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Transformative Use of ICT in EU Regions

Differences in Innovation Culture Across Europe

– A Discussion Paper –

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1 Introduction

The starting point for this document is the TRANSFORM State(s) of the Art(s) report (Cornford et al. 2006) which took a broad look into theories explaining why there are differences in Regional Innovation Culture (RIC) and how specific characteristics of RICs influence the capability of regions to achieve economic and social progress in the knowledge-based economy and society.

Now that the case study regions have been selected, the task is to review the literature in order to identify existing *empirical* evidence about the type of differences in the innovation culture between the regions and countries we want to analyse. Unfortunately, the elusiveness of the term "regional innovation culture" (and the various uses which the different academic faculties make of the term "culture") makes this a difficult task.

The present document summarises some available evidence about differences in innovation culture across Europe, with a special focus on the Germany, Italy, Poland, Slovakia, Spain, Sweden, United Kingdom – the countries in which case studies are conducted as part of TRANSFORM. In addition, EU15 and EU25 averages and figures for the USA are presented, wherever available, to provide points of reference.

Section 2 looks into available evidence from mainly qualitative empirical analysis of innovation related cultural differences between EU countries. Arguably, not much of this evidence has found its way into informing policy making at EU level. A main reason is likely to be the looming risk of cultural determinism. We also quote from available statistical data which can be used for highlighting differences in innovation culture across Europe. A small number of analytical reports have produced data which in some way cover the aspects of willingness and open-mindedness of citizen towards technological innovation and entrepreneurial activities. Country differences which can be detected in survey-based statistics, however, need to be treated with care because of the difficulty to conduct robust cross-cultural research using harmonised data collection tools (see Harkness et al. 2003).

Section 3 presents findings on differences in innovation culture within nation states, i.e. at inter-regional level. The number of studies which have been conducted in this area is small and varies across EU Member States. Nevertheless, we feel that the studies cited can shed some light on differences in Regional Innovation Culture within Europe.

2 National Differences in Innovation Culture

This chapter deals with the question what the research literature says about the extent to which there are differences in national culture which have an influence on the capability of regions to foster innovation, and the specific ways in which innovation takes places within a country.

"Innovation culture" is to be understood in terms of attitudes towards innovation, technology, exchange of knowledge, entrepreneurial activities, business, uncertainty (Hofstede 2001), and related behaviour and historical trajectories.

Most comparative work on cultures is based on the assumption that there is a large degree of homogeneity within nation states as opposed to large differences between nation states. The work of Hofstede and his followers, for example, does not look into differences between regions within countries at all, with very few exceptions (e.g. Belgium is divided into Wallonia and Flanders).

It is for this reason that this document first looks into available evidence on differences in innovation culture across countries. Indeed, although the main focus of TRANSFORM is on region-level innovation culture, it must still be assumed that the properties of national cultural exert a – more or less strong – influence on regional settings, and as such need to be taken into account.

2.1 "Measuring" National Culture

Meaningful empirical research on cultural influences on ICT adoption must first develop a definition of what one intends to understand by "culture". The following three showcase definitions disclose the main aspects to be considered in any definition of culture:

Herbig and Dunphy (1998:13) define culture as follows: "culture is the sum total of a way of life: it is the values, traits, or behaviours shared by the people within a region. The function of culture is to establish modes of conduct, standards of performance, and ways of dealing with interpersonal and environmental relations that will reduce uncertainty, increase predictability, and thereby promote survival and growth among the members if any society." This definition hints at the fact that culture is not stable but evolves to meet the needs of society. That culture is not fixed once and for all is underlined by studies mapping value change (Rosenstiel & Koch: 201-203).

Hofstede (1991:5) however presents a more definite and less flexible conception of culture when he defines it as "the collective programming of the mind, which distinguishes the members of one human group from another." Hofstede concedes that people belong to different cultural groups at the same time (nation, gender, organisation…). With regard to economic activities however he considers the national scale to be of particular importance. According to Hofstede, "national culture" is the set of collective beliefs and value that distinguishes people of one nationality from those of another. This view perceives national cultures as extremely stable. Hofstede claims that "(…) this stability can be explained from the reinforcement of culture patterns by the institutions that themselves are products of the dominant cultural value systems". Even if cultures shift in the log run, "they shift in formation, so that the differences between them remain intact" (Hofstede 2001:255).

In order to arrive at a possible "measure" of culture, Brons (2006:549) looked into different definitions of culture. He was able to distinguish two major elements present in nearly all definitions of culture: 1) culture guides, influences or co-determines behaviour and 2) culture is socially transferred. This means in short that culture is perceived as "meta-behaviour". Brons holds that meta behaviour as some deeper structure is reflected in actual behaviour. Therefore it should be possible to measure cultural differences indirectly, that is to infer them from data about collective behaviour. He points to the problem that although data about social behaviour (social mobility, frequency of labour conflicts, political violence, wealth distribution) tell something about a country's (or region's) culture it is not always very clear how to interpret these data.

Values are often seen as one "layer" of cultural traits (see onion model in Figure 11 on page 24). Rosenstiel and Koch (2001:201) argue that, like culture in general, „values are an abstraction; they cannot be observed directly. They have to be inferred from indicators. Such indicators can be (a) observable human behaviour, (b) human artefacts, or (c) verbal statements by persons about their value orientation." Most research on values and on value change however resorts to the third kind of indicator: statements on value orientation. One important influence of values is on corporate cultures that in turn represent an important indicator for innovative capacity. The authors hold that although "socioeconomic values are not identical with the spectrum of values that make up corporate culture and that also includes norms and ideologies, (...) they do constitute part of it. Because corporate cultures are rooted in a consensus on values, they are directly affected by value change" (Rosenstiel & Koch 2001:209).

2.2 Dimensions of (National) Culture

Different models trying to map out differences in national culture have been established, many of which turn to "dimensions", or specific "traits" of culture in order to work out different systems of cultural attitudes and behaviour. Myers and Tan (2002:5) distinguish three categories of national culture models: Single dimension models, Multiple dimension models and Historical-social models.

Table 1: Models of national culture

Models	Source	Cultural Dimensions
Single Dimension	Hall, 1960, 1976; Hall & Hall, 1990 Lewis, 1992 Fukuyama, 1995 Trandis, 1995 Bolger, Hallam, & Vinton, 1985	High Context - Low Context Monochronic - Polychronic High Trust - Low Trust Idiocentric - Allocentric Monosynchronic and Polysynchronic
Multiple Dimensions	Hofstede, 1980, 1983, 1991; Hofstede, Neuijen, & Ohayv, 1990	Power Distance, Uncertainty Avoidance, Individualism - Collectivism, Masculinity - Femininity
	Hampden-Turner & Trompenaars, 1994	Universalism - Particularism Analyzing - Integrating Individualism - Communitarianism Inner directed - Outer directed Time as sequence - Time as synchronization Achieved Status - Ascribed Status Equality - Hierarchy
	Lessem & Neubauer, 1994	Pragmatism - Idealism/Wholism Rationalism - Humanism
	Kluckhohn & Strodbeck, 1961	Free Will - Determinism Accumulation of Wealth - Just Enough
	Newman, Summer, & Warren, 1977	Improvement - Maintaining Status Quo Social Action - Maintaining Relationship Merit based - Relationship based WideSharing - Non Sharing Objective - Emotional
Historical - Social	Bloom, Calori, & de Woot, 1994	Euromanagement Model
	Chen, 1995; Cragg, 1995; Seagrave, 1995	South East Asian Management Model

Source: Myers and Tan (2002:6)

The literature review effected by Myers and Tan (2002:5) shows that several authors tried to operationalise culture through the use of multiple cultural dimensions. The most famous and most widely used of these “models of cultural dimensions” was developed by Hofstede (2001). He based his model on a survey of employees in IBM subsidiaries in 64 countries (in 1970). The first version of Hofstede’s model of national culture contained four dimensions: power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation:

- Power distance is the extent to which the less powerful members of organizations and institutions (like the family) accept and expect that power is distributed unequally. This represents inequality (more versus less), but defined from below, not from above. It suggests that a society's level of inequality is endorsed by the followers as much as by the leaders.
- Individualism is seen versus its opposite, collectivism, that is the degree to which individuals are integrated into groups. On the individualist side we find societies in which the ties between individuals are loose: everyone is expected to look after him/herself and his/her immediate family. On the collectivist side we find societies in which people from birth onwards are integrated into strong, cohesive in-groups, often extended families which continue protecting them in exchange for unquestioning loyalty.
- Masculinity versus its opposite, femininity, refers to the distribution of roles between the genders which is another fundamental issue for any society to which a range of solutions are found. The IBM studies revealed that (a) women's values differ less among societies than men's values; (b) men's values from one country to another contain a dimension from very assertive and competitive and maximally different from women's values on the one side, to modest and caring and similar to women's values on the other. The assertive pole has been called 'masculine' and the modest, caring pole 'feminine'. The women in feminine countries have the same modest, caring values as the men; in the masculine countries they are somewhat assertive and competitive, but not as much as the men, so that these countries show a gap between men's values and women's values.
- Uncertainty avoidance deals with a society's tolerance for uncertainty and ambiguity. It indicates to what extent a culture programs its members to feel either uncomfortable or comfortable in unstructured situations. Uncertainty avoiding cultures try to minimize the possibility of such situations by strict laws and rules, safety and security measures, and on the philosophical and religious level by a belief in absolute truth. People in uncertainty avoiding countries are also more emotional, and motivated by inner nervous energy. The opposite type, uncertainty accepting cultures, are more tolerant of opinions different from what they are used to; they try to have as few

rules as possible, and on the philosophical and religious level they are relativist and allow many currents to flow side by side. People within these cultures are more phlegmatic and contemplative, and not expected by their environment to express emotions.

Later on, Hofstede developed a fifth dimension, based on a study among students in 23 countries:

- Long-term versus short-term orientation: Values associated with Long Term Orientation are thrift and perseverance; values associated with Short Term Orientation are respect for tradition, fulfilling social obligations, and protecting one's 'face'. Both the positively and the negatively rated values of this dimension are found in the teachings of Confucius, the most influential Chinese philosopher who lived around 500 B.C. However, the dimension also applies to countries without a Confucian heritage.

Although the model is concerned with "national" cultures, Hofstede groups the countries into supranational cultural regions: "Power distance scores are high for Latin, Asian and African countries and smaller for Germanic countries. Individualism prevails in developed and Western countries, while Collectivism prevails in less developed and Eastern countries; Japan takes a middle position on this dimension. Masculinity is high in Japan, in some European countries like Germany, Austria and Switzerland, and moderately high in Anglo countries; it is low in Nordic countries and in the Netherlands and moderately low in some Latin and Asian countries like France, Spain and Thailand. Uncertainty avoidance scores are higher in Latin countries, in Japan, and in German speaking countries, lower in Anglo, Nordic, and Chinese culture countries. A Long Term Orientation is mostly found in East Asian countries" (www.geerthofstede.nl). This grouping of country scores points in his opinion to the roots of cultural differences that should be sought in the common history of similarly scoring countries.

The Hofstede scores for his five dimensions for the EU countries for which data are available are reproduced in Table 2.

Table 2: Hofstede Cultural Dimension Scores for EU Countries

Country	Power Distance	Individualism	Masculinity	Uncertainty Avoidance	Long-Term Orientation
Austria	11	55	79	70	--
Belgium	65	75	54	94	--
Bulgaria*	70	30	40	85	--
Czech Republic*	57	58	57	74	13
Denmark	18	74	16	23	--
Estonia*	40	60	30	60	--
Finland	33	63	26	59	--
France	68	71	43	86	--
West Germany	35	67	66	65	31
Greece	60	35	57	112	--
Hungary*	46	80	88	82	50
Ireland	28	70	68	35	--
Italy	50	76	70	75	--
Luxembourg*	40	60	50	70	--
Malta*	56	59	47	96	--
Netherlands	38	80	14	53	44
Norway	31	69	8	50	20
Poland*	68	60	64	93	32
Portugal	63	27	31	104	--
Romania*	90	30	42	90	--
Slovakia*	104	52	110	51	38
Spain	57	51	42	86	--
Sweden	31	71	5	29	33
U.K.	35	89	66	35	25

* = Values estimated by Hofstede; -- = not available

Brons (2006:550) critiques Hofstede on the grounds that Hofstede regards his measurement as direct although in fact he based his measurement not on actual behaviour but on what people said they would do. This refers to the problem of measurement elaborated above: whether culture is best measured against what people do or against what they think would be appropriate to do. While Brons thinks that actual behaviour is more revealing, Rosenstiel and Koch (2001:200) come to the conclusion that the correlations between values and behaviour are weak because human behaviour is affected by many factors, of which cultural values is just one.

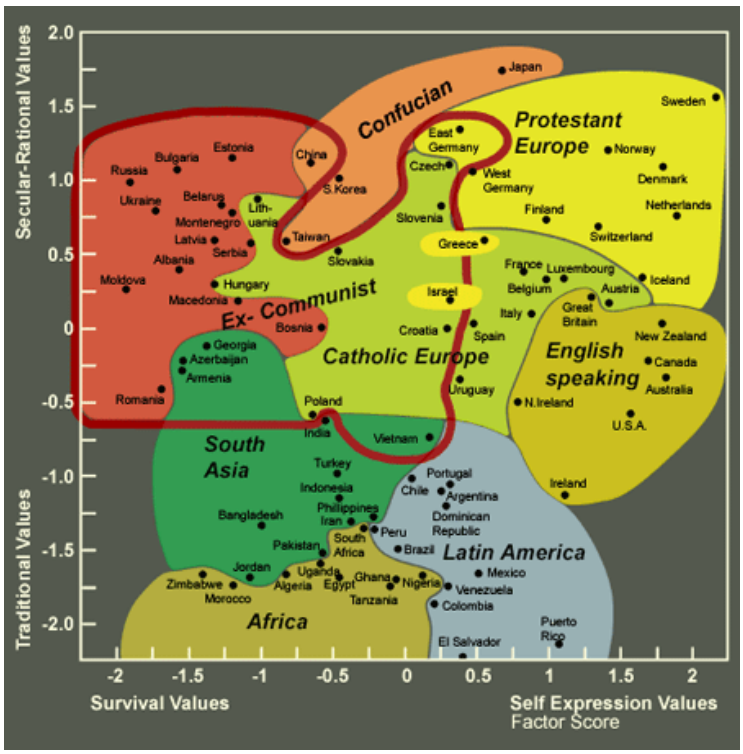
Irrespective of criticism such as this, Hofstede's indices have proven to be valuable for explaining economic differences. Dieckmann (1996) found a negative and significant correlation of uncertainty avoidance with the growth rate of per capita income[1].

Another widely used system for measurement of cultural differences between nations was developed by Inglehart (1997) and builds on data from the World Value Survey[2] (see box below). As opposed to Hofstede's approach which is informed by cultural theory and stress on path dependency, Inglehart is more indebted to modernization theory, which argues that processes of economic and social development lead to cultural convergence (cp. Kerr 1983).

Inglehart-Welzel Cultural Map of the World

The map below reflects the fact that a large number of basic values are closely correlated; they can be depicted in just major two dimensions of cross-cultural variation.

The World Values Surveys were designed to provide a comprehensive measurement of all major areas of human concern, from religion to politics to economic and social life and two dimensions dominate the picture: (1) Traditional/ Secular-rational and (2) Survival/Self-expression values. These two dimensions explain more than 70 percent of the cross-national variance in a factor analysis of ten indicators-and each of these dimensions is strongly correlated with scores of other important orientations.



The Traditional/Secular-rational values dimension reflects the contrast between societies in which religion is very important and those in which it is not. A wide range of other orientations are closely linked with this dimension. Societies near the traditional pole emphasize the importance of parent-child ties and deference to authority, along with absolute standards and

[1] Sensitivity analysis showed, however, that this correlation was not robust with respect to changes in the set of exogenous variables considered.

[2] See http://margaux.grandvinum.se/SebTest/wvs/index_html.

traditional family values, and reject divorce, abortion, euthanasia, and suicide. These societies have high levels of national pride, and a nationalistic outlook. Societies with secular-rational values have the opposite preferences on all of these topics.

The second major dimension of cross-cultural variation is linked with the transition from industrial society to post-industrial societies-which brings a polarization between Survival and Self-expression values. The unprecedented wealth that has accumulated in advanced societies during the past generation means that an increasing share of the population has grown up taking survival for granted. Thus, priorities have shifted from an overwhelming emphasis on economic and physical security toward an increasing emphasis on subjective well-being, self-expression and quality of life. Inglehart and Baker (2000) find evidence that orientations have shifted from Traditional toward Secular-rational values, in almost all industrial societies. But modernization, is not linear-when a society has completed industrialization and starts becoming a knowledge society, it moves in a new direction, from Survival values toward increasing emphasis on Self-expression values.

A central component of this emerging dimension involves the polarization between Materialist and Postmaterialist values, reflecting a cultural shift that is emerging among generations who have grown up taking survival for granted. Self-expression values give high priority to environmental protection, tolerance of diversity and rising demands for participation in decision making in economic and political life. These values also reflect mass polarization over tolerance of outgroups, including foreigners, gays and lesbians and gender equality. The shift from survival values to self-expression values also includes a shift in child-rearing values, from emphasis on hard work toward emphasis on imagination and tolerance as important values to teach a child. And it goes with a rising sense of subjective well-being that is conducive to an atmosphere of tolerance, trust and political moderation. Finally, societies that rank high on self-expression values also tend to rank high on interpersonal trust.

This produces a culture of trust and tolerance, in which people place a relatively high value on individual freedom and self-expression, and have activist political orientations. These are precisely the attributes that the political culture literature defines as crucial to democracy.

Source: Inglehart & Welzel (2005)

There are, of course, further sources for indices which attempt to capture national differences in culture. For exsample, for his study on the correlation between political culture and growth, Mauro (1995) calculated indices from data sets on institutional performance such as those produced by “Business International (BI)”. BI indices are available on (a) efficiency of the judical system, (b) corruption, (c) red tape and (d) political stability. The source of the data were expert assessments by BI’s correspondents stationed in about 70 countries.

2.3 Culture and Innovation

Just as culture is difficult to define, “culture of innovation” is also a multifaceted term. Often used in terms of “business culture”, the following definition takes a more general approach: In his essay on the theoretical background that could be useful in enlightening the concept of “culture of innovation”, Wieland (2004: 10) conceives culture of innovation as the institutions (norms, values, formal and informal) that have a significant influence on how the actors involved in an innovation process perceive economic and technical challenges and that provides them with strategies to tackle these.

Herbig and Dunphy (1998:14) highlight the profound significance of culture for the adoption of innovative technologies when they hold that "existing cultural conditions determine whether, when, how and in what form a new innovation will be adopted. If the behaviour, ideas and material apparatus which must accompany the use of innovation can affect improvements along lines already laid down in the culture, the possibilities of acceptance are much greater." They cite several previous studies[3] that attribute higher innovation capacities to societies which are characterized by:

- Higher Individualism
- Willingness to take risks
- Readiness to Accept Change
- Long-Term Orientation
- Low on Power/Status/Hierarchy (Low Power Distance)
- Weak Uncertainty Avoidance
- Openness to New Information
- Frequent Travel
- Positive attitude Towards Science
- Value of Education to Society (High Education Levels)
- Early Adapters (innovators ARE early adopters not so much the other way round)
- Religion (however, depending on which religion, see below).

The authors stress the fact that most people work in hope of reward. This is why class systems that freeze people in place will discourage people to work hard or to innovate. The same holds true for a society in which lack of trust in institutions prevails. This is because people have to be persuaded that they can affect their destiny in order to become active and innovative citizens (Herbig & Dunphy 1998:18). The existence of social capital, as conceptualised by Coleman, should therefore be conductive to an innovative climate.

The authors devote an entire chapter to the relationship between religion and innovation, which they consider of special importance. In their opinion the relatedness is twofold: On the one hand a strict segregation of church and public affairs is regarded as being beneficial towards a country's innovative potential: They hold that often "where religious and political systems are intertwined, definite cultural bias exists against technology that might affect tradition." The Arab states, Ireland, Spain and Latin American countries are cited as examples of these "usually underdeveloped" societies where "more often than not, the educational level and general intellectual environment […] is not conductive to innovation" (Herbig and Dunphy 1998:20). On the other hand they judge the religious transcendence of work inherent in Christian faiths – especially as to be found as part of the protestant work ethic – as contributing to a country's innovative capacity. In the view of Lynn White, an medieval historian cited by them, the Judeo-Christian belief that domination of nature is sanctioned by religion was essential for the aggressive effort to exploit nature and to develop technology to its full potential. In contrast Asian faiths such as Hinduism or Buddhism that aim at the elimination of desires and are more benign towards nature are supposed to provide less incentives to innovate. Islamic virtues and moral perceptions are also seen as hindering innovations. Herbig and Dunphy hold that because in Islamic cultures material advancement does not entail higher status or merit and because innovation is considered to be the work of the devil the propensity to innovate is low and fatalism is prevalent. This tendency is reinforced when the ulama voice opposition to innovation and thus make any change a high-risk project[4].

Figure 1 presents recent Eurobarometer data on the share of the adult population who state that they "believe in God" or in another sort of "spirit, God or life force". The data indicate the degree of differences which exist across EU25 countries.

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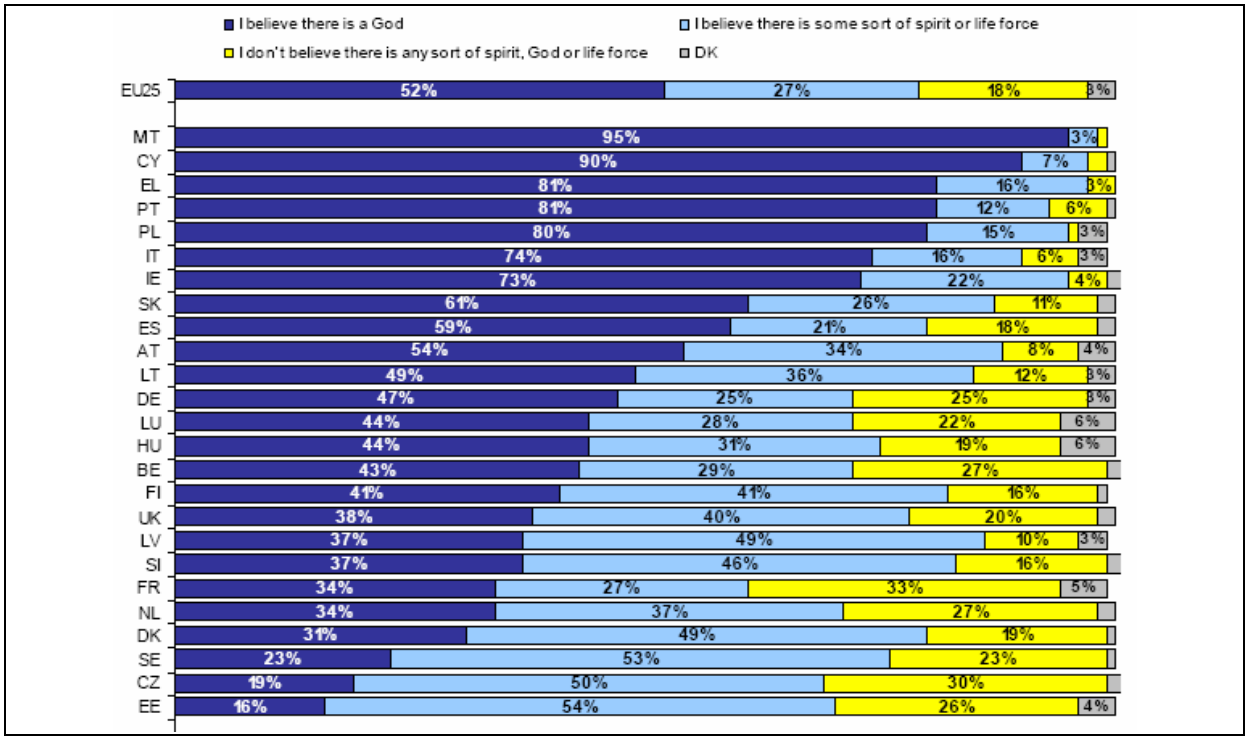
[3] Barnett (1953), Rothwell and Wissema (1986), Hofstede (2001), Beteille (1977), Mokyr (1991), Herbig & Miller (1992), Lee (1998)

[4] One has to ask though if restrictive political and economic systems that leave little influence to ordinary people do not contribute as much to a high degree of fatalism and low-innovativeness as religious beliefs do.

Figure 1: Religious beliefs of EU25 adult population according to Eurobarometer study



Source: Special Eurobarometer 225 (see TNS/EOS Gallup 2005)

Religious beliefs also differ, of course, within countries. In a recent study using data from the European Value Studies, Beugelsdijk et al. (2006: 324-325) found that – at least within Germany and the Netherlands – "regional differences in terms of a Protestant ore a Catholic tradition are not so strong to differ signifcantly from national characteristics *once the latter is controlled*" [emphasis added]. The authors interprete their findings as supporting Inglehart & Baker (2000:36) who suggest that "given religious traditions have historically shaped the national culture of given societies, but that today their impact is transmitted through nationwide institutions, to the population of that society as a whole – even to those who have little or no contact with religious institutions". According to this view, religious beliefs today are of less importance for economic development compared to those in the past, especially if these have become deeply embedded in national/regional culture.

The influence of culture on innovation has also been explored by Shane (1993; 1995). His research suggests that rates of innovation (measured as per capita number of trademarks) are predominately influenced by weak uncertainty avoidance. This turned out to be a more important factor than even per capita income. Weak power distance and strong individualism were also shown to be related to innovation, if to a lesser extent. Shane (1995) also analysed national differences in attitudes about the role of innovation champions ("people who take personal risks to overcome resistance to innovative ideas in established organisations"). He found a signifcant association between national culture and national preferences for innovation championing strategies: "It found that the more collectivist a society is, the more people in it prefer champions to gather support for an innovative idea by making cross-functional appeals for support from organization members. It also found that the more uncertainty accepting a society is, the more people in it prefer champions to overcome organizational inertia to innovation by violating organizational norms, rules and procedures. Finally, it found that the more power distant a society is, the more people in it prefer champions to make those in authority the locus of support for efforts to overcome resistance to innovative ideas."

Research by Ulijn and Weggeman (2001) maps out a more differentiated relationship between national culture and innovativeness. They suggest that different types of corporate culture exist which – depending on the overall national culture – might obtain equally good results concerning economic growth and innovative capacity. Hence one has to keep in mind that more than one satisfactory blend of cultural attributes can lead to innovation.

2.4 Culture and Entrepreneurship

2.4.1 Empirical Research

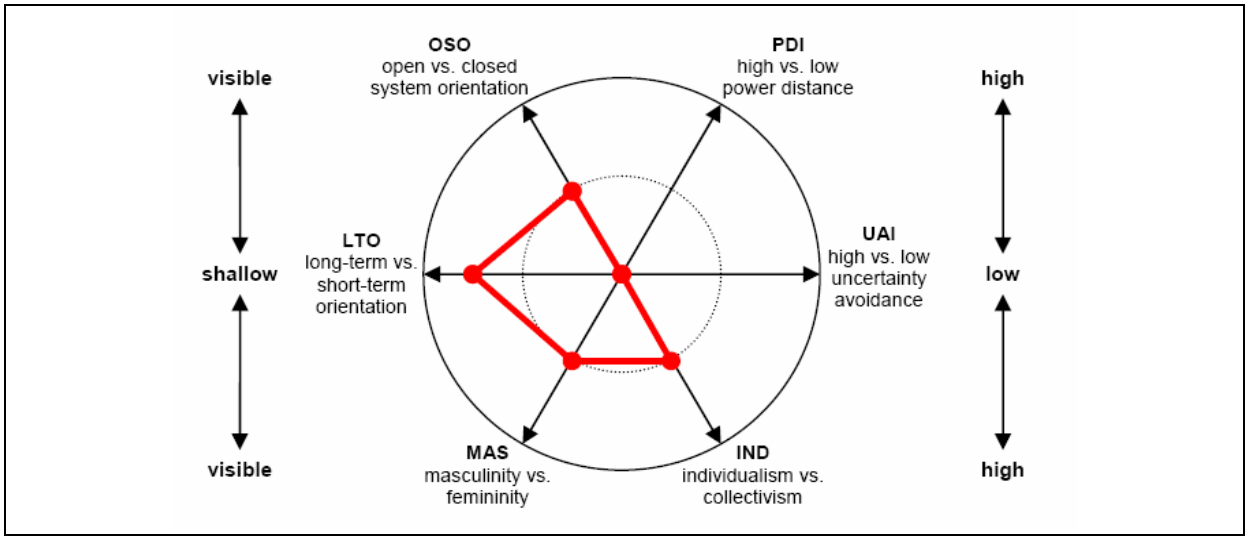
Hofstede claims that innovation is directly related to entrepreneurship and that therefore cultural dimensions influencing innovation will also set the background for entrepreneurial activities. Beugelsdijk (2007:192) argues in the same vein that propensity for innovation and propensity to entrepreneurship go hand-in-hand because in his opinion entrepreneurship is not only associated with the formation of new firms, but should also be understood in the sense of starting something new. This might include innovative and enterprising behaviour inside already existing organizations. He claims that since entrepreneurship is associated with alertness, the finding of new product-market combinations and innovation, "entrepreneurship, innovation and economic growth are logically linked through the recognition and exploitation of opportunities in economic and social areas". Common sense supports the assumption that innovative cultures might feature a high rate of entrepreneurship as well. The opposite though, might not hold true. Hofstede et al (2004:195) find some evidence for their dissatisfaction hypothesis which states that people less satisfied in life as a whole show a higher degree of entrepreneurship. It remains questionable, however, if the factors causing higher entrepreneurship that are cited by Hofstede et al (societies with larger power distance, stronger uncertainty avoidance, more bureaucracy, more corruption and relatively poor with people less satisfied with democracy and society) really do provide a promotional environment for innovation.

One of the factors that highly relates to entrepreneurship and innovation is Hofstede's dimension of "uncertainty avoidance". It refers to the prerequisite for both, that is to be willing to take a risk, and invest time and/or money in the face of uncertainty. Wennekers et al (2007) looked into the presumed relationship between uncertainty avoidance and the rate of business ownership across 21 OECD countries. They differentiate between the effects of risk aversion on an individual level and on the national level. While risk-averse individuals are less likely to resort to entrepreneurial activities, the corresponding relationship on a national scale is less clear-cut. There are two opposing hypotheses: on the one hand that high uncertainty avoidance might inhibit entrepreneurship and on the other hand that a high degree of uncertainty avoidance in the overall society results in an restrictive working environment in existing companies and organisation which in turn raises the incentive for self-employment. Both hypotheses are taken into account in Wennekers et al's quantitative analysis of statistical data for 21 one OECD countries form 1976-2004. One of the main outcomes is that there is evidence for a push effect of high uncertainty avoidance on the rate of business ownership. However this effect diminishes over time. This leads the authors to the presumption that in the changing environment of an information economy that evolved during the last years, low uncertainty avoidance acts as a growing pull factor toward entrepreneurship and that thus both Baum's push hypothesis for high uncertainty avoidance and Shane's pull hypothesis for low uncertainty avoidance might be equally valid for the economies of today.

In a similar study of 27 countries world-wide, Uhlaner and Thurik (2007) find a clearly negative relationship between the cultural dimension of Post-Materialism as developed by Inglehart (1997) and entrepreneurial activities.

Menzel et al. (2006) carried out a comprehensive study of the literature on the influence of national, corporate and professional culture on intrapreneurship, defined as entrepreneurship within existing organizations and considered "an important source of technical knowledge to develop radical innovation" within companies (ibid.: 3). They suggest an ideal profile of intrapreneurship-supportive culture" (see Figure 2) for which they use Hofstede's five dimensions as well as a new one called "open systems orientation". This is "about the coexistence of internal and external factors and sources of innovation along the whole value chain: funding of innovation, idea generation, sourcing and sharing of knowledge, joint development, marketing, and distribution" (cp. von Hippel 2005).

Figure 2: A possible ideal profile of intrapreneurship-supportive culture



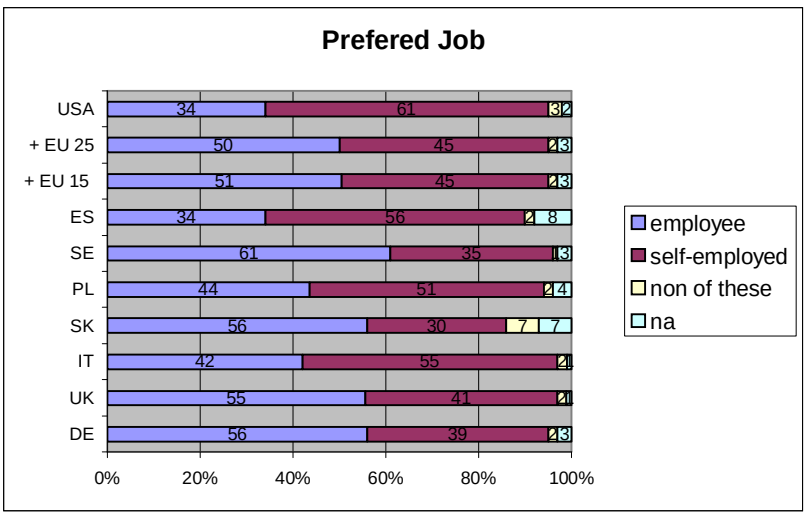
Source: Menzel et al. (2006: 17)

2.4.2 EU-Level Survey Research on Entrepreneurial Attitudes

A 2004 Eurobarometer survey can be used to obtain comparative data about attitudes of the adult population towards entrepreneurial behaviour.

Figure 3 presents data on respondents' preferred job status. For the EU on average the share of people preferring employee status is similar to the share of people preferring to be self-employed. Among the countries covered by TRANSFORM, there is a more widespread preference for entrepreneurship in Spain (56%) and in Italy (55%), while in Sweden (35%) and Slovakia (30%) a clear majority favours being employee. In contrast to the results for the EU, the adult US population appears more open-minded towards the possibility of being self-employed, with 61% preferring this option over being employed.

Figure 3: The result of the question which kind of job would the respondents prefer if they could choose



Source: Flash Eurobarometer 160 (see TNS/EOS Gallup 2004a)

A more specific look at the reasons for respondents' preferences (Table 3) reveals that 30% of EU citizens prefer the fixed income which comes with an employee status, even in Slovakia its 55%. The stability of the employment is for 24% of the respondents important, in Italy 48% and the reason of a not risky job for 21%, whereas in Germany this was named with 47%. The same question asked in the

USA had the outcome that 16% would prefer the regular income but 28% the severity of decision, which is stated in the European Union only with 6%.

Table 3: Main reasons for preferring employee status (in %; multiple response)

	DE	UK	IT	SK	PL	SE	ES	EU15	EU25	USA
Regular, fixed income vs irregular, variable income	29	25	54	55	24	17	20	29	30	16
Stability of employment	13	29	48	29	23	18	23	23	24	10
Not as risky/ unfavour-able economic climate	47	6	9	23	20	6	12	20	21	5
Severity of decision/ being tied to business	10	9	1	4	4	5	10	6	6	28

Source: Flash Eurobarometer 160 (see TNS/EOS Gallup 2004a)

Table 4: Main reasons for preferring self-employed status (in %; multiple response)

	DE	UK	IT	SK	PL	SE	ES	EU15	EU25	USA
Personal independence	85	81	80	64	66	75	66	79	77	21
Own environment	22	9	18	28	10	9	7	15	16	61
Better income prospects	27	23	17	43	27	6	14	20	23	9
A business opportunity	12	7	11	10	5	3	5	8	8	2
others	31	23	10	52	16	18	21	19	20	7

Source: Flash Eurobarometer 160 (see TNS/EOS Gallup 2004a)

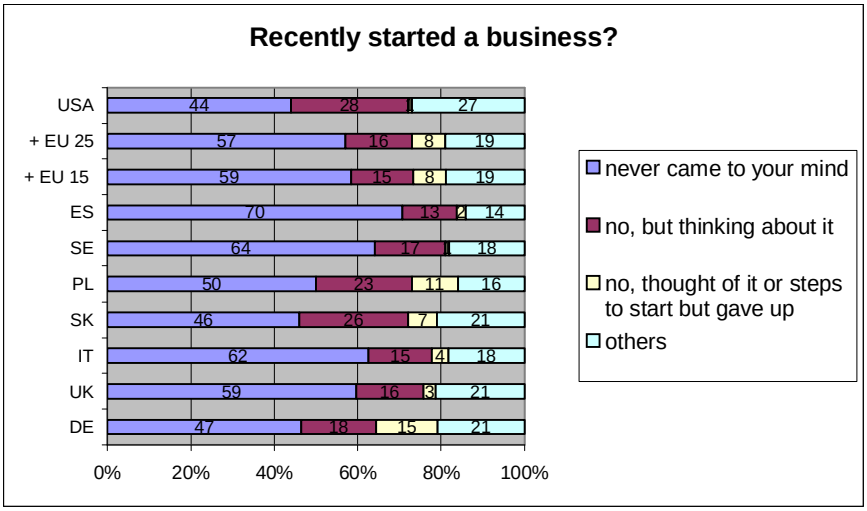
Looking at the reasons for establishing an own business, Table 4 shows that most self-employed state personal independence (77%) as the main reason, which also includes self-fulfilment and focusing on an interesting task. The possibility of achieving a higher income is mentioned by only 23% of respondents. The country breakdown shows that German self-employed stated “personal independence” most often (85%), compared to the U.K. (81%) and Italy (80%). The possibility to achieve a higher income matters most for the self-employed in Slovakia, where 43% state this factor as a main reason. A very different result emerges from the US data, as here 61% of self-employed respondents selected the possibility of creating their own working environment as the most important reason for being self-employed[5].

57% of EU respondents have never thought about setting up an own business (see Figure 4). EU countries with above average figures for this question include Spain (70%), Sweden (64%), Italy (61%) and the United Kingdom (59%). 16% of EU respondents state that they are currently thinking about starting up a business – this share is considerably larger in the post-Communist countries Poland (23%) and Slovakia (26%). In Germany, a comparatively large share of respondents state they have once considered becoming self-employed but have since given up on the idea (15%).

Compared to the EU picture, the results for the USA indicate a higher propensity to consider becoming self-employed – more than one in four are currently thinking about setting up an own business.

[5] The validity of comparison between USA and EU figures on this questions is hampered by the fact that multiple-response was not allowed in the USA.

Figure 4: Recently set up a business or taken steps to do so

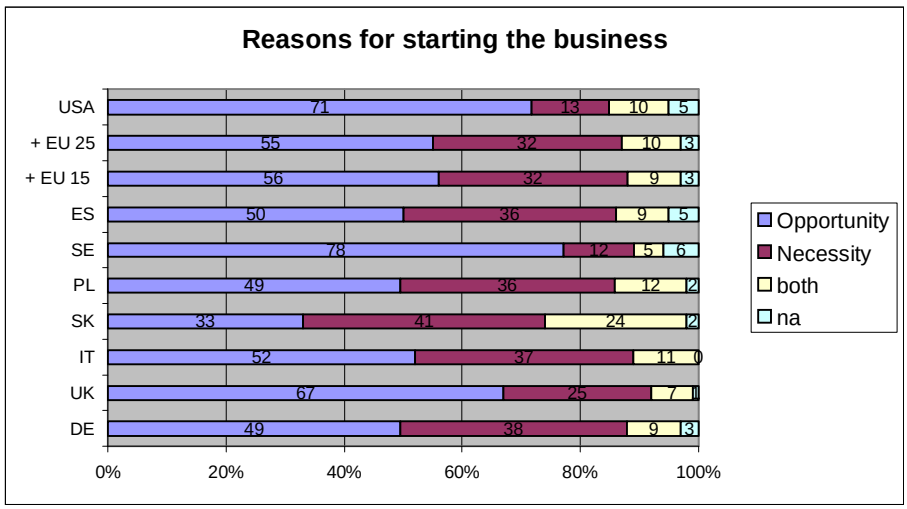


Source: Flash Eurobarometer 160 (see TNS/EOS Gallup 2004a)

In the literature there is an ongoing debate about the extent to which the decision to start a business is mainly caused by push or mainly caused by pull factors. A typical push factor would be unemployment, while a typical pull factor would be the possibility for more self-responsibility.

The Eurobarometer survey asked those respondents who are either self-employed already or who are currently taking steps to set up a business for their reasons for doing so (Figure 5). It turns out that with 55% most of the respondents consider pull factors (opportunity) as more important, while 32% rank push factors (necessity) as more relevant. The percentage of respondents who see being self-employed as an opportunity is especially high in Sweden (78%) and the U.K. (67%). Only 13% of the respondents in the USA started (or are about to start) a business out of necessity, while 71% did/do so because they saw an opportunity.

Figure 5: Starting the business because of an opportunity or out of necessity



Source: Flash Eurobarometer 160 (see TNS/EOS Gallup 2004a)

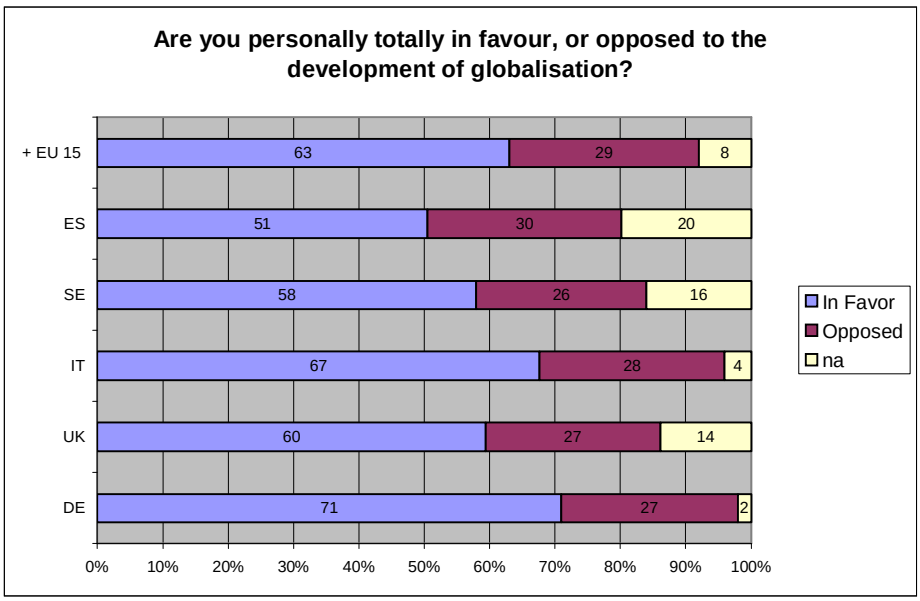
2.4.3 EU-Level Survey Research on Attitudes towards Economic Globalisation

A 2003 Eurobarometer study assessed attitudes within the EU15 about globalisation and economic competition.

According to the survey (Figure 6), the majority of EU15 citizens (63%) are generally in favour of globalisation, defined as the opening-up of economies resulting in worldwide competition. The country

breakdown shows that the highest shares of respondents in favour of globalisation are to be found in Germany (71%) and Italy (67%), while Spain has the lowest figure (51%). On average, nearly 30% are generally opposed to globalisation.

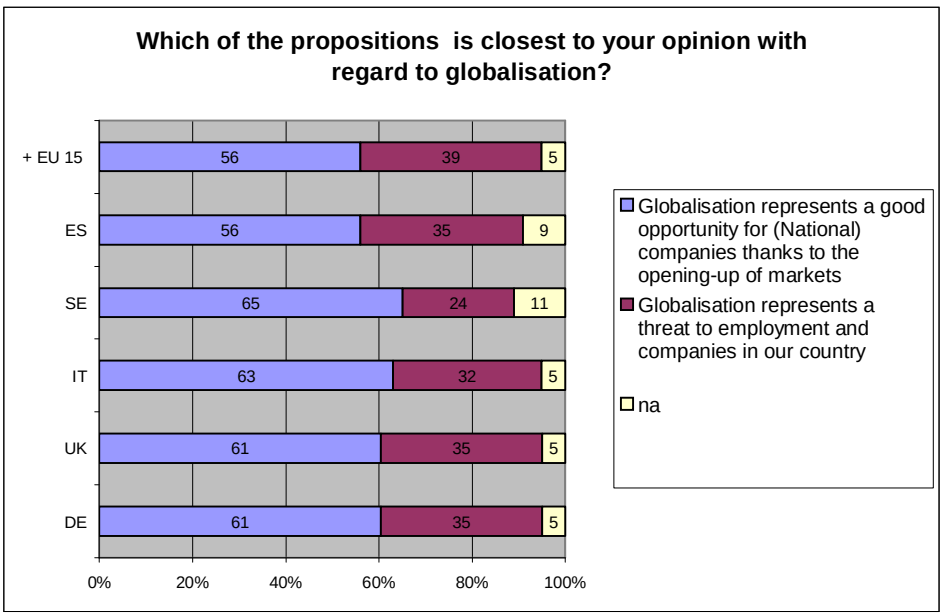
Figure 6: Percentage of respondents and their approach to globalisation



Source: Flash Eurobarometer 151b (see TNS/EOS Gallup 2003)

Respondents were also asked if globalisation in their opinion represents a good opportunity for domestic companies (thanks to the opening-up of markets), or if it rather means a threat to national employment and the country's companies (Figure 7. Choosing between these two propositions it turns out that most of EU15 respondents (56%) consider globalisation to be an opportunity for national businesses rather than a threat. Respondents from Sweden were most optimistic, with two in three considering globalisation as an opportunity for their country.

Figure 7: Percentage of the conclusion which propositions is closest to the opinion with regard to globalisation

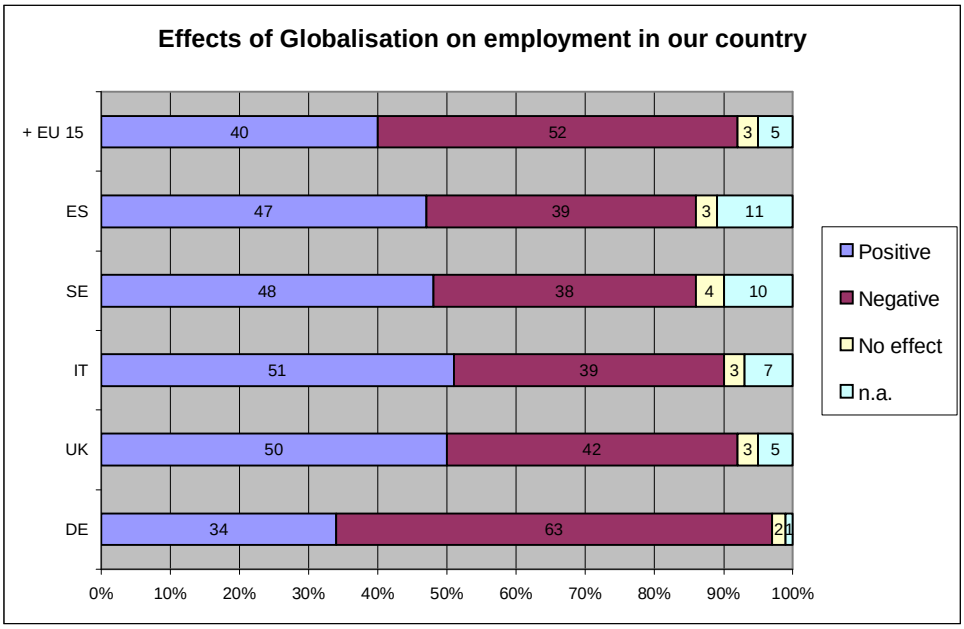


Source: Flash Eurobarometer 151b (see TNS/EOS Gallup 2003)

Globalisation's impact on domestic employment is considered to be less positively (see Figure 8). With

52% more than every second Eu15 citizen sees globalisation as a threat to their country's employment. This view is especially widespread in Germany (63%).

Figure 8: Impact globalisation has on domestic employment



Source: Flash Eurobarometer 151b (see TNS/EOS Gallup 2003)

Finally, the survey asked whether respondents would see an intensitication of globalisation in the future as being more or less advantageous for themselves and their families (Table 5).

Table 5: Attitudes towards the personal impacts of intensifying globalisation

Q8. In your opinion, if globalisation intensifies in the future, would you say that overall this would be more or less advantageous for you and your family ?

	BASE	Plus avantageux / More advantageous	Moins avantageux / Less advantageous	[Ni plus, ni moins avantageux] / [Neither more or less advantageous]	[NSP&SR] / [DK&NA]
EU 15	**7515**	**52%**	**32%**	**10%**	**5%**
BELGIQUE	498	43%	44%	7%	6%
DANMARK	501	49%	28%	13%	10%
DEUTSCHLAND	501	60%	34%	4%	3%
ELLAS	500	33%	46%	20%	1%
ESPANA	503	51%	26%	12%	12%
FRANCE	500	43%	47%	6%	3%
IRELAND	500	66%	23%	7%	3%
ITALIA	501	49%	25%	23%	5%
LUXEMBOURG	503	47%	34%	13%	6%
NEDERLAND	500	56%	32%	6%	7%
OSTERREICH	500	34%	34%	26%	6%
PORTUGAL	500	63%	17%	9%	11%
SUOMI	501	46%	31%	18%	4%
SVERIGE	500	48%	21%	17%	14%
UNITED KINGDOM	507	61%	29%	6%	4%

Source: Flash Eurobarometer 151b (see TNS/EOS Gallup 2003)

2.5 Culture and Technology Adoption

2.5.1 Empirical Research

Concerning the adoption of ICT as a specific segment of innovation uptake, the importance of cultural factors is well recognized. However, as Hasan and Ditsa (1999:5) discovered in their study of cross-cultural differences in ICT adoption, very little research has been undertaken to this regard: "Of all the factors that must be considered in the adoption of information technology, culture is probably the most difficult to isolate, define and measure. Consequently the influence of local culture on the adoption of computer-based information systems in organisations has not featured prominently in the research literature."

In their comparative study of the adoption of IT in Australia, West Africa and the Middle East Hasan and Ditsa (1999) identified eight cultural dimensions as potential factors influencing the uptake of IT: Power Distance, Uncertainty Avoidance, Individualism/Collectivism, Masculinity/Femininism, Time Orientation (derived from Hofstede), Monochrony/Polychrony and Context (derived from Hall & Hall 1990) and Polymorphic/ Monomorphic (derived from Bottger et al. 1985).

Hofstede's cultural dimensions having been explained above, the remaining factors are conceptualized as follows:

- Monochrony and Polychrony describe attitudes towards the use of time in performing task. Monochronous societies focus on issues one at a time and emphasize procedures for task completion. Polychronous societies perform activities in parallel and concentrate on task completion rather than on procedures.
- Context means the amount of information that surrounds an event. In high context cultures little information is coded, most is implied in the person itself while in low context cultures the mass of information is in an explicit code.
- Polymorphic and Monomorphic refers to the influence of opinion leaders. In Monomorphic cultures the expertise of leaders is supposed to span a wide range of issues, whereas in polymorphic cultures, a leader's scope is limited to his explicit area of expertise

Although referring to Hofstede's dimensions of national culture, the authors decided to base their research on a transnational scale of cultural regions rather than limiting themselves to quite recent and often arbitrarily designed borders of nation states.

The three regions included in their study showed the characteristics depicted in Table 6.

Table 6: Key characteristics of macro-regions studied by Hanan and Ditsa

	Australia	**West Africa**	**Middle East**
Power Distance	Low	High	High
Uncertainty Avoidance	Moderately Low	Low	High
Individualist vs. Collectivist	Highly Individualistic	Highly Collective	Collective
Masculinity vs. Femininism	Masculine	Feminine	Masculine
Time Orientation	Long-term	Short-term	Short-term
Monochrony vs. Polychrony	Poly	Mono	Mono
Context	Low	High	High
Polymorphic vs. Monomorphic	Mono	Poly	Poly

Source: Hanan and Ditsa (1999:10)

Hasan and Ditsa come to the conclusion that measured against the rate of uptake of new technology per head of population, age of IT in use, courses related to IT as indicators of IT uptake, West Africa shows a more favourable climate for IT adoption than the Middle East. As the two societies score similarly with regard to most cultural dimensions, the differing attitudes towards IT adoption are most likely due to opposing degrees of Uncertainty Avoidance.

An overview summarizes the influences of cultural factors on the adoption and use of IT for the three case studies.

Table 7: Overview of influence of cultural factors on adoption of IT in macro-regions studied by Hanan and Ditsa (1999)

	Australia	**West Africa**	**Middle East**
Power Distance	IT has flourished in this low PD culture as networked organisations develop flatter management structures	In this high PD culture, IT is often an imposition on organisations from the top without taking advice from IT staff	In this high PD culture, governments want to control IT and are concerned with its power to democratise society
Uncertainty Avoidance	People are prepared to take risks and ready to adopt new IT, resulting in successful innovation	Also prepared to take risks but many unwise and risky projects are undertaken and a lot of incomplete IT projects are observed	In this high UA culture, there is almost no R& D. they accept only well established IT products from the developed world
Individualist vs. Collectivist	The individualistic characteristic of the culture is exemplified in the typical solitary image of a computer programmer	Collective attitude towards solving IT problems by teams of IT professionals. Potential to produce good IT solutions	Most IT projects initiated by people trained in the West who have individualist skills, whereas locals usually prefer to work in teams. Source of conflict in joint projects.
Masculinity vs. Femininism	IT development has been predominantly technical and male oriented. Women are becoming more prominent as the number of less technical positions grows	Males and Female vie for top jobs in IT industry. People are more interested in what the technology can do rather than technical details	Most jobs in IT held by men, but IT provides jobs for women. Welcomed by those trying to raise position of women, but seen as a threat in conservative circles
Time Orientation	Most organizations have a three to five year strategy and think reasonably long term	Short-term planning is prevalent, so that only results of today determine success and are rewarded	Management want quick results and do not appreciate the time value of money. Many organizations retain inefficient manual systems
Monochrony vs. Polychrony	Modern interactive, multi-tasking systems encourage polychronous work and are popular	IT professionals prefer completing one job before taking another: a display of monomchonous culture	Batch systems were readily adopted in the 60s and 70s and many have not been upgraded
Context	System developers are good at low level development which requires detail and abstraction	Interested in getting a system in place without much attention to details	Seem to prefer modern high level end-user development tools which suit a high context culture better than traditional programming
Polymorphic vs. Monomorphic	IT management is separated from core business resulting in problems of communication: a display of monomorphic culture	IT managers are expected to have knowledge of every aspect of IT and the organization: display of polymorphic culture	Managers are expected to deal with IT issues without being trained in IT: a display of polymorphic culture

Source: Hanan and Ditsa (1999)

2.5.2 EU-Level Survey Research

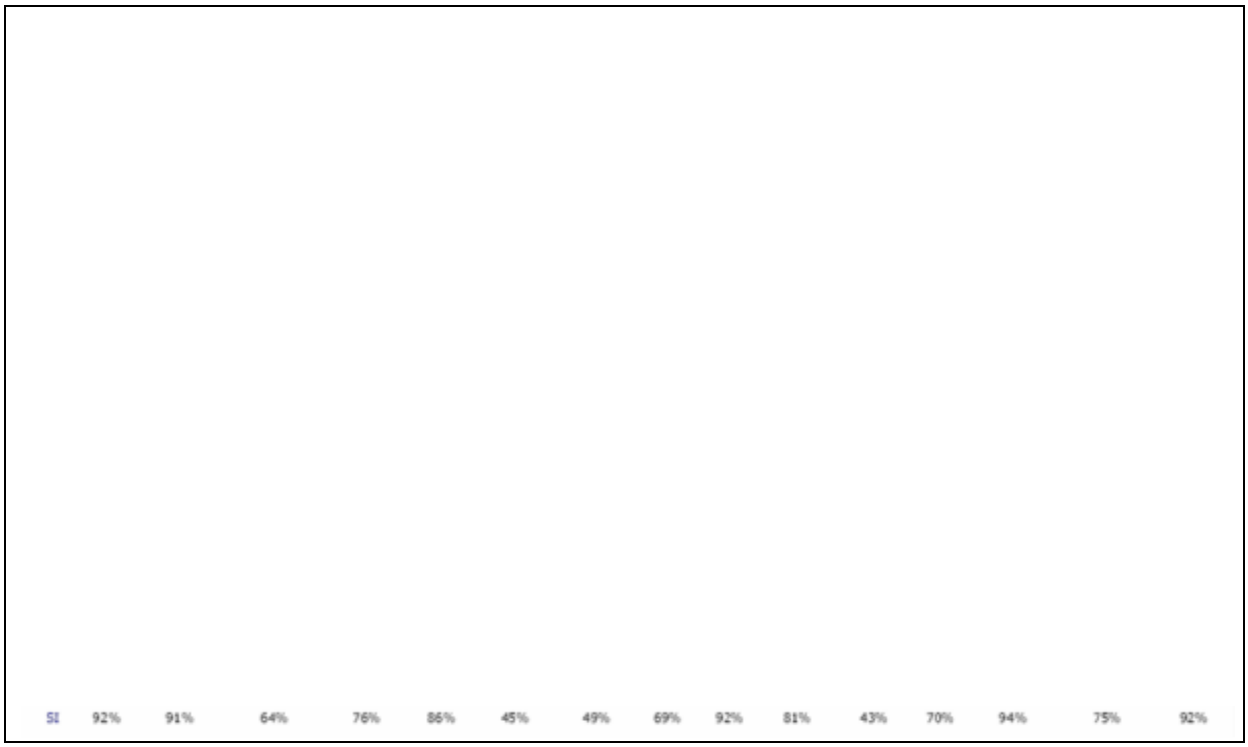
In a 2005 Eurobarometer survey, a representative sample of the EU25 adult population was asked about their views on technology. In particular, the survey tried to explore the perceived effects of a number of selected new technologies on quality of life in the next 20 years.

In general, a majority of EU25 respondents appear to think positively about the effects of new technologies will have a positive effect on our way of life. There are, however, significant differences between technologies, and – to a lesser extent – also between EU countries.

The technologies covered were: Computers and Information Technology, Biotechnology and genetic engineering, Space exploration, The Internet, Nuclear energy for electricity production, Nano-technology, Mobile phones, New energy sources to power cars, Air transport, Military and security equipment, High speed trains, Medicines and new medical technologies, High-tech agriculture (Agriculture using new technologies), Energy saving measures in the home.

Of these, nano-technology is considered by fewest respondents of having a positive effect (48%), while the six most frequently cited new technologies with positive effects are “medicines and new medical technologies” (94%), “energy saving measures in the home” (92%), “solar energy” (91%), “new energy sources to power cars” (90%), computers and information technology” (87%) and “the Internet” (78%). A smaller majority, one in three, believes that mobile phones will have a positive effect in the next 20 years.

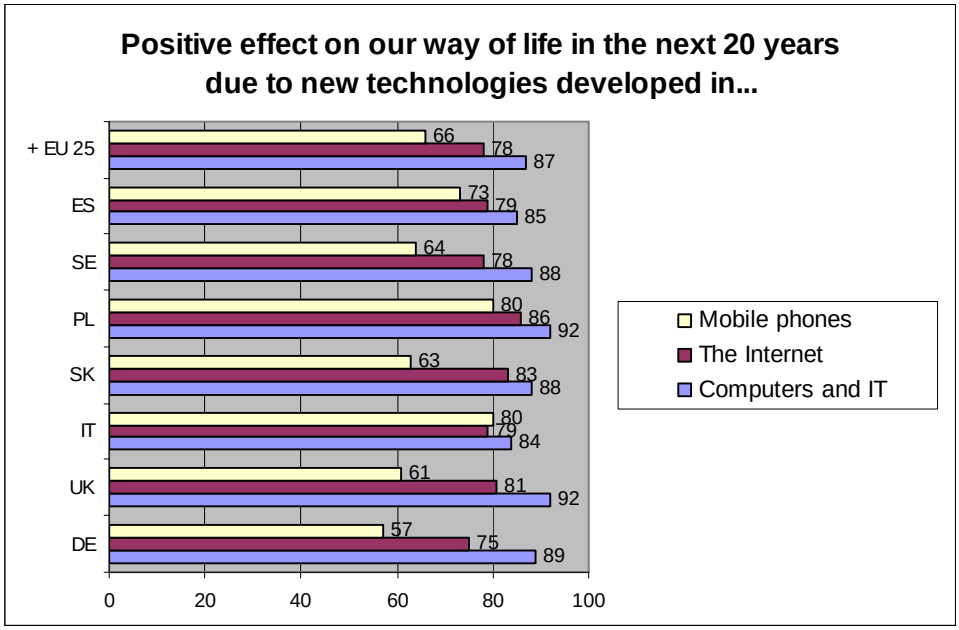
Table 8: New technologies perceived to have a positive effect in the next 20 years



Source: Special Eurobarometer 225 (see TNS/EOS Gallup 2005)

Figure 9 shows differences between the EU countries covered by TRANSFORM with respect to attitudes towards computers & IT, the Internet, and mobile phones. While shares of respondents who think that computers will have significant positive effects in the next 20 years are similar across all countries, there are sizeable differences with respect to mobile phones: 80% of Italian and Polish respondents expect positive effects from this technology, while the figures are 57% and 61% for Germany and the U.K., respectively.

Figure 9: ICTs perceived to have a positive effect in the next 20 years



Source: Special Eurobarometer 225 (see TNS/EOS Gallup 2005)

The eUSER survey, which was conducted in 2005 in ten EU Member States, included a set of questions on attitudes towards technology. The survey used a representative sample of the total adult population living in private households. The findings (see Table 9) indicate considerable differences between the countries covered. Fore example, while in Ireland 69% of the entire adult population state that they are interested in new technologies, in France the figure is only 49% and in the Czech Republic even lower (46%).

Table 9: Attitudes towards new technologies in Europe 2005
(Share of responses "strongly agree" and "agree")

	DE	FR	IT	DK	UK	IE	PL	HU	CZ	SI	Overall sample
I am interested in new technologies*	55%	49%	55%	55%	56%	69%	51%	61%	46%	60%	55%
Computers are intimidating to use*	14%	17%	15%	9%	21%	22%	34%	15%	11%	24%	18%
I enjoy using the Internet**	64%	70%	63%	69%	72%	70%	78%	79%	81%	56%	70%
I enjoy using the mobile phone***	42%	39%	42%	46%	46%	60%	72%	75%	61%	32%	50%
The Internet is very useful for my work**	55%	52%	52%	56%	56%	55%	87%	53%	67%	68%	59%
The Internet is very useful to me in private life**	54%	43%	30%	60%	64%	65%	57%	41%	59%	59%	54%
Keeping up with computer developments takes much time*	58%	50%	51%	65%	47%	45%	42%	36%	53%	62%	51%
One shouldn't use Internet for everything because of security*	60%	56%	45%	58%	46%	48%	74%	45%	41%	26%	50%

*Base: *Total population 18+, ** Internet users 18+, *** Mobile phone users 18+* *Data source: eUSER 2005*

3 Regional Differences in Innovation Culture

This chapter looks into what the research literature says about the extent to which there are differences in innovation culture between regions within a country.

Research concerned with regional cultural differences and their impact on economic activities has been fairly limited. This is mainly due to the problem that data is far more easily available on a national than on a regional scale. In addition to that, in the case that data is indeed available for administrative districts, these more often than not do not correspond to cultural or functional entities.

This is why – in spite of a number of authors criticising Hofstede on the grounds that he does not account for regional and subcultural differences – there are few empirical studies pertaining to the impact of regional cultures on innovation or economic activities in general.

Myers and Tan (2002:8) for example point to a profound mismatch between the nation-state, which is a recent phenomenon, and dominant culture, which in some cases has existed for thousands of years (cp. Beugelsdijk et al. 2006). They further stress the fact that many nations are comprised of more than one culture and/or many subcultures and call for a more complex and multidimensional approach to the study of culture's influence on Information Systems. It is argued that culture has to be studied at international, national, regional, business and organisational levels while taking into consideration that these levels are often inter-connected and intertwined. Another criticised aspect is that conceptions of national culture view the human world as composed of separate, distinguishable entities and fail to take account of recent anthropological conceptions of culture as contested, temporal and emergent, being constantly interpreted and (re)produced. The authors' call for stronger theoretical approaches as well as for improvements in the research methodologies is however not supplemented by an alternative framework for such an encompassing analysis.

Beugelsdijk et al. (2006) in their study indeed found "significant intra-country differences". Examples include huge differences along the Inglehart dimensions Traditional/rational and Survival/self-expression between North and South Italy, and also between Hamburg and Saarland in Germany. Below, this research is being discussed first, before reviewing additional research which was carried out at national level in selected countries.

3.1 Multi-country Analysis

3.1.1 Western Europe

Beugelsdijk et al. (2006) look for associations between cultural values and economic development in European regions. For this they used NUTS-1 level data from the European Value Studies carried out in 1990 and 1999. NUTS-1 level data from this source is available for Belgium. France, Germany, Italy, the Netherlands, Spain and the U.K. The authors applied Inglehart's cultural dimensions Traditional/rational and Survival/self-expression as a conceptual framework for the study. Economic development was measured by Gross Regional Product per head, for two poins in time preceding the value measurements, namely 1977 and 1990.

Key findings include:

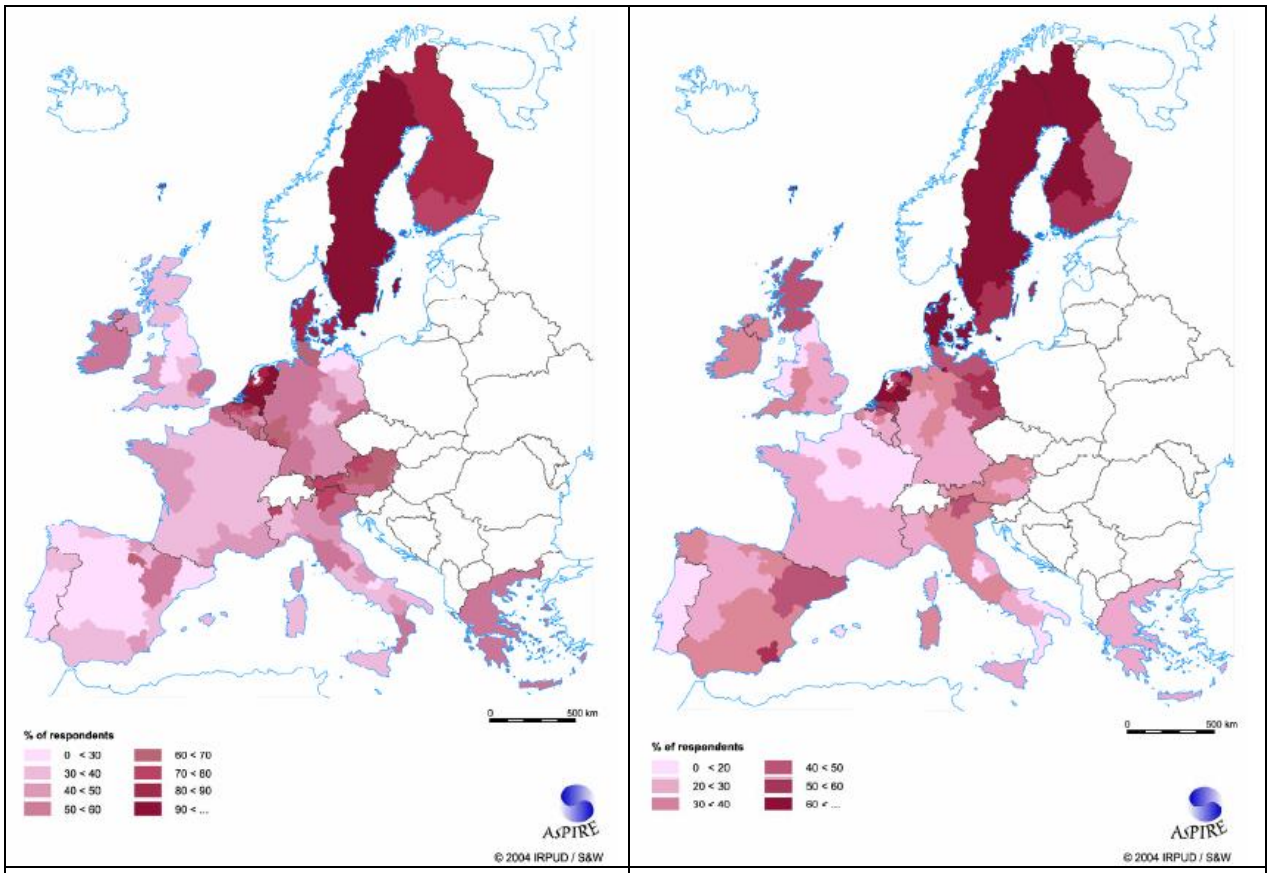
- The level of economic development is significantly correlated with differences in value systems. However, rather than indicating a causal relationship between culture as the cause and economic development as the result, the analysis suggests that value systems develop in line with economic development. This would support the revised modernization theory as promoted by Inglehart & Welzel (2005).
- Religious heritage is also found to be significantly associated with values systems, but this result only holds true at the national level. Once nationality is controlled for, regional differences in terms of a Protestant or a Catholic tradition are not significantly related with values anymore.
- Convergence of values as a result of an economic catch-up growth of poorer regions – as suggested by development theorists – is unlikely to occur in the short or medium term, if at all. "The vision of the European Commission [...] in which there would be a reasonable homogeneous regional social-economic structure across Europe and a shared European value system is therefore not built on realistic accounts of the actual cultural differences that exist in Europe".

In a second study, Beugelsdijk and van Schaik (2006) analysed differences in social capital across 54 NUTS-1 regions in Western Europe, and explored whether there is a correlation between social capital and economic development. The data sourced used, again, was the European Value Studies (1990 data).

For quantifying social capital, the level of trust as measured by the widely-used "generally speaking" question was used: "Generally speaking, would you say that most people can be trusted, or that you cannot be too careful in dealing with people?". Scores very widely across Europe, within as well as between countries. The authors did not find a correlation between trust and Protestantism or religion in general, as suggested by some authors (e.g. Knack & Keefer 1997). The other variable used to measure social capital is membership in groups or networks, i.e. numbers of such organisations which the respondent is member of. A difference is being made between active and passive membership. The results indicate that "controlling for the initial level of GRP per capita, social capital is significantly and positvely [...] related to regional economic growth in the sample of 54 Western European regions" (Beugelsdijk and van Schaik: 1061).

This supports findings from an analysis by Lindner et al. (2005) using data from the EVS as well as other sources (e.g. Eurobarometer). Figure 10 reproduces two graphical representations of the EVS data on trust and civic engagment. In addition to these indicators, Lindner et al. also explored association between GRP/head and other social capital indicators, namely % reading newspaper daily, attachment to town/village, attachment to region, stated political interest, political discussion, openness to foreigners, and statements about the social being more important than the economic. The explanatory power of all of these for explaining differences in economic development were found to be very low, though.

Figure 10: Regional differences in key social capital indicatotrs



Membership in civic organisations (EVS 1999/2000)	People who have trust in other persons (EVS 1999/2000)

Source: Lindnder et al. 2005: 41-42.

3.1.2 German-French Border Region

Dörrenbacher and Schultz (2002) undertook an empirical study on the Saar-Lorraine region. The cross-border regions of Saarland (Germany) and Lorraine (France) feature many socio-economic similarities as both regions are striving to overcome a legacy of early industrialisation. Common historic and cultural bonds contribute to a common functional region on both sides of the border. The workforce on both sides of the border is accustomed to industrial employment, especially by large companies. It is characterised by a weak spirit of enterprise and a culture of unemployment, which exerts a negative influence on the development of a strong innovation culture. Dörrenbacher and Schulz assume consequently that the regional innovation culture is very similar in both regions irrespective of national borders and that one should look at cultural, historic and functional entities instead. A deeper look into the hypothesised cross-border production systems and cross-border corporate cultures in the automobile industry however shows a quite differentiated and contradictory picture. Notwithstanding the cultural similarities, there are nearly no regional cross-border firm relationships. As the automobile industry is heavily globalised, supplier branch plants are most often controlled from outside and assembly plants are furnished by firms outside the Saar-Lorraine region. Although in other areas cross-border linkages do exist, the production systems of the two major assembly plants are hardly interlinked and more embedded in the respective national and corporate culture than in the regional culture. The socio-cultural embeddedness of firms and their respective culture of innovation is – according to this study – to be found in the conflicting context of regional culture, national culture and the respective corporate culture which might be influenced itself by transnational company structures.

3.2 Single-country Analysis

3.2.1 Netherlands

Brons (2006) provided one of the first attempts at a quantitative measure of regional cultural differences. He assumes that different culture – economy relationships exist on different spatial scales. Culture, thus, can be measured indirectly for any territorial scale for which sufficient behavioural data is available. In his case study of regional culture in the Netherlands Brons (2006) included all except two of 489 Dutch municipalities. He used all available data reflecting meta-behaviour or culture for the period from 1997-2003. The resulting 65 variables were grouped by means of a series of factor analyses in order to find the meta-behavioural factors behind the behavioural data. With regard to cross-cultural psychology, which defines culture as a set of core values and as a sub-set of meta-behaviour, Brons (2006:551) interprets the results of his factor analysis as *core value dimensions*. Based on previous studies on national culture (see section 2.2), Brons selected seven dimensions of interpretation: individualism-collectivism, power distance, masculine-feminine values, uncertainty avoidance, conservatism, post-materialism and dissatisfaction.

A final principal component analysis revealed that in the Netherlands, the cultural dimensions most relevant to regional cultural difference are, in descending order: post-materialism, protestant conservatism, classical individualism, egalitarian anti-conservatism and dissatisfaction. Concerning these five cultural dimensions, Brons was able to identify significant regional differences. However he points to the fact that it is not clear whether the spatial differences are due to differences in regional culture or rather the result of socio-economic and cultural differences that only happen to be regionally unevenly distributed. According to him post-materialism, for example, seems to be much more an effect of urbanisation, low income and education than of an historical cultural regional pattern. Brons comes to the conclusion that whatever the source of meta behaviour or cultural differences, they determine behaviour so that the collected data can be used in empirical analyses of economical and or sociological phenomena. Multiple regression for example shows that for the Dutch municipalities protestant conservatism and dissatisfaction as well as post-materialism (controlled for urbanisation, income and education) positively influence entrepreneurship.

3.2.2 USA

One of the first to demonstrate explicitly the importance of cultural factors for industrial adaptation was Saxenian (1994). Her comparison between the Boston route 128 and the silicon valley however did

not establish any causal link between culture and industrial adoption, nor did she actually measure cultural influence (James 2005: 1198-1199).

James (2005:1198) points to one of the most immanent problems of the research into the relationship between regional economy, innovation and culture, when he criticises that "while the formal "hard" institutions that underpin innovative regional economies are relatively well theorized, their cultural basis are still not fully understood. While many accounts are typically suggestive of something intangible that permits innovation to proceed in some places but not in others, they often fail to specify the exact nature of these "mysterious" processes through which regional cultures promote innovative activity more successfully in some regions than in others."

In his research James focuses on the high-tech industrial agglomeration in Salt Lake City which is embedded in Mormonism as a highly visible regional culture whose ideologies are written down and easily accessible. He argues that a firm's cultural embeddedness is best understood in terms of tensions between regional self-identity imported into the firm versus key elements of corporate cultures that have been shown in the regional learning literature as being central to firms' abilities to innovate.

Figure 11: Onion model of culture

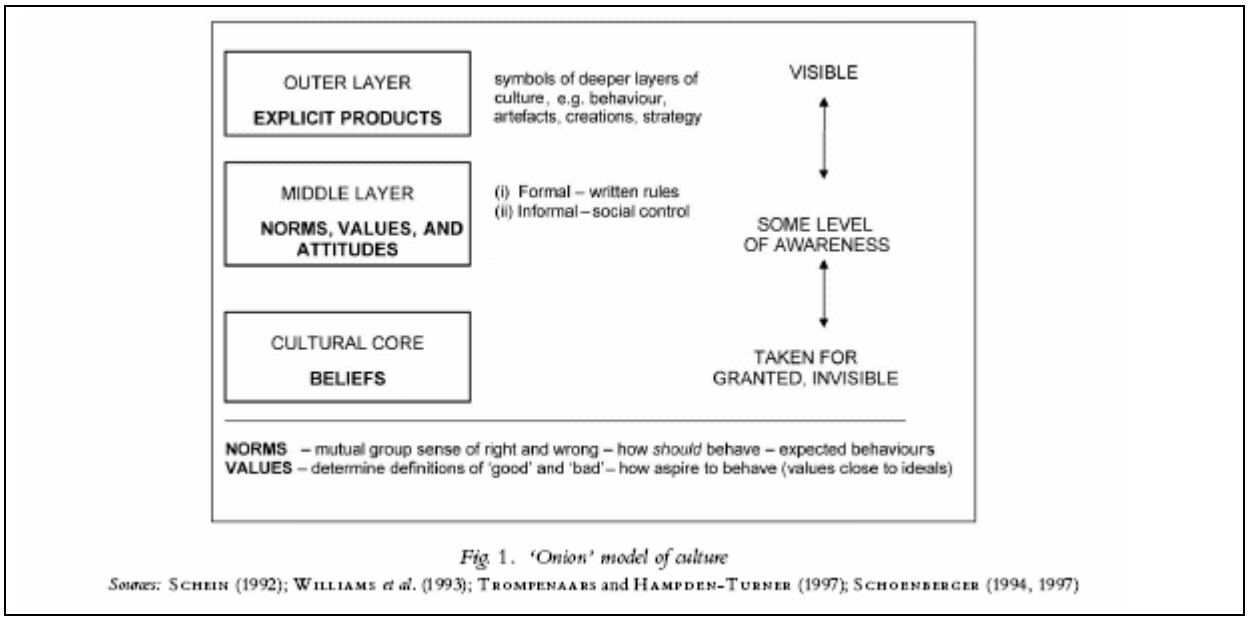


Fig. 1. 'Onion' model of culture

Sources: SCHEIN (1992); WILLIAMS *et al.* (1993); TROMPENAARS and HAMPDEN-TURNER (1997); SCHOENBERGER (1994, 1997)

Source: James 2005: 1199

Drawing on the multi-tiered conception of culture used in the organizational studies literature (see Figure 11), James sets up a regional culture hierarchy made up of a) individual corporate culture, b) regional industrial culture and c) the broader regional culture. He argues that regional cultural systems of collective beliefs and conventions are imported into the firms' cultural cores and hence shape firms' systems of organizational control (middle layer). On the outer layer, regionally culturally inflected patterns of corporate behaviour become observable.

Using both an extensive quantitative survey and qualitative in-depth interviews, James (2005:1204) was able to highlight four main traits of Mormon regional culture which are at odds with regional cultural traits usually attributed to high innovative capacity:

- Unity and mutual trust versus interfirm networking and studied trust;
- self-sufficiency and autonomy versus outsourcing and exploitation of other firms' competences;
- debt avoidance versus venture capital sought;
- family (than church) above all versus "sleeping bags under the desk" and afterwork socialising.

The last point is especially interesting as it demonstrates that social capital and networking can be used in very different ways with differing impacts on innovative capacity. While the Mormons' strong bonding relations whose focus lay outside the working place seem to inhibit long working hours and limit the possible output, well developed bridging capital between different firms and strong inter-firm

relations are thought to further economic success and innovative potential.

As to innovations, James (2003:284) observes that: "The use of information to generate new knowledge crucially depends on interactions between different actors with different ideas, methods of approach and viewpoints whose interactions around work problems will often generate new and unexpected ideas or synergies. The import of cultural attitudes of respect for authority, established ideas and non-confrontation, along with limited workforce diversity, therefore constrains firms' abilities to use new information in this way. Thus, while in some cases, firms' import of regional cultural traits enhances and reinforces their innovative capacities, in other cases it potentially constrains them. Crucially, both enablers and constraints on firms' innovative capacities stem from the same regional culture in which they are embedded."

It is important to note that neither culture nor cultural embeddedness remain constant over time. James (2003:285) noted two relevant mechanisms for cultural embeddedness: "key individuals" who have a strong influence on corporate culture and "strength in numbers" which refers to the fact that culturally-inspired decisions have to be accepted and ratified by a majority of the workforce. He holds that depending on the relative balance of these two key mechanisms of embedding, firms' import of regional cultural values is subject to change, most likely decreasing over time while the firm itself is growing.

Concerning policy implications James (2006:1212) raises the following research questions:

- When firms' corporate cultures are embedded in strong regional culture, to what extend is it possible to realign those corporate cultures in line with policy prescriptions?
- What policy levers might be working?
- Over what time scales might such changes be feasible?
- How should policy measures vary across national economies with different mosaics of regional cultures embedded within each?

He points to the fact that the "right" mix of formal institutions is not sufficient for a successful cluster policy. Without an understanding of the culture that underpins a (successful) regional industrial system it will stay highly problematic to try and take what works in one region and implement it in a different regional cultural context (2003:286). However an integration of cultural concepts into innovation and cluster policy will only be feasible once regional culture gets better conceptualised and empirically verified (James 2006:1198).

3.2.3 Germany

Proff (2007) in her essay on product innovations and cultural diversity inquires into the reasons for regional differences in innovation culture. She regards differing historical, political and economic developments as having some kind of influence on the development of a specific regional culture. Although all of these aspects play a role in determining regional innovative capacity[6], according to her the key factor is to be found in differences in regional cultural diversity. The term "cultural diversity" is employed by the author in a very precise way meaning "business culture diversity". This cultural diversity can be traced back to:

- different industrial cultures (due to divergent resources or technologies);
- diversity of professions, educational, vocational training and socialisation;
- diversity of corporate cultures due to founders' strong personalities (e.g. in Germany Krupp, Thyssen).

The study focuses on the level of business management, but since a region's innovative potential depends heavily on that of its enterprises, the findings might also be illuminating at regional level. The author cautions, however, that the link between regional and national cultures has always to be taken into account. Regional cultures are always embedded into a national (innovation) culture that plays a role in reinforcing or inhibiting product innovations. This is why regional cultural diversity can only claim to be a necessary but not sufficient condition for product innovations. She cites Germany as an

[6] She argues that cultural diversity is especially important for product innovations in fast changing and unstable business environments as those found in the knowledge economy and ICT branches.

example for an innovation-averse national culture as surveys in Germany often register a prevailing innovation-hostile mood (e.g. McKinsey&Company 2005); wide-spread anguishes concerning the future and changes in general; and scepticism in face of high-risk new technologies. Low flexibility and risk aversion of the German population are often deplored as limiting the innovative potential.

Mathiesen (2007:116) however argues that there is no abstract measure of heterogeneity that could guarantee innovation processes. He insists that the relationship between heterogeneity and innovation can only be discovered on a case-by-case basis. His case studies of knowledge milieus in several East German regions are based on a concept of "knowledge cultures". The author distinguishes between "soft networks" (milieus of knowledge) and "hard networks" (strategic and formally institutionalized networks of knowledge and innovation). These networks constitute cultures of knowledge which in turn shape a region's knowledge habitus. As far as creative processes and innovations are concerned, the embedding "soft networks" characterized by strong interior communication flows, high potentials for self-organization and innate development dynamics are of special importance. This interesting theoretical background turns out to be quite difficult to translate into robust case studies as knowledge milieus are difficult to trace. In his description of knowledge milieus in East Germany, Matthiesen's analysis therefore concentrates mainly on "hard" institutions, supplemented by research on prevailing self-images of the cities studied.

Concerning East Germany in general Matthiesen (2007:96) discerns an ongoing process of hybridization: the dynamics of a developing knowledge culture transform – but do not erase – the heritage of socialism and "east-Fordist" monostructures that shaped mental, cultural and social traits as well as the innovation climate. An important factor for the transformation of a regional knowledge and innovation culture seems to be migration. Matthiesen developed the term "space pioneer" to describe people who bring heterogeneity to homogenous and vacating regions and thus initiative a sort of "gentrification process" on a regional scale that facilitates development and innovation. This relates to recent research by Niebuhr (2006) who investigated the effect of cultural diversity of the workforce (defined as workers' nationality) on innovaton output for a cross-section of German regions. She found that "differences in knowledge and capabilities of workers from diverse cultural backgrounds enhance performance of regional R&D sectors". However, while diversity in Germany is highest among low-skilled employees who have no formal vocational qualifications, the strongest positive impact on innovation output was found for diversity among qualified employees.

Entrepreneurial activities and its conditions have been researched exhaustively. According to the definition of "national innovation culture" underlying the current study, attitudes towards entrepreneurship are considered to be one aspect of innovation culture. A positive entrepreneurial attitude might therefore be used as a proxy for a low degree of risk aversion which is one of the predispositions for innovation processes. Some authors state that not only entrepreneurial attitudes but also the number of newly established enterprises are positively related to innovation occurrence. Grotz and Brixy (2005:150) indicate that in sluggish economic situations newly established business are seen as a source of innovation and an engine of economic growth.

In the case of Germany the spatial distribution pattern of new business formation remains highly stable over time (Grotz and Brixy 2005:151). These regional differences in business formation can be explained by economic and structural factors and a certain path dependency on the one hand and personal characteristics of business founders on the other hand. Entrepreneurs show typical characteristics concerning age, gender, education, socio-cultural environment, readiness to take risk and willingness to perform. Concerning the aforementioned attitudes towards risk and entrepreneurship Bergmann (2005) detected considerable differences between 10 German Regions (*Raumordungsregionen*). In his empirical study Bergmann looked into the determinants for positive or negative entrepreneurial attitudes – a factor very rarely accounted for in previous publications. Bergmann holds that cultural traits of regions cannot be measured directly. He suggests to treat cultural influence on entrepreneurial attitude as a residual category: a significant regional influence on entrepreneurial attitudes, which cannot be explained by personal characteristics or the regional economic and socio-demographic structure, is supposed to be a clue to differences in culture and mentality. In this respect he considers the difference in risk aversion between the different regions, especially the East and West German regions to be significant. According to Bergmann (2005:196) this points to a difference in mentality which exterts an influences on the scope of entrepreneurial activities[7].

[7] Bergmann cautions insofar as he only took two East German regions into consideration. He calls for further analysis taking into account all East German regions (2005:196).

One of the few studies dealing with cultural differences between (West) German regions was carried out by Miegel (1991). His comparison between 26 rural districts (Landkreise) with strong and weak employment indicators looked into differences in economic culture and work culture as non-economic factors influencing employment. The author points out that previously the relationship between attitudes and economy had hardly ever been examined as the economics literature more often than not considers this subject to be off-limits (ibid.:115). In a survey asking for opinions on typical features of the local population (self-image and values), on prerequisites of success and on the significance of gainful employment (importance attributed to career and job performance) the two groups of districts in Germany showed several significant variations. In an overall view however the variations remained relatively small in scale. Miegel (ibid.:92) attributes this fact to a very homogenous society that results in a homogenous national economic culture which is only slightly modified by regional differences. Although the economic situation differs substantially between the strong and weak districts, the survey reveals very similar degrees of satisfaction. This is interpreted as a proof for differing mental sets: while for example in some regions people are satisfied with less income and more free time/social activities, elsewhere career and income are seen as priorities and contribute to the well-being.

The author supposes that the reasons for differing (economical) attitudes and behaviors can be found in different geographical and historical backgrounds. Although little evidence for purely geographical influence on economic attitudes is to be found, Miegel (1991:97) suggests that a region's endowment with natural resources might influence the development of a specific economic culture. A barren region where mining is more auspicious than agriculture might turn more easily towards the use of technology and might retain a certain openness towards technology and innovation[8]. As for historical developments, there were some kinds of influences to be found. Most of the "strong" districts were historically characterized by a strong influence of religion and church, which might have helped to transcend the importance and value of labour. The two contrasting types of heritage law in Germany – inheritance by real estate divestiture versus the single heir rule – might also have played a role: in regions characterized by the single heir rule farms remained prosperous and population stagnant as the non-inheriting children most often stayed on the farm as they were not able to nourish a family of their own. In regions with real estate divestiture the inherited parts got smaller from generation to generation so that the heirs soon could not make a living off their land any more. As most children founded families the population growth contributed to the necessity to look out for different income solutions which might have contributed to more individualistic and capitalistic patterns of behavior.

Miegel (2007:103) also noted probably relevant differences in historical governance structures between strong and weak district. A disproportionately large number of strong districts belonged to the small German states, where economy and politics used to be highly interwoven and the government was interested in activating the entire economic capacity of the mini-state in question. By contrast many of the weak districts could be found on the periphery of the former big and highly centralized state of Prussia. Most of the weak districts were situated remote from trade centers and routes. The author (ibid.:104) assumes that trading activities fostered attitudes and mindsets that turned out to be well-adapted to a modern industrial society. Concerning current influences on regional economic cultures, Miegel (2007:105) points to the importance of migration. The "strong" districts integrated far more refugees and displaced persons than the "weak" ones which might be an indicator for the higher integrative capacity. On the other hand the migrants brought with them different attitudes and mindsets that influenced the self-image of the residents and contributed to cultural diversity.

Finally, the author comes to the same conclusion as James: a more socially oriented and caring type of local society will concede less importance to career-based thinking and will in consequence bestow less effort and time on their workplace. This in turn sets firm limits to economic success and growth. Work cultures that are strongly oriented towards labor based income however are more disposed towards innovation and investments as in these types of culture risk and sacrifice are not balked at and a higher degree of mobility, flexibility and openness towards technical innovations is to be found. Miegel suggests that a high degree of propensity to innovation and investment will help to increase productivity and competitiveness whereby the GDP and the labor market will be influenced in a positive manner.

Based on Miegel's research in West Germany, Müller-Syring (1994) undertook a similar study on the economic culture of the East German federal state of Saxony. The comparability of the research results with Miegel's findings is assured by the use of the same questionnaire and the same regional

[8] The opposite view was mentioned by Grabher (1993) when he identified the "weakness of strong (historical) ties" and low propensity to change in Germany's Ruhr area.

level of administrative districts. Müller-Syring's research tries to answer the question if the economic culture in Saxony has been significantly influenced by the state-commanded economy. If so, are the influences only short term or will they stay inscribed for a long time and thus influence on the adoption of market economy?

The impact chain that determines economic culture is conceptualised as follows: *long-term, enduring and contemporary influences* result in certain *ways of thinking and set of minds*. These influence on *attitudes relevant for economy and work* and vice-versa. The attitudes and dispositions are engraved in an overall *economic and labour culture*. This economic culture determines *economic activities and their expression*. These activities in turn feedback on the economic culture as well as on economic attitudes and might also modify contemporary or future influencing factors.

The Saxon attitude concerning economy and work as presented by Müller-Syring (1994:16-60) features several significant deviations from the average West-German pattern of attitudes. Two main – and quite contradictory – characteristics are (a) high commitment to performance as well as (b) an only marginal belief in their ability to decide on how to shape their lives which goes along with (c) a relatively high degree of risk aversion. The answers on questions relating to work ethos back up this ambivalence: while Saxons accept more easily than the average West-German to work hard in order to succeed, they are less inclined to take responsibilities, to make decisions by themselves or to impose themselves when things get difficult. Müller-Syring attributes these last features to the Saxon's experience with a planned economy and dictatorial political system in which there was no place for individual decisions and responsibilities.

Concerning labour force behaviour, the study's results are congruent with those concerning social attitudes. The population shows a higher degree of value orientation towards work and employment than most West-Germans. Müller-Syring explains this with the high importance that socialism attributed to each and everyone's work. In contrast to West Germany, where leisure time evolved as a second pole around which one's life could be centred, in the socialist East German states work and merit remained essential for the significance of life. Thus the author considers the differences between East and West-Germany regarding work ethos as quite natural. He is more surprised by the fact that both positions seem to converge more and more: for example while East-Germans today regard a pay rise as the most important incentive, they consider that in 10 years time, once the salaries are adjusted to the higher western level, they would favour an increase in leisure time as an incentive, just as today do a majority of West Germans. However, in this domain as well, the Saxons' profile remains ambivalent. They combine success-orientation with a high degree of commitment towards their community and favour collectivism. Müller-Syring traces these features back to the difficult economic situation in the former GDR, where self-organisation of groups of neighbours and friends were a necessity.

As far as the historical and long-lasting influences are concerned, Müller-Syring finds some clues as to how the specific economic culture in Saxony might have developed. Throughout the history the region has been relatively densely populated featuring very early a high degree of urbanization. This meant that a large part of the population was not subordinated to feudalism but was used instead to a certain degree of self-organization. During the 16th century, the bourgeoisie of the townships and the sovereign started to cooperate in order to fend off the common danger of petty-princes and robber-knights vying for power and wealth. This cooperation was of great value for commerce and economic development since the sovereign patronized innovations and subsidized certain enterprises that he considered of a importance. The bourgeoisie in turn provided the government with economic know-how. Saxony was an important trade center and its flourishing economy provided an incentive for immigrants who contributed to a high degree of cultural diversity. The endowment of diverse natural resource was propitious to an early economic diversification as well. The economic landscape was characterized significantly by the mining industry. Miners were not – as common elsewhere – landlords whose serfs did the work. Instead miners were free men who were often organized in cooperatives, thus developing deep-seated sense of entrepreneurship which resulted in the early advent of industrialization in this region. In the rural areas the lack of large land holdings and the prevailing heritage system by real estate divestiture contributed to the development of a sense of individual economic responsibility. Protestantism, originating in Saxony, strongly influenced the Saxon work ethic and explains both the orientation towards achievements as well as the importance that Saxons attribute to the community and community services.

More current influences on work attitudes are to be found in the migration movements since the Second World War as well as in the economic and political system of the German Democratic Republic. While the inflow of refugees in the aftermath of the Second World War reinforced the

workforce's work experience and performance-orientation, the exodus of motivated and well-educated professionals from the GDP to the FRG weakened the spirit of enterprise and competition. The economic isolation, nationalization, as well as the mergers and concentration tendencies in the GDP entailed a fundamental change of the economic structure in Saxony. Constantly inadequate supplies impeded any benefit from the still substantial potential for innovation. The centrally planned economy restrained creativity, initiative and assertiveness. However, the dysfunctional economic system forced Saxons to develop a "chaos-qualification" – i.e., to find ways and means to uphold production under averse circumstances. While the socialist system welcomed and promoted the prevailing work ethic, the Saxons' traditional performance orientation was considered more a danger than an asset. The existing high degree of competitiveness was to an even larger extent considered undesirable and suppressed. The historically strong group orientation however was further reinforced by the necessity to cooperate and through the group-specific privileges that were accorded to the workforce employed in the large textile conglomerates as well as in the mining industry.

Today the Saxons' economic and social profile displays historically anchored positive work attitudes that underwent some modifications due to the economic and political system of the GDP. According to the survey conducted by Müller-Syring this specific work mentality differs considerably from West-German attitudes. The question if this mentality will remain unchanged or adapt to West-German values could not be answered at the time of the study, although Müller-Syring projects the strong work orientation to prevail and thus to provide auspicious investment opportunities. However he advises investors to take account of the Saxon work mentality which will prove more beneficial in an economic environment characterized by Small and Medium Enterprises and organizational structures based on team work.

3.2.4 Italy

The significant regional differences in economic structure and development in Italy have incited a number of researchers to look for the reasons for such an uneven development. Some of these studies took cultural as well as economic factors into account.

One type of approach is based on the (german) research school concerned with "economic style analysis". Economic style analysis describes and analyses how economic transactions are organised and enacted in different ways in different countries. Although economic style analysis is usually concerned with national differences, Stemmermann (1996), in his analysis of the Italian economic culture, discerns substantial regional differences that prompt him to use „(regional) economic style zones" as units of research instead. He defines an "economic style zone" as a region that is part of a national economy and that disposes of specific functional and coordinative mechanisms that are however integrated into the national economic system. In Italy the regionally different pathways of political, economic and social development contributed to the evolution of four regional economic styles: Northeast, Northwest, South and Rome. Three of them were already inscribed in the political tripartition of the Italian peninsula from the 13th century onwards: the papal state of Rome, the host of small independent and city states in the North of Italy and finally the kingdom of Naples in South Italy. In the North the eastern and western region underwent differing economic developments. The Northwest which in the 1950s and 60s was characterized by heavy industrialization is called "First Italy" in contrast to the rural and little industrialized south, the "Second Italy". The Northeast, the "Third Italy" industrialized slightly later, in the 60s and 70s and in very particular way. Its economic structure is characterized by a host of networks of SME's, the majority of whom belong to the manufacturing sector. Stemmerman gives the following explanative factors for the development of this flexible local production system characterized by competition and cooperation: first of all the communist and catholic or Christian Democratic subcultures that account for strong local ties and a well developed civil society. Furthermore he also points to the historically developed strong urban-rural relationships. He holds that many of today's networks are built upon the historically developed and tightly woven network of cities. Last of all the tenure system of mezzadria is mentioned, according to which the tenant used to be part owner of the livestock and thus was actively involved in and responsible for the farm management. This might have contributed to the very early development of an entrepreneurial work ethos.

In contrast to the network structure in the northeast, the nortwestern "First Italy" is characterized by few but big urban centres of mass production. Established in the mid 20th century, they focused on international markets and were quick to take up new technologies and innovations. This structure facilitated an economic growth miracle during the 50s and 60s, but at the same time the social fabric

was heavily affected: internal migration of low-wage workers from the south, radicalisation of the workforce and fundamental restructuring of social and political organisations and institutions gave rise to a heavily fractured society.

According to Stemmerman the rural south, the “Second Italy” is to be classified as a “marginal economy”. This region, where nearly no important, independent cities developed and which remained influenced by feudal structures until the recent past, shows a lagging economic development until today. The unsuccessful interventions by the national state administration since the 1950s only contributed to a “development without autonomy”. The transfers of national funds contributed to an economic style based on “political entrepreneurship” with economic actors depending highly on political protection. A climate of clientelism developed where personal ties are exploited in order to obtain (public) favours and benefits and the preference for employment in the public sector is prevalent. Finally the mafia emerged as a major economic actor, a fact whose consequences are well-known.

Rome as the last “economic style zone” aims at balancing the different regional interests. The local economy is characterised by its central function for the entire nation and by the state functioning as one of the major economic actors.

A more general picture of the different economic and political development of north and south Italy is to be found in Putnam’s 1993 work “Making democracy work. Civic traditions in Modern Italy”. He saw the main difference between the two regions in their differing degree of “civicness”, the lack of which in his opinion caused the underdevelopment of the Italian south. In his perception of social capital strong bonding ties towards family and/or church organisations (as those existing in South Italy) are not supposed to show positive effects on democratic institutions and development.

Boschma (2005) tried to analyse the role of social capital in the specific industrial development of the Third Italy. Instead of associating social capital with economic growth in general, as Putnam did, Boschma presumes that social capital has been especially beneficial in view of the development of the industrial districts made up of flexible networks of SME’s that contributed to the successful development and economic growth of the Third Italy during the last decades. The special efficiency of the local networks is explained in terms of a combination of competition (stimulating innovation), specialisation (enhancing productivity) and cooperation between local actors (minimising uncertainty and opportunism, while stimulating transfer of knowledge). The high degree of flexibility inherent in this type of organisational structure turned out to be especially well suited for the differentiation of demand since the 1970s, thus enabling considerable economic growth rates.

Norms of mutual trust, that are thought to boost economic development, exist in the region of the Third Italy not only on the small-scale level of industrial districts, but on a larger scale as well. Here Boschma refers to the deeply rooted and cohesive political subcultures (either Communist or Catholic/Christian Democrat), which reflect a fine balance between the state and civil society that enhanced effectiveness and credibility of institutions of governance. Boschma concludes that social capital and norms of mutual trust act as mechanisms that overcome market failures which arise because of uncertainty. This is why social capital contributed to the rise of the Third Italy by 1. lowering the cost of coordination between smaller firms, 2. encouraging cooperation mechanisms that are vital for competitiveness of small firms, 3. favouring the transmission of knowledge at district level which is essential for small firms to be able to learn and innovate. The existence of the two strongly developed political subcultures fostered the flexibility of the labour market because it regulated potential social conflicts and provided for a high rate of social mobility and put a limit on class polarisation.

Burroni, who, on an even smaller scale of analysis, looked into different patterns of local development within the Third Italy noted the importance of institutional factors and politics for regional economic development. His research shows that within a region characterised by a relatively homogenous economic culture, the economic development can still be influenced in different ways through political and structural factors.

3.2.5 England

The theme of industrial and innovation culture in the UK has been the topic of several books (Edgerton and Economic History Society 1996, Ingham 1984, Wiener 1985), although no consensual conclusions have been reached. According to Ingham and Wiener (Ingham 1984, Wiener 1985) there has been, especially since the late XIX century, a disconnect between industry life and the interests of the British elite. Wiener describes how the aristocracy in the UK was able to absorb the emerging bourgeoisie, by inducing them to adopt the former's lifestyle. This allowed the British aristocracy to maintain its political clout by hindering the emergence of a fully developed capitalist culture, valuing capital accumulation and innovation.

This absorption happened in several ways: on the one hand the aristocracy diversified its investments to the industrial sector, therefore linking itself to the bourgeoisie on an economic basis; it also included accepting many nouveau-riche into its ranks, often through marriage arrangements; but crucially by allowing the sons of industry businessman to attend the elitist 'public schools'. In these schools the education was essentially classical, and new subjects such as science were not taught as they were seen as undignified. Also, and connecting to current debates about the interaction between Universities and the private sector, the same culture predominated at the higher level of education, where the utilization of scientific knowledge to develop new commercial applications was never considered as something worthy. Therefore when the potential heirs to the big industrial groups become adults they had, through formation and socialization, acquired the tastes of the aristocracy, where practical work that involved dealing with money was disdained and a more rural and conservative lifestyle was valued. Ingham (1984) argues that this absorption prevented the same kind of social revolution that happened in Germany or France, where the bourgeoisie destroyed (often through violence) the existing social structures to install in its place a structure more akin to an industrial society. This had an impact in the entire institutional framework regulating society, such as government policy, school curriculums, relations between banks and industry or the functioning of business associations.

Wiener (1985) while putting forward a similar argument focuses more specifically on how this had an impact on the divergent interests of the City (the financial centre of London) and the industrial sector in England. According to his argument the financial sector in England was from an early stage outward looking, especially as the existence of the English Empire allowed it to have a crucial role on world trade. This was also accompanied by a political action that promoted the British pound worldwide (for many years the Sterling was the standard regulating currencies). These policies also had (and still have) an implication inside Britain, as the maintenance of a strong pound to serve the interests of the financial firms in the city hurts British industry's exports.

According to Wiener (1985) the fact that the City had from the beginning a certain degree of independence from the internal industrial sector (as it was mainly oriented to being the intermediary in international trade) together with the disdain of high society for industrial activity, led the City agents to distance themselves even further from industry when the latter started its process of decline, towards the end of the XIX century. Therefore, the conclusion of both Ingham and Wiener (Ingham 1984, Wiener 1985) is that even though England led the industrial revolution in the XVII and XVIII centuries, through a series of technological breakthroughs, it was not able to maintain its position due to a disconnection between the elite governing the country (and eventually the financial sector in London) and its industrial sector. This explains, according to the same authors, the poor performance of England in terms of innovation and consequentially its continuing industrial decline.

This thesis has been however challenged by authors such as Edgerton (1996). He argues that much of the literature criticizing the alleged anti-industrial culture in England is based on a flawed argument: that British industry has been declining. This decline is measured by the diminishing importance of British industrial output worldwide, as measured by its proportion of total production, and also by annual growth rates. This measurement is however incorrect, because in fact British industry has continued to expand its productive capacity and its exports. What happened instead was that other countries who were lagging behind in the XIX century, such as Germany or France, accelerated their pace of growth in the XX century. This means that there was no absolute British decline but rather a catching up from other countries that diminished the weight of the former's production worldwide, even though it kept increasing throughout the XX century.

In what regards the low rates of investment in science and technology (S&E), Edgerton again criticizes the methodologies that have been used to measure this investment. First because much of the discussion relies on the testimony of scientists, engineers and industrialists, whose hidden agendas

(such as the intent of putting pressure on government to increase public investment in these areas) renders their opinions questionable. For instance, Edgerton (1996) remembers that complaints about lack of funding were often stronger during periods of rapid increase in spending. But more important is the conflation between S&E and innovation that is frequently found in the literature, when in fact the relation between both is very complex. For instance, Edgerton noticed that in the 60's Britain had a higher level of R&D spending than Japan but it had lower growth rates. Additionally many of the authors who have criticized the British decline argued that the country had no proper training institutions for Engineers. However such a statement is usually made in comparison with the German case, where several schools were created during the XX century, specifically dedicated to this type of training. In Britain however, the training of engineers was done at Universities because educationists in this country thought that it would be more appropriate to have multi-faculty Universities. And in fact, according to Edgerton's (1996) comparison with the USA, Germany, France, Japan and Italy in terms of the provision of engineering graduates Britain indeed lagged behind some countries in the beginning of the XX century, but this was not the case by the 1960s. And Germany productivity only surpassed the British in the 1960s.

Overall what Edgerton (1996) argues is that it is wrong to establish direct relations between factors that are probably related but not in a linear way. Therefore it is incorrect to draw a direct line between a certain type of culture and innovation and indeed between innovation and growth. These are complex and multidimensional factors that relate with each other differently, according to the context and the sector involved.

Similar conclusions may be reached by looking at studies about entrepreneurship. Even though entrepreneurialism is not necessarily innovative, there is a strong connection between both, as new ideas are often diffused through the establishment of new firms. Several authors (Armington & Acs 2002, Kirchhoff & Armington 2002, Lee et al. 2004, Reynolds et al. 1994) have tried to understand why some regions are more entrepreneurial than others, and their results may shed some light on this issue (see Table 10). What they show is that entrepreneurialism is a product of agglomeration (as there is a positive significant correlation with population growth and concentration). But at the same time this agglomeration needs to be combined with a specific type of economic development trajectory: those regions where there is a higher industrial intensity and smaller establishment sizes are more likely to be entrepreneurial. Again this is consistent not only in the US but in the cross national comparison. The explanation for this is that old industrial regions, such as South Yorkshire, had an economic structure based around a few large firms that employed thousands of workers. In contrast places like London or Cambridge, more oriented towards services, have a bigger tradition in small business activity. This has a direct impact on the institutional structure of regions, with the former being more dependent on the existence of a few big projects and the latter being more able to generate entrepreneurial activity. In terms of ICT adoption success seems to be more connected with the second type of cultural/institutional structure, because more than having a big firm providing a service, the important is to have all firms using it to become more competitive.

Table 10: Indicators used to explain firm birth rates in journal articles by Lee et al. *(2004), Armington* et al. *(2002), Reynolds* et al. *(1994), Kirchhoff* et al. *(2002)*

Independent Variables	Articles were it was used to explain firm birth rates	Significant or non significant
Economic factors		
Income growth	Lee *et al.* (2004) Armington *et al.* (2002) Reynolds *et al.* (1994)	Sig. Sig. Positive
Industry intensity	Lee *et al.* (2004) Armington *et al.* (2002) Kirchhoff *et al.* (2002)	Sig. Sig. Sig.
Establishment size	Lee *et al.* (2004) Armington *et al.* (2002) Kirchhoff *et al.* (2002)	Sig. (-)[9] Sig. (-) Sig (-)
% of small firms	Reynolds *et al.* (1994)	Positive
University R&D expenditures	Kirchhoff *et al.* (2002)	Sig.
Number of patents	Lee *et al.* (2004)	Not sig.
Government spending in infrastructures	Reynolds *et al.* (1994)	No impact
Government financial assistance to new and small firms	Reynolds *et al.* (1994)	No impact
Social factors		
Population growth	Lee *et al.* (2004) Armington *et al.* (2002) Reynolds *et al.* (1994) Kirchhoff *et al.* (2002)	Sig. Sig. Positive Sig.
% of population with formal occupational training or post-high school degrees	Reynolds *et al.* (1994)	Positive
Population density	Reynolds *et al.* (1994)	Positive
% of population 25-44 years old	Reynolds *et al.* (1994)	Positive
% of population with high school degree	Kirchhoff *et al.* (2002)	Not sig.
% of adults with college degree	Lee *et al.* (2004) Armington *et al.* (2002) Kirchhoff *et al.* (2002)	Sig. Sig. Not sig.
Extent of socialist voting patterns in recent election	Reynolds *et al.* (1994)	Mix impact
Cultural factors		
Creativity – Bohemian Index[10]	Lee *et al.* (2004)	Sig.
Diversity – Diversity (or gay) index[11]	Lee *et al.* (2004)	Sig.
Diversity – Melting pot index[12]	Lee *et al.* (2004) Kirchhoff *et al.* (2002)	Not sig. Not sig.

[9] The sign (-) means that the relation is negative i.e. the regions with lower establishment sizes have higher firm birth rates.

[10] Measures the proportion of ´bohemians` and other artistically creative people in a region

[11] Measure of the concentration of same-sex male unmarried partners

[12] Measure of the % of population that is foreign-born

4 References

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