigger, these inventors also indicated that they would not consider opening their own firm at all – in some cases, they stated they were not willing to do so at all, not even in case a necessity trigger would be present.

Other individual characteristics and circumstances, such as perceived self-reported entrepreneurial skills, seem to be of little influence. Examples in the nearby social environment (family, close friends) were neither a prerequisite nor a guarantee for entrepreneurial tendencies of an individual.

6. Conclusion

In conclusion, it can be said that, indeed, there seem to be some profound differences between entrepreneurial tendencies across different types of economies, although individual factors can not be disregarded (see section 5). In answering the research question, then, that is the following:

To what extent do institutional circumstances influence innovative individuals with regards to opening their own firm?

it can be said that, again, this influence of institutional circumstances on innovative individuals is profound first and foremost. Although the small sample of the current study renders it to be exploratory in nature, some clear patterns that are rooted in literature already emerge.

Firstly, the type of economy present within a transitioning country appears to determine its product market tendencies, with LMEs generally serving the market with radical innovations and CMEs being particularly conducive to incremental innovations. The country's native SMEs reflect these general tendencies.

Secondly, individuals' motivations upon starting their own firm also differ across types of economies. While individuals in CMEs are, as expected, only particularly likely to become self-employed when forced to do so due to personal circumstances (the so called *necessity* entrepreneurs), an LME is (also) conducive to *opportunity* entrepreneurs. This is the case, because individuals in these countries perceive more opportunities to become self-employed while (intuitively) facing less restraints. Additional cases of *opportunity* entrepreneurship, based on e.g. the perceived need to secure a stable

income in a flexible labor market through taking matters into their own hands *while previously still employed*, were nonetheless not observable in the present Hungarian sample.

Thirdly, this study finds no clear pattern in the manner in which (potential) entrepreneurs obtain their entrepreneurial skills. Deriving from the Varieties of Capitalism (VoC) framework, one would expect individuals inhabiting a country characterized by a liberal market economy to acquire their skills “on the job” due to its emphasis on general skills and short educatory trajectories because of highly fluid labor markets. Nevertheless, this does not seem to be an exclusive feature of these types of economies, even though theory-based insights would suggest otherwise. Also in coordinated market economies in Central Europe, where one would expect individuals to acquire aforementioned skills through formal education mainly, a sizeable portion of entrepreneurs acquires these skills “on the go”. Next to this, and more in line with theoretical expectations, formal education is also a popular way of obtaining these skills. It is furthermore likely that the amount and difficulty of skills needed to be successfully self-employed is underestimated by the majority of people in these transitioning countries.

Lastly, MNCs seem to be a major force in the market of the transitioning LMEs of Central Europe, in this case Hungary. Here, MNCs seem to take on the role of the relatively slow-moving, rigid CME-like institutions, providing stable employment conditions, well facilitated in-house learning trajectories, and incremental rather than radical innovations. These colosses simultaneously employ an apparent majority of brilliant young researchers and innovative individuals, depriving these nations of some of their potential innovative entrepreneurs. In CMEs, these people are mainly employed in SMEs, providing the country with the much-needed innovative SMEs that propel the growth of the national economy.

On a more general level, the insights gained in the present study suggest that the literature seeking out respectively institutional and individual explanations of entrepreneurship is not mutually exclusive. While the (legal) institutional context is able to influence the types of firms usually established in a particular economy, as well as the motivation of individuals to do so, individual explanations cannot be disregarded. Although some individuals are purely knowledge driven, possess few characteristics that would identify them as potential entrepreneurs, and will likely never become self-employed, also these individuals might be driven to open their own firm due to their personal circumstances. The likelihood of their personal circumstances forcing them into self-employment is, in turn, highly dependent on the institutional framework. At the same time, there are individuals that are able to circumvent apparent problems in the economic environment due to sheer determination and skill, seemingly marginalizing the role of the institutional framework other than the provision of basic legal, monetary and IPR facilities. Although the present study, and the institutional branch of entrepreneurship literature in general, assumes that the distribution of individuals with a certain set of characteristics and skills is equal across nations, this need not be the case – again due to differences in the institutional framework, reverberating in educational systems, instilled values, and general attitude tendencies of the population at large. Another influential factor in the development of (innovative, SME-based) entrepreneurship in general is likely to be the still ever growing global MNC network.

Assuming these insights are indicative of general trends, analyses should therefore be sensitive towards more than one dimension of factors influencing (tentative) entrepreneurship, particularly so should policies be based upon the resulting insights. Meanwhile, policy-makers should accept the overarching (institutional) framework within which tentative entrepreneurs have to operate – highly coordinated economies will most likely not be particularly conducive to radically innovative SMEs, while liberal economic environments will not foster a labor force with the highly specific skills needed for top notch incrementally improving technologies. This suggests the need for differential policies

across different types of economies and necessitates further inquiry into the true sources of the innovative entrepreneurial activities sought after by modern, capitalist economies.

Works Cited

- Acs, Z. J. and L. Szerb (2007). "Entrepreneurship, Economic Growth and Public Policy." Small Business Economics **28**: 109-122.
- Aidis, R. and M. Van Praag (2007). "Illegal Entrepreneurship Experience: Does it make a Difference for Business Performance and Motivation?" Journal of Business Venturing **22**: 283--310.
- Amit, R., K. R. MacCrimmon, C. Zietsma and J. M. Oesch (2000). "Does Money Matter? Wealth Attainment as the Motive for Initiating Growth-Oriented Technology Ventures." Journal of Business Venturing **16**: 119-143.
- Audretsch, D. B., Roy Thurik, Ingrid Verheul and S. Wennekers (2002). Entrepreneurship: Determinants and Policy in a European-U.S. Comparison. Boston, Kluwer Academic Publishers.
- Audretsch, D. B. and R. Thurik (2001). Linking Entrepreneurship to Growth. OECD Science, Technology and Industry Working Papers. Paris, Organization for Economic Co-operation and Development.
- Bhola, R. and I. Verheul (2006). Explaining Engagement Levels of Opportunity and Necessity Entrepreneurs. Rotterdam, The Netherlands, Centre for Advanced and Small Business Economics, Erasmus University Rotterdam.
- Bottka, S. (2005). Case Hungary - National Policy Priorities and R&D Programmes in the Field of ICT. CISTRANA, Brussels, Tekes.
- Breitfuss, M. and P. Stanovnik (2007). Country Review - Slovenia. Monitoring and Analysis of Policies and Public Financing Instruments Conducive to Higher Levels of R&D Investments: The "Policy Mix" Project, European Commission: 1-40.
- Bretznitz, D. (2005). "Collaborative Public Space in a National Innovation System: A Case Study of the Israeli Military's Impact on the Software Industry." Industry and Innovation **12**(1): 31--64.
- Burke, A. E., F. R. FitzRoy and M. A. Nolan (2002). "Self-employment Wealth and Job Creation: The Roles of Gender, Non-pecuniary Motivation and Entrepreneurial Ability." Small Business Economics **19**: 255-270.
- Busenitz, L. and J. Barney (1997). "Differences between Entrepreneurs and Managers in Large Organizations." Journal of Business Venturing **12**(1): 9-30.
- Carroll, G. and E. Mosakowski (1987). "The Career Dynamics of Self-Employment." Administrative Science Quarterly(32): 570-589.
- Christensen, C. M. and a. J. L. Bower (1996). "Customer Power, Strategic Investment, and the Failure of Leading Firms." Strategic Management Journal **17**: 197-218.
- CIA (2008). The World Factbook. Washington, D.C., Central Intelligence Agency.
- Colecchia, A. (2002). The New Economy and the Role Played by the ICT Producing Sectors: Recent Trends and Comparisons Across OECD Countries. IOAS Conference on the New Economy. London: 1-26.
- Collins, C. J., P. J. Hanges and E. A. Locke (2004). "The Relationship of Achievement Motivation to Entrepreneurial Behavior: A Meta-Analysis." Human Performance **17**(1): 95--117.

- Cooper, A. C. and W. C. Dunkelberg (1986). "Entrepreneurship and Paths to Business Ownership." Strategic Management Journal 7(1): 53--68.
- Cooper, A. C., C. Woo and W. C. Dunkelberg (1989). "Entrepreneurship and the Initial Size of Firms." Journal of Business Venturing 10(4): 53-68.
- Cromie, S. (1987). "Motivations of Aspiring Male and Female Entrepreneurs." Journal of Occupational Behaviour 8(3): 251--261.
- Domolki, B. (2002). ICT in Hungary: Institutions, Regulations, Challenges and Applications in Academia, Industry and the Public Sector. Laxenburg, International Federation for Information Processing (IFIP): 1-7.
- Dunford, M. and A. Smith (2000). "Catching Up or Falling Behind? Economic Performance and Regional Trajectories in the "New Europe"." Economic Geography 76(2): 169-195.
- EC (1999). Action Plan to Promote Entrepreneurship and Competitiveness. Luxembourg, European Commission.
- (2003). Entrepreneurship in Europe. Brussels, Belgium, European Commission.
- (2008). Inno-Policy TrendChart - Policy Trends and Appraisal Report: Hungary. E. Directorate-General.
- Eurostat (2008). Eurostat Home Page: Data, Eurostat.
- (2009). Eurostat Home Page: Data, Eurostat.
- Fabry, B. and M. Trimborn (2007). Arbeitnehmererfindungsrecht im internationalen Vergleich. Düsseldorf, Carl Heymanns Verlag GmbH.
- Faragó, K., O. Kiss and J. Boros (2008). "Risk-taking in entrepreneurs, compared to criminals and students: The role of uncertainty and stakes." The Journal of Socio-Economics 37: 2231--2241.
- Feldmann, M. (2007). The Origins of Varieties of Capitalism: Lessons from Post-Socialist Transition in Estonia and Slovenia. Beyond Varieties of Capitalism - Conflict, Contradictions, and Complementarities in the European Economy. B. Hancké, Martin Rhodes and M. Thatcher. New York, Oxford University Press: 3-38.
- Freeman, C. and a. F. Louçã (2001). As Time Goes By - From the Industrial Revolutions to the Information Revolution. Oxford, Oxford University Press.
- Hall, P. A. and D. Soskice (2001). An Introduction to Varieties of Capitalism. Varieties of Capitalism: The Institutional Foundations of Comparative Advantage. Peter A. Hall and D. Soskice. New York, Oxford University Press: 1-70.
- Hancké, B., Martin Rhodes and M. Thatcher (2007). Introduction: Beyond Varieties of Capitalism. Beyond Varieties of Capitalism - Conflict, Contradictions, and Complementarities in the European Economy. B. Hancké, Martin Rhodes and M. Thatcher. New York, Oxford University Press: 3-38.
- Haridranath, G. (2004). Hungarian IT: Coping with Economic Transition and Globalisation. 12th European Conference on Information Systems, Turku, Finland, Turku School of Economics and Business Administration.

Henderson, R. M. and K. B. Clark (1990). Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms. Managing Strategic Innovation and Change. M. L. Tushman and P. Anderson. New York, Oxford University Press: 92-107.

Herrmann, A. M. (2008). One Political Economy, One Competitive Strategy? Comparing Pharmaceutical Firms in Germany, Italy, and the UK. New York, Oxford University Press.

--- (2009). Supervision Meeting. N. C. G. t. Voert. Utrecht.

Hessels, J., M. v. Gelderen and R. Thurik (2008). "Entrepreneurial Aspirations, Motivations, and their Drivers." Small Business Economics 31: 323--339.

JAPTI (2008). "Invest Slovenia - ICT." Retrieved August 16, 2009, 2009.

Khilstrom, R. and J. Laffont (1979). "A General Equilibrium Entrepreneurial Theory of Firm Formation based on Risk Aversion." Journal of Political Economy(87): 719-748.

King, L. P. (2007). Central European Capitalism in Comparative Perspective. Beyond Varieties of Capitalism - Conflict, Contradictions, and Complementarities in the European Economy. B. Hancké, Martin Rhodes and M. Thatcher. New York, Oxford University Press: 3-38.

Knight, F. (1921). Risk, Uncertainty and Profit. New York, Augustus Kelley.

Krenker, A., Janez Bester and A. Kos (2007). Regional Cooperation between Universities, Research Institutions and Industry. Organizacija. 40: 97-100.

Kundera, M. (1984). "The Tragedy of Central Europe." The New York Review of Books(31): 33-38.

Lituchy, T. R. and M. A. Reavley (2004). "Women Entrepreneurs: A Comparison of International Small Business Owners in Poland and the Czech Republic." Journal of International Entrepreneurship(2): 61-87.

McClelland, D. C. (1961). The Achieving Society. Princeton, NJ, Van Norstrand.

--- (1975). "Power: The Inner Experience." New York Irvington.

McClelland, D. C., R. A. Clark, T. B. Roby and J. W. Atkinson (1958). The Effect of the Need for Achievement on Thematic Apperception. Motives in Fantasy, Action and Society. J. W. Atkinson. Princeton, NJ, Van Norstrand: 64-82.

Nguyen, G. D. and a. C. Genthon (2006). Has the European ICT Sector a Chance to be Competitive? Bruges European Economic Policy Briefings. Bruges, College of Europe. 14.

NKTH (2005). Hungarian Research Directory. Bibór Klekner, Katalin Kurucz and V. Mohácsi. Budapest, NKTH: 1-129.

--- (2008). "Péter Pázmány Programme - Regional Knowledge Centers (RKC)." Retrieved August 16, 2009, 2009, from <http://www.nkth.gov.hu/english/regional-knowledge/peter-pazmany-programme>.

OECD (2003). Entrepreneurship and Local Economic Development: Programme and Policy Recommendations. Paris, Organisation for Economic Co-operation and Development.

--- (2006). Compendium of Patent Statistics 2006. Paris, Organization for Economic Co-operation and Development.

--- (2008) Compendium of Patent Statistics 2008.

Okey, R. (1992). "Central Europe/Eastern Europe: Behind the Definitions." Past & Present(1): 102-133.

Pavlínek, P. (2004). "Regional Development Implications of Foreign Direct Investment in Central Europe." European Urban and Regional Studies(11): 47-70.

Péceli, G. (2007). Recent Advances in Industry-University Cooperation - A Hungarian View. IT STAR Workshop, Genzano di Roma, Italy, IT STAR.

Polgar, T. (2009, May 05, 2009). "Hungary: Research Performers - Higher Education Systems." Retrieved July 12, 2009, 2009, from <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=ri.content&topicID=66&countryCode=HU&parentID=65>.

Ragin, C. C. (1987). Case-Oriented Comparative Methods. The Comparative Method - Moving Beyond Qualitative and Quantitative Strategies. Berkeley, CA, University of California Press: 34-52.

Ray, D. M. and D. V. Turpin (1990). "Factors influencing Japanese Entrepreneurs in High-Technology Ventures." Journal of Business Venturing 5: 91--102.

Reynolds, P. D., W. D. Bygrave, E. Autio, L. W. Cox and M. Hay (2002). Global Entrepreneurship Monitor, 2002 Executive Report. London, Babson College, London Business School and Kaufman College.

Ritter, A. (1998). "Entrepreneurship, Microenterprise, and Public Policy in Cuba: Promotion, Containment, or Asphyxiation?" Journal of Interamerican Studies and World Affairs 40(2): 63-94.

Schlamberger, N., Cene Bavec and F. Pivec (2003). ICT in Slovenia: Institutions, Regulations, Challenges and Applications in Academia, Industry and the Public Sector, IFIP.

Schumpeter, J. A. (1934). The Theory of Economic Development. Cambridge, Massachusetts, USA, Harvard University Press.

--- (1947). "The Creative Response in Economic History." The Journal of Economic History 7(2): 149--159.

Shane, S. and S. Venkataraman (2000). "The Promise of Entrepreneurship as a Field of Research." The Academy of Management Review 25(1): 217--226.

Smith, S. W. (2006). Innovation in the U.S. Computer Equipment Industry - How Foreign R&D and International Trade Shape Domestic Innovation. Shaping Science and Technology Policy - The Next Generation of Research. D. H. Guston, and Daniel Sarewitz. 2006, The University of Wisconsin Press: 173-193.

Storey, D. J. (2003). Entrepreneurship, Small and Medium Sized Enterprises and Public Policies. Handbook of Entrepreneurship Research: An Interdisciplinary Survey and Introduction. Z. J. Acs and D. B. Audretsch. Boston, Kluwer Academic Publishers: 473-511.

Szanyi, M. (2004). Competitiveness and Industrial Renewal - The Role of Foreign Direct Investments in the Development of the Hungarian Electrical Industry. Seminar on Foreign Direct Investment and Multinational Corporations in Enlarged Europe. Madrid, Universidad Complutense de Madrid.

Thurik, A. R., M. A. Carree, A. v. Stel and D. B. Audretsch (2008). "Does self-employment reduce unemployment." Journal of Business Venturing 23: 673--686.

Tidd, J., John Bessant and a. K. Pavitt (2005). Managing Innovation - Integrating Technological, Market and Organizational Change. Chichester, John Wiley & Sons Ltd.

Tushman, M. L. and a. C. A. O'Reilly (1996). "Ambidextrous Organizations: Managing Evolutionary and Revolutionary Change." California Management Review 38(4): 8-30.

Tyson, L. d. A., Tea Petrin and H. Rogers (1993). "Promoting Entrepreneurship in Eastern Europe." Small Business Economics(6): 165-184.

Van der Knaap, L. (2009). Triggers of Entrepreneurship in the SDT and ICT Industries: On the Motives of Inventors to Become Entrepreneurs. Department of Innovation and Environmental Sciences. Utrecht, Utrecht University. **MSc Science and Innovation Management**.

Venturini, A. U. (2005). Case Slovenia - National Policy Priorities and R&D Programmes in the Field of ICT. CISTRANA, Brussels, Tekes.

Veres, E. (2007). Monitoring and Analysis of Policies and Public Financing Instruments Conducive to Higher Levels of R&D Investments: The "Policy Mix" Project - Case Study ICT in Hungary, European Commission: 1-23.

Vizjak, A. (2007). Programme of Measures for Promoting Entrepreneurship and Competitiveness 2007-2013. M. z. Gospodarstvo. Ljubljana, Republika Slovenija: 1-79.

Xu, H. and M. Ruef (2004). "The Myth of the Risk-Tolerant Entrepreneur." Strategic Organization 2(4): 331--355.

Zhao, H., G. E. Hills and S. E. Seibert (2005). "The Mediating Role of Self-Efficacy in the Development of Entrepreneurial Intentions." Journal of Applied Psychology 90(6): 1265--1272.

Appendix I VoC Analysis Slovenia and Hungary continued

This section provides one additional analysis of one of the VoC framework's spheres of economic interaction to illustrate the differences between Hungary and Slovenia once more. In doing so, it also provides some insights in the ICT industry.

A.I.1 Inter-Firm Relations

To grasp the (in)significance of standard-setting practices in the two cases selected for the present study, first some light should be shed on the characteristics of the ICT industry as such. This industry, and particularly the computer industry, is traditionally characterized by high uncertainty, discontinuous change and fast R&D driven technological advance. Examples include the progression from 14" Winchester data drives via 8" and 5.25" drives to 3.5" diskettes (see e.g. Christensen and Bower 1996), and the consequent inclusion of vacuum tubes, transistors, semi-conductors, integrated circuits, very-large-scale integration, and sub-micron processor models in computing (see e.g. Tushman and O'Reilly 1996; Freeman and Louçã 2001). High barriers to entry exist, apparent in the high costs of required R&D for each new generation of chips, high costs of plant start-up due to achievable economies of scale, required for competitiveness, and profound uncertainty (Freeman and Louçã 2001). This evokes a frontrunner-catch up situation in the industry at large and between multinationals in particular.

The industry's structure simultaneously allows for catching up. Firms are often either slow to invest in new technologies, prone to investing in the wrong technology, or unable to juggle the need to defend the old market and conquer the new one at once (Christensen and Bower 1996; Tushman and O'Reilly 1996). As these firms fail to compete, the industry allows for a large amount of new entrants to enter the market at every point of radical change. This multitude of firms competes for a market share through superior product design or marketing and the most efficient production methods before significant shakeout takes place. A few dominant players will emerge in the end, dominating the market until a new radically different technological advance takes place. Then, the process starts anew until a new set of dominant firms is established, which is often radically different from the preceding dominating set of firms. Once this set of dominant firms is established, however, it is relatively difficult for competitors to breach into their market (Christensen and Bower 1996; Tushman and O'Reilly 1996; Freeman and Louçã 2001; Smith 2006). In this respect, the dominant firms can be seen as trendsetting firms, while their competitors are trying to catch up from their peripheral vantage point.

In the ICT hardware industry, most national economies face this problem of a relatively peripheral position ever since the United States established itself as the market's frontrunner. US firms succeeded to that extent due to their quick commercialization of marketable ideas, high investment in R&D, and fostering of a "vigorous and competitive software industry" (Smith 2006: 182), driving demand. This was possible due to the country's strong scientific institutions and innovative engineers as well as entrepreneurs, operating in an environment favorable towards entrepreneurship (Freeman and Louçã 2001). The only national industry capable of making a significant leap towards the US' competitive production potential of computers, then, was Japan. This was only possible when aided by severe import restrictions, protection of native industries, and access to state-of-the-art knowledge through forced licensing. The US market was consecutively eroded abroad first. This started off with mass produced lower end peripherals, which were increasingly easy to produce due to standardization of interfaces, set through market dominating firms. However, market erosion increasingly progressed towards lower and eventually high end computers as well, eventually even touching upon the US' home market in the early 1980s. The US computer industry remained competitive, however, and met

sophisticated competition with new, innovative products and the creation of, and expansion into, new market segments (Smith 2006).

The ICT commodities, peripherals, and software industries are meanwhile more accessible to foreign economies. Commodities (e.g. land-line phone sets) and peripherals are relatively low-tech and are thus also relatively easy to produce in a manner profiting from economies of scale and inexpensive labor. These markets can thus be served even when a significant knowledge gap between the most sophisticated producers and those attempting to enter the market persists. The same is true for software, for which local producers have the added advantage of being better suited to serve (niche) markets in their proximity. In Hungary, for instance, local software and media producers profit from the nation's population preference for content in their native tongue (Bottka 2005). These submarkets of the ICT industry can therefore be expected to have more potential for new entrant economies, in addition to the ICT services industry that mainly *uses* technology, often imported from abroad. Realistically, significant catch-up by currently (semi-)peripheral industries can be expected in the sub-sectors of (parts of) the software industry, mobile telecommunications, internet service providers, and ICT services *using* (foreign) technology, like computer assembly and webhosting (Nguyen and Genthon 2006).

It can therefore be assumed that standard-setting practices as such are not the most telling dimensions of the ICT industry's characteristics – these are, after all, decided upon through market races won by either of the sizeable multinational corporations (MNCs), after which the smaller competitors and specialized suppliers work with these standards. It therefore proves to be more telling to delve into the R&D (cooperation) mechanisms present within the cases of Hungary and Slovenia. A competitive economy, as commonly asserted, requires successful R&D and technological progress after all. Technological progress, in turn, requires adequate knowledge infrastructures. The past decades, the latter have been stimulated in both Hungary and Slovenia through investments in knowledge networks, international cooperation and local innovation networks and services. Integration into the European Union's Framework Programs has taken place and has inspired many of the country's more recent measures and foci. Also university-industry alliances and sectoral innovative clusters have been stimulated in recent years (Bottka 2005; Veres 2007).

In Hungary, some cases of successful university (or other knowledge institute)-industry cooperation have been reported (Szanyi 2004; Bottka 2005), for example between the BME department of Telecommunications and Media Informatics and Ericsson Research, Nokia, and Microsoft. Innovation and knowledge centers, for instance the Mobile Innovation Centre and Innovation and Knowledge Center of Information Technology, both at BME, service both MNCs (HP, Nokia, Siemens, Sun Microsystems, T-Mobile, Ericsson) and local firms (Péceli 2007). The Pázmány Péter program simultaneously aims to establish regional centers of excellence, where innovative projects resulting from industry-university cooperation are stimulated and managed. The number of university departments involved in these projects amount to about six or seven every year (Péceli 2007; NKTH 2008), of the about seventeen university and public research institute departments conducting directly related research in Hungary (NKTH 2005).

Partially due to the country's relatively well educated, inexpensive, and hard working labor force, and partially due to the nation's "close proximity to Western European markets, [...] fiscal incentives of the government and privatization opportunities" (Szanyi 2004: 18), many multinational companies (MNCs)^[17] relocated their facilities to Hungary after the economic transition of the early 1990s. Prominent examples thereof are Nokia and Ericsson, which eventually started conducting (part of)

^[17] In fact, the majority of important multinationals is or has been present, including the five largest consultancy firms and telecom operators as well as soft- and hardware vendors (e.g. Compaq, IBM, Unisys, Oracle).

their R&D in Hungary as well. While these MNCs have brought state-of-the-art technologies to Hungary, as well as created jobs in manufacturing of components and peripherals, they have also sped up the demise of older, formerly state-owned enterprises that had acquired technical know-how through “learning by doing” in the protectionist period (Haridranath 2004). The remaining local SMEs active in the ICT industry generally have serious problems in terms of financing and marketing, opening the market for more subsidiaries of MNCs (Péceli 2007). As a consequence thereof, 77% of the Hungarian R&D conducted in the ICT sector in 2001 was conducted by multinationals^[18] (Bottka 2005; EC 2008), particularly in select urban areas (Pavlínek 2004). In the economy as a whole, R&D expenditure was for about 72% accounted for by MNCs in 1997 (King 2007). This reflects the overall importance of FDI in the country at large, amounting to US\$ 2 billion per year on average (Colecchia 2002; Domolki 2002; Veres 2007). Knowledge spillovers and close cooperation between MNCs and Hungarian owned firms is nevertheless relatively rare, as Hungarian firms were (initially) unable to meet the MNCs’ demand conditions. This was due to their obsolete production methods and lacking project management skills, causing them to fail to provide the batch volumes required. The MNCs’ foreign suppliers therefore often co-located with them, whenever applicable. Oftentimes, pre-existing knowledge channels, within or between MNCs and their suppliers, were and are therefore often used (Haridranath 2004; Szanyi 2004). Meanwhile, MNC-knowledge institute ties remain relatively limited; MNC-Hungarian owned firm collaborations are even less regularly occurring (Szanyi 2004). These weak local and regional linkages make the local economy particularly vulnerable, as these MNCs can therefore easily move their production to lower-cost locations whenever the need arises (Pavlínek 2004). Until now, domestic technology development has been lagging behind (Bottka 2005; Veres 2007; Polgar 2009). This evidence points towards an LME-type sphere of inter-firm relations, as the R&D environment is dominated by MNCs operating individually within a neo-classical market. Families of firms and close interaction between MNCs and/or local firms and/or knowledge institutes do not occur on a significant scale – cooperation is lacking.

Slovenia, meanwhile, has traditionally served as a (communications) gateway between Western and Eastern Europe due to its relatively privileged position under the Yugoslavian regime and favorable geopolitical positioning. The thus established (international) market relations prevented the Slovenian export market from collapsing dramatically during the nation’s economy’s transition (Schlamberger *et al.* 2003; Feldmann 2007; JAPTI 2008). Inter-firm ties were formed relatively early and were later on reinforced by the outward direct investments by Slovenian companies in the emerging markets of (other) ex-Yugoslav republics. As a result, IT services provided by e.g. Hermes Softlab and Telargo accounted for about 34% of exports between 2000 and 2006. Also providers of telecommunication services, e.g. Telekom Slovenije, accounted for a large share of exports. Other important companies in the ICT sector include IBM, Debitel, Ericsson, HP, Iskratel/Siemens, Microsoft, Oracle, and SAP (JAPTI 2008).

Meanwhile, it is recognized that R&D has to keep up with technological developments in order to market both new innovations and maintain Slovenia’s ability to provide adequate services. To this end, for instance the Information Technology Standing Regional Committee (IT-STAR) initiative was launched in 2001, supported by IFIP, with Hungary, Italy, and Austria as members alongside Slovenia. This organization aims to offer a virtual platform, facilitating the exchange of skills and experiences in the region (Schlamberger *et al.* 2003). Also, the national government attempts to stimulate R&D in the ICT sector (amongst others) through instating national R&D programs with thematic foci and funding of R&D, mediated by the Ministry of Higher Education, Science and Technology as well as the Slovenian Research and Technology agencies. Instruments used include

^[18] The remaining 23% was accounted for by several larger Hungarian businesses, including KFKI Computer Group, Synergon, Montana, Kurt (European Data Recovery Service) and Szemalk, as well as a multitude of active SMEs, including e.g. Mindmaker and Graphisoft (Domolki 2002; Haridranath 2004; Szanyi 2004).

funding of 3 or 5-year research and infrastructure programs, postgraduate education and crucial institutions, as well as the provision of a research infrastructure, stimulation of scientific communication, and stimulation of international cooperation. Because the economy is relatively small, but relatively saturated with highly educated young people (there is no significant brain drain), there can be a broad research focus, supported by a relatively well developed research infrastructure. Further dissemination of knowledge is stimulated through encouraging researcher mobility and multilateral or regional R&D programs (Venturini 2005; Breiffuss and Stanovnik 2007; Krenker *et al.* 2007; Vizjak 2007). Cooperation between research, education, and business nevertheless remains somewhat strained, as is commonly observed in capitalist economies. R&D investments by the private sector are lagging behind (Venturini 2005). Due to the well developed (international) market relations and, as compared to Hungary, well developed inter-firm ties, however, the Slovenian ICT industry can be characterized as a CME-type economy in terms of inter-firm relations, albeit not as explicitly so as ideal-type case Germany.