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8

INNOVATION CAPACITIES AND NATIONAL CULTURES

Drawing a cartography of the European landscape

Regis Coeurderoy

Introduction

One of the European Union's key objectives is to be an economic area that remains at the cutting edge of innovation and moreover ensures a standard of living through innovation policies (European Council 2000). In order to implement that strategy, the European Council launched the Lisbon Strategy,¹ subsequently revised in 2006, in particular with the purpose of increasing research investment to 3% of GDP. After ten years, the outcomes were, however, mixed (Figure 8.1): only two countries (Sweden and Finland) reached the 3% goal and only five other countries (Denmark, Austria, Germany, France and Belgium) were above the EU average. The EU average remained virtually the same for almost a decade, only rising from 1.85% to 1.90% (European Commission, 2010). A new strategy for the decade 2010–2020 was launched, called 'Europe 2020', with a strong focus on research and innovation. The new innovation framework does not really change the previous targets and maintains the 3% of EU GDP to be invested in R&D (European Commission 2017a).

A typical first reaction to these results is of course to speak of economic growth. It is true that economic growth would give public and private actors greater flexibility to invest in R&D. But economic research considers that innovation is a driver rather than a consequence of economic growth (Aghion and Howitt 2010). It is thus key to enact reforms that would unleash the creativity, initiative-taking and entrepreneurial spirit that are powerful engines of innovation – and not only rely on R&D budget expenditures and patent counting. As pointed out by Philippe Aghion (2006, p. 3),

it would be naive to assume that patent protection and R&D subsidies would be sufficient to foster innovation and productivity growth. It is not enough to invest more in R&D here and there to get the economy to grow faster. In the same way that R&D becomes essential when an economy develops, it becomes vital to create the micro and macro-economic conditions for innovation-based growth.

Basically, innovation must be more globally understood as related to the set of norms, behaviours, beliefs and customs that exist within the population of a sovereign nation – what we call a national culture (Hofstede 2001).

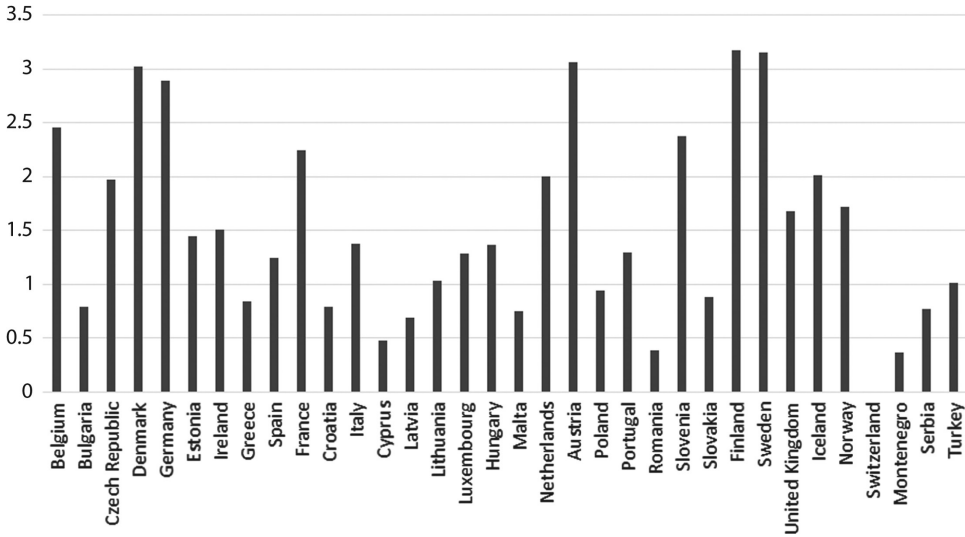


Figure 8.1 Gross domestic expenditure on R&D (GERD), % of GDP, 2014
Source: Figure elaborated from data provided by Eurostat (2017).

Although a link is to be expected between national culture and innovation performance at country level, the topic remains relatively unexplored, as discussed below. For that reason, the objective of this chapter is to shed light on the impact of national cultures on the innovation capacities of European countries. In the next section, I set out some facts and figures that provide first insights on the issue in Europe. This is followed by a review of the literature with a special focus on empirical research articles. I then describe my methodology and provide key results – including regression analysis and cartography. I conclude with some key implications of these findings for possible reforms in Europe.

Facts and figures on national cultures and innovation in the EU

A comparison of the current situations of EU countries in terms of innovation reveals significant and persisting diversity. The Innovation Scoreboard published by the European Commission (2016) shows a 1:4 ratio between the most innovative country in Europe (Switzerland, or second-placed Sweden if only EU member states are considered) and the least innovative country, which is Bulgaria (Table 8.1). In its annual report (European Commission 2016), the European Commission identifies four main groups of countries, which I have reproduced in this table: (1) innovation leaders; (2) strong innovators; (3) moderate innovators; and (4) modest innovators. This ranking manifests the disparities between Northern Europe and Southern and Eastern Europe. The EU member countries ranked as ‘innovation leaders’ are Sweden, Denmark, Finland, Germany and the Netherlands (2015 values). The current situation is not new: the 2008 figures exhibit the same group of leaders, apart from the Netherlands, which managed to join the group more recently (conclusion drawn from European Commission 2017b).

This ranking is not confined to a few innovation performance indicators (‘outputs’), but also evaluates the infrastructures that have been put in place in these countries (‘enablers’) and the innovation activities undertaken by companies (‘firm activities’). It thus offers an overview of a country’s long-term innovation capacity. That is the main reason why the positions in the

Table 8.1 Classification of European countries by innovation group

<i>Types of innovators</i>	<i>Countries</i>
(1) innovation leaders	<i>Switzerland</i> , Sweden, Denmark, Finland, Germany, Netherlands
(2) strong innovators	Ireland, Belgium, United Kingdom, Luxembourg, Austria, <i>Iceland</i> , France, Slovenia, <i>Norway</i>
(3) moderate innovators	Cyprus, Estonia, Malta, Czech Republic, Italy, Portugal, Greece, Spain, Hungary, Slovakia, Poland, Lithuania, Latvia, Croatia
(4) modest innovators	Bulgaria, Romania

Source: Classification derived from data provided in European Commission (2016, p. 7). EFTA countries added by the author (in italics).

ranking remain stable through time. The innovation performance index is a composite measure of 25 indicators, computed from an unweighted average (European Commission 2016, p. 12).²

A literature review of empirical studies on national cultures and innovation

In the academic literature, relatively few research articles have tackled the relations between innovation and culture at country level. In a seminal article, Scott Shane (1992) raised the question ‘Why do some societies invent more than others?’ In his paper, the author explores the extent to which the cultural features of one country influence its propensity to innovate. He draws two main conclusions from his empirical research findings. First, the results show that the extent to which a society stresses social hierarchy tends to decrease inventiveness. The main reasons are that bureaucracy limits creativity and that hierarchisation inhibits communication between superiors and subordinates. Moreover, hierarchy goes alongside centralisation and reduces employees’ incentives. Hierarchical societies place greater emphasis on regulation than on trust and may be more reluctant to accept radical changes challenging established positions. Shane (1992) also provides evidence that individualistic societies tend to be more inventive. They value freedom more than collectivist societies and provide more individual rewards for initiatives and inventions. Last but not least, individualistic societies encourage more independence and non-conformity, which are both powerful drivers for innovation. These key findings are based upon the measure of the per capita number of invention patents granted to nationals of 33 countries (in 1967, 1971, 1976 and 1980). The cultural values are the measures developed by Hofstede (2001) from a large survey of 88,000 employees at IBM throughout the world.

These first findings were confirmed by Scott Shane (1993) in another paper on a related topic. In that article, Shane (1993) directly assesses the effect of cultural values on national rates of innovation for the same group of 33 countries (in 1975 and 1980). He finds that rates of innovation are clearly associated with uncertainty acceptance and, to a lesser degree, related to power distance and individualism. Shane (1993) concludes from this research that, first, ‘culture matters’ in innovation issues at country level. Innovation is not just a question of spending money but also, if not more, a question of societal values. These influential values are no surprise to researchers involved in innovation studies. A reluctance to accept uncertainty inhibits innovativeness, because innovation involves risk and change, while individualism and lack of power distance are associated with innovation (Shane 1992). In a more recent article, Rinne et al. (2011) revisit the study by Shane (1993). They also find a strong negative relation between power distance and innovation, at a national level, and a strong positive relation

between individualism and innovation. By contrast, they do not find any relation between uncertainty avoidance and innovation.

Taylor and Wilson (2010) explore in greater depth the influence of individualism on innovation rates. They analyse data on 62 countries spanning more than two decades and test several measures of individualism. They confirm that most measures of individualism have a strong, significant and positive effect on innovation. They show, however, that a certain type of collectivism – patriotism and nationalism – can also foster innovation.

Methodology, data analysis and key findings

Based on these previous findings, the precise aim of my empirical investigation is to determine whether the EU countries ranked among the most innovative are culturally distinct from the other European countries. To do this, I base my analysis on the national cultural dimensions identified and analysed by Geert Hofstede (2001) and previously used in the first assessments of the links between culture and innovation (Shane 1993, 1995; Tellis et al., 2009; Taylor and Wilson 2010). I test the impact of the following three cultural dimensions (Hofstede 2017), all of which have been previously studied: (1) power distance – which is the degree to which the ‘less powerful members of a society accept and expect that power is distributed unequally’; (2) individualism versus collectivism – individualism being the ‘preference for a social framework in which individuals are expected to take care of only themselves and their immediate families’; and (3) uncertainty avoidance – which expresses ‘the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity’ (Hofstede 2017).

I assess the impact of these dimensions on the innovation capacity of European countries as measured in the above-mentioned European Commission (2016) report. I run regression analysis to assess the impact of cultural features on the innovation performance of countries during the 2011–2015 period (Table 8.2).

For the rest of the analysis I keep only those European countries that are integrated into the European Union or those maintaining long and close relationships, by which I mean European Free Trade Area (EFTA) countries. This includes Iceland, Norway and Switzerland. Data on Liechtenstein are not available. Note also that, for the case of Cyprus, I have taken the decision to replicate the Greek values. This is something that can be considered as an acceptable approximation because the figures are for the Republic of Cyprus only. I run the analysis on a panel of 31 countries for five years (155 observations). Because the three significant cultural dimensions are closely correlated (Table 8.3), I also create a synthetic factor (through principal component analysis), which summarises the three cultural dimensions. The low values of this factor stand for countries supporting rather individualistic behaviours, sharing power and accepting risk-taking. I regress innovation capabilities on the three values of national culture, but also introduce GDP per capita (thousands of current US\$) as a control variable.

In this regression model, I thus assess the direct effect of national cultures on innovation performance. Following Williamson’s framework on the economics of institutions, culture can be considered as a key component of social embeddedness. This level is taken as given and changes very slowly – in the order of centuries (Williamson 2000, p. 597). In that perspective, cultural dimensions can be considered as exogenous and stand-alone. Nonetheless, it would be fruitful to further explore the diffusion of cultural dimensions in other sub-level strata.

Regression results significantly confirm the power of cultural values on the capability of countries to perform in innovation in the European context, with an explained variance close to 50 per cent when measured alone. The most discriminating variable is power distance,

Table 8.2 Regression analysis of cultural values on innovation performance

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
Power distance	-0.324 (9.48)**	-0.143 (3.79)**		
Individualism	0.156 (1.98)*	0.113 (1.98)*		
Uncertainty avoidance	-0.171 (3.85)**	-0.115 (3.26)**		
Synthetic factor of national cultures			-12.928 (14.79)**	-7.259 (6.57)**
GDP per capita		0.326 (5.38)**		0.329 (5.62)**
Constant	66.034 (8.36)**	43.523 (6.61)**	21.188 (11.18)**	34.790 (17.13)**
R2	0.48	0.65	0.47	0.64

N = 155 observations; * p < 0.05; ** p < 0.01.

Table 8.3 Correlation between the cultural dimensions for EU and EFTA countries

	<i>Power distance</i>	<i>Individualism</i>	<i>Uncertainty avoidance</i>	<i>GDP per capita</i>
Power distance	1.00			
Individualism	-0.57**	1.00		
Uncertainty avoidance	0.62**	-0.59**	1.00	
GDP per capita	-0.59**	0.43**	-0.47**	1.00

N = 155

** p < 0.01.

followed by uncertainty avoidance and, slightly behind that, individualism. These results confirm that European societies where power is distributed unequally among individuals strongly inhibit their innovation capacities. A taste for collectivism apparently does nothing to foster innovation capacity, while a dose of individualism tends to favour it, maybe because it may more easily unleash entrepreneurial initiatives, which are a powerful engine of innovation at present. A reluctance to accept uncertainty and ambiguity, and a desire to regulate change produce a similar effect on innovation in Europe. Innovation initiatives do indeed generally require test-and-try initiatives and actions whose outcomes can remain unknown for a long while. Finally, it should be noted that in these three cases the results exhibit significant explanatory power, in particular for power distance. Note also that the cultural synthetic indicator can be seen as a clear signal in favour of the influential role of culture to differentiate innovation capacities in Europe. This suggests that, although the relations between culture and innovation are obviously not directly observable, they are nevertheless very likely to be closely linked.

Although I can give evidence on the relations between national cultures and innovation performance, I do not know the specific situation of each country. For that reason, I pursue the analysis with a cartographic approach. I create a graph in which the cultural dimension derived from the synthetic factor is plotted along the x-axis, while the y-axis indicates innovation capacities,

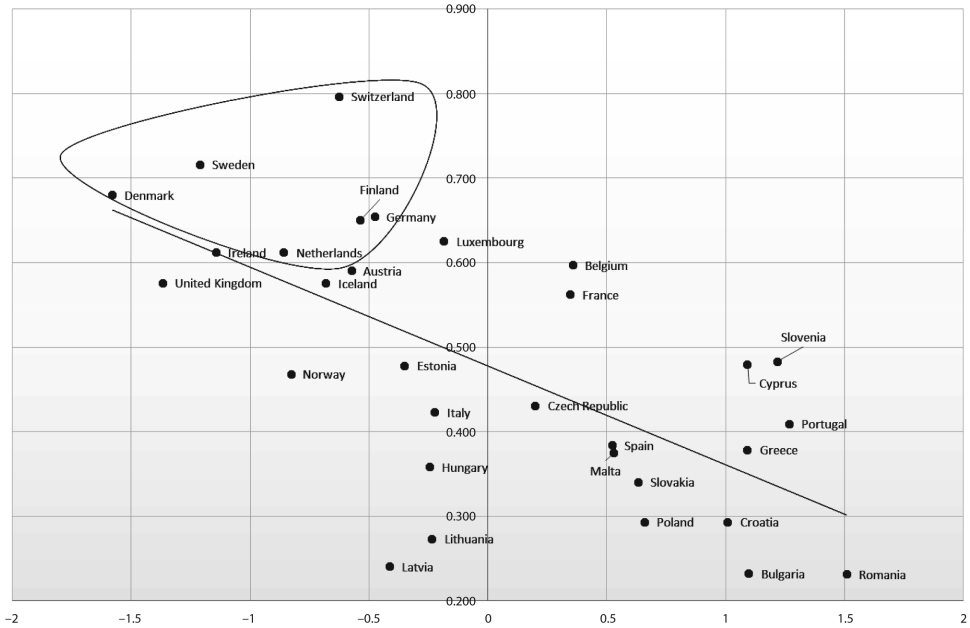


Figure 8.2 The cultural space of EU innovation capacities

X axis = cultural dimension derived from the factorial analysis of the three measures – power distance, individualism and uncertainty avoidance.

Y axis = innovation capability on a 0–1 scale.

EU and EFTA countries included.

using the innovation performance values calculated for the EC report (European Commission 2016), computed as averages for the period 2011–2015.³ Note that these are unweighted values, so for example Germany and Malta have equal weight. The reason for this choice is that I am seeking to compare national cultures independently of their economic or demographic weight. Nevertheless, one should bear in mind these proportions when studying the graphs.

Some clear conclusions can be drawn from this synthetic graph (see Figure 8.2). First of all, it is quite visible that the most innovative EU countries, according to the European scoreboard, are located in the top-left quadrant of the graph. Narrowing this down, the top most innovative countries ('the innovation leaders') can be grouped together in a specific zone that I will call the 'cultural space of innovation'.

In contrast to this zone, I observe that the least innovative countries are mainly located in the bottom-right quadrant – indicating opposite characteristics to the first group. As a particular case, note the situation of Luxembourg, which shows a good performance level on average (2011–2015) but left the group of innovation leaders in 2015. It remains that Luxembourg, like Austria and the United Kingdom, is very close to this cultural space. It can thus be expected that these countries are not likely to have strong cultural barriers against innovation and could easily trigger a catch-up process.

Another sub-group can also be detected, which exhibits relatively low innovation capacity levels but exhibits cultural features that are not so different from the leading group: the three Baltic countries, plus Italy and Hungary. Even though there is a gap which is not trivial, it seems that these countries benefit from cultural patterns that are quite favourable for unleashing more

innovation-driven policies and can then expect a catch-up process in innovation performance in the medium run. The remaining singular case is Norway (not an EU member state), which is not an innovation leader but is a special case in Europe owing to its oil revenues, which may dampen the incentive to innovate. For the other countries, it can be derived from the analysis that entering into what many call an ‘innovation-driven society’ would require triggering strong cultural changes. On the basis of this synthetic cultural factor, their positioning shows that entering an innovation-driven society is a big challenge.

Of course, the analysis developed in this chapter is a national-level analysis and hence provides an assessment of relations on an average basis. It introduces explanatory dimensions for understanding why some societies may generate more innovation than others. There remain, however, limitations in this exploratory perspective. Innovation performance can also be driven by sub-groups in one population and – on some occasions – transformations can be unleashed by minorities, and this could be termed a ‘revolution’.

Conclusion

The cultural analysis of innovation capacity shows that, although there is no such thing as an ‘innovation culture’ per se, innovation is more likely to thrive in certain cultural spaces. In particular, accepting a more egalitarian distribution of power (according to the power distance indicator) and refusing to regulate the future (according to the uncertainty avoidance indicator), will help to create favourable conditions for innovation in Europe. Furthermore, a ‘loosely-knit’ structure of relations between individuals seems to be more favourable to innovation.

These cultural questions are seldom taken into account in structural reform programmes, as efforts are generally focused on regulatory dimensions and on incentive schemes, without really considering how these regulatory changes are integrated by actors from the normative and cognitive perspectives. Working from the above results, it is possible to sketch out the foundations of other reforms – ‘cultural reforms’ – in order to build an environment that would be more conducive to innovation in countries that are deficient in this regard. Concerning the question of power distance, it is important to encourage the countries that are most strongly attached to this principle to implement policies that will foster the development of more egalitarian relations. At the interpersonal level, these actions should begin with educational policy, starting from an early age and carrying on through to higher education. In the working world, significant efforts should be made towards a form of decentralisation that would reduce the number of hierarchical echelons and also lessen vertical interdependence between people.

Concerning the question of uncertainty, it is also important to encourage the more reluctant countries to face up to uncertainty and to pursue policies that promote its acceptance. This would entail implementing policies based on experimentation and the evaluation of results and, as far as possible, circumscribing any debates that focus on general principles or laying down rules. It would also involve curtailing the existence of established positions or statuses that tend to paralyse efforts towards change. Last but not least, it would be useful in some countries to introduce reforms helping individual initiatives to be launched and rewarded. This would enhance risk-taking behaviours in these societies.

These reforms would certainly release significant innovation potential in those countries. But there is one point, one difficulty that must not be overlooked and that can be expressed in the following question: How can we change culture? Obviously, we cannot change a country’s history and it would be an illusion to think we can ignore the historical foundations upon which a society is built. We also must be wary of undertakings aimed at ‘cultural revolution’. Our memory of the past century and certain current events should cause us to exercise great caution in this area.

It is nevertheless possible to gradually introduce a process of transformation in order to move in the intended direction, even though the effects of these changes will only be felt in the medium to long term. Perhaps it would be better to say ‘it is important to introduce a transformation process quickly in order to move in the intended direction because the effects will only be felt in the medium to long term’.

Notes

- 1 The Lisbon Strategy recommended six main initiatives to boost innovation: (1) developing networking activities and joint research programmes; (2) improving the business environment to foster R&D investments; (3) better coordinating and monitoring the national efforts; (4) developing the infrastructures in information technologies to better circulate scientific knowledge; (5) removing mobility barriers for researchers and crafting policies to attract research talents in Europe; and (6) moving towards patent protection at the community level.
- 2 ‘Enablers’ is the first pillar evaluating country performances across three dimensions: human resources; open, excellent research systems; and finance and support. ‘Firm activities’ is the second pillar with three dimensions: firm investments; linkages and entrepreneurship; and intellectual assets. ‘Outputs’ is the third pillar with two dimensions: innovators; and economic effects. The full methodology is described in European Commission (2016).
- 3 Other graphs with each cultural value were also made but only the synthetic one is presented here for the sake of parsimony. Graphs and analysis are available upon request.

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