

**MORAL CULTURE
AND INNOVATION
IN EUROPE**

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Research Papers



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1. Moral character and innovation

Contemporary sociology of morality has paid so far limited attention to the tradition of enquiry built around virtue ethics (as shown, for instance, in Hitlin and Vaisey, eds. 2010). This tradition finds its ancient roots, in the West, in Plato and Aristotle (2011 [4th century BC]) and in the synthesis of Classical and Christian tradition of Aquinas (2005 [1271/1272]), down to modern variants such as those of the Scottish Enlightenment (Hutcheson, for instance). Most recently, it has found its way into contemporary debate through a seminal paper of Anscombe (1958) and the work of Williams (1985) and, particularly, of MacIntyre (2007 [1981], 1988, 1990, 1999, 2006).¹ Virtue ethics draws attention to habitual practices in which moral agents engage in with a view to attaining goods internal to these practices, thereby achieving a good moral character, living a good life and making a contribution to a good society, as these goods are understood within a given moral tradition. In virtue ethics, practices and the goods related to them are the main focus of morality, while morality as a frame, repertoire or discourse of justification for strategic or expressive behavior (a prevalent topic in current sociology of morality: Swidler 1986; Boltanski and Thévenot 2006) gets a subordinate place in moral inquiry.²

A sociology of virtue focuses on two main issues: on the ways in which the actual practice of virtues that we find, for instance, in advanced modern societies are connected to the ends of a good life and a good society; and on the social conditions for developing the kind of moral agency able to engage in the practice of those virtues.

In this paper,³ we suggest a causal link between a set of virtues and productive innovation, that is, a practice in the interface of a pursuit of knowledge, or science, and its commercial applications. Such practice is usually understood as a good one, in a blend of moral traditions that accommodate Classical and Christian traditions with the assumed best practices of a “polite and commercial society” (Langford 1989), namely, a civil society in a broad sense (Pérez-Díaz 2011). Our position has, in this respect, some affinity with that of McCloskey, as shown in her depictions of “bourgeois virtues” (2006).⁴ The goodness of innovation belongs, then, in the current *topoi* of contemporary discourse, as a practice conducive to a healthy and successful society (Hall and Lamont 2009).

The bibliography offers a wide array of factors to explain innovation, notably economic and political ones, such as the level of available financial resources, the regulatory frame of economic sectors and of intellectual property, the openness of the economy, or the characteristics of national or regional institutions. Lately, growing attention has been paid to socio-cultural factors, such as the level of human capital or the quality of universities, and to social capital.⁵ Our contribution can enrich the debate at this point, as we think an important role is played in innovation by the relative strength of a set of virtues that make up a rather

1. See also Athanassoulis (2004) and Hursthouse (2010).

2. See also Vaisey (2009), Giddens (1984), and Flanagan and Jupp, eds. (2001).

3. This paper builds on a more extensive, previous study: Pérez-Díaz and Rodríguez (2010).

4. Of course there may be strong correspondences between non-Western (Confucian and Taoist ethics, for instance) and Western ethical traditions (see Merton 2004).

5. Two examples of the main approaches towards explaining innovation at a national level in Furman, Porter and Stern (2002) and the *Oxford Handbook of Innovation* (Fagerberg, Mowery and Nelson, eds. 2005). For the application of cultural factors see Shane (1993), Herbig and Dunphy (1998) and Didero *et al.* (2008). For a review of studies on social capital and innovation, see Zheng (2010).

coherent moral culture. This culture underlies the strategies of the relevant actors and the workings of institutions. The quality of these institutions depends on the ground rules as they are actually enacted (North 1990), hence, on the moral dispositions of the agents involved.

We understand these virtues as variants of a culture of moral common sense associated, in the West, with a millennial tradition of Classical and Christian roots that accommodate values of secular humanism and modern civil society. More specifically, we use a version of the traditional cardinal virtues, which includes prudence or the cultivation of intelligence, fortitude and temperance, and justice, with a connected dimension of openness to other societies.⁶ We assume this moral culture is relatively rooted, albeit unevenly, in Western societies as a consequence of historical processes that implied considerable continuity between the axial age (6th-5th centuries BC) and the late 18th century, at least for large sections of the population. Important as they are to understand the evolution of the moral culture of the learned elites, we leave aside the discontinuities that began in the Lower Middle Ages, later became more accentuated and ended up in their recent modernist and post-modernist versions (MacIntyre 2007), so much so that some observers (Giddens 1991; Bauman 1993) think the ancient kind of common moral sense is gradually being replaced by the coexistence of rather incoherent moralities.

Our hypothesis is that systematic variation in the real presence of that moral culture, *qua* moral practice (not *qua* mere statements of belief: Aranguren 1958), in the context of a relatively homogeneous and well delimited cultural-institutional area (contemporary Western Europe), is associated with the level of innovation. We believe that more complete and coherent varieties of that culture foster behaviors and attitudes that are conducive to innovation. The more individuals cultivate their intelligence, their perseverance and equanimity, the greater their self-confidence and trust in others, allowing them to compete and collaborate, and the wider their horizons, the more likely they will become successfully involved in productive innovation.

Questions of method

Our approach has the following characteristics. First, although we hope that our theory can be applied to a wide number of societies, we think it is better to start by applying our discussion to a relatively definite cultural-institutional area,⁷ the “Europe of fifteen” (EU15) which includes Northern, Central and Southern European countries. Since the Second World War, most of this area has lived under the institutions of liberal democracy, a market economy (with a large public welfare system) and a web of free associations, though in most Mediterranean countries democracy has been a more recent experience. Allowing for this caveat, the cultural and institutional homogeneity of these countries makes it easier to understand how variations in national cultures are associated with variations in innovation.

Second, in order to construct our indicators of virtue we have relied on the available international surveys, even though they have been formulated by other authors and with other purposes. These indicators relate to the agents’ practices as well as to statements of value, or of fact, suggesting the practices that prevail in their social milieu. Sources of these variables are coded in their definitions (see table 1) and listed in the bibliography.

6. We leave aside the central role of the theological virtues of the Christian tradition (von Balthasar 2004).

7. See Boudon (2010).

Third, as the indicator of a country's innovation capacity we have chosen the 2004-2008 average rate of triadic patent families, i.e., those presented in the patents offices of the European Union, the United States and Japan, per million inhabitants.⁸

Fourth, we show the strength of the linear relationship of the cultural variables with the patent rate by means of the Pearson correlation coefficient (r), which adopts values from -1 to 1. We do not believe that the model that best fits the data is always reflected by a straight line, but we think that it is sufficient to show the plausibility of the associations observed.

Fifth, we observe connections between virtues that suggest a rather coherent moral character. Strictly speaking, our variables are imputed to national aggregates of individuals. This prevents us from solving to our entire satisfaction the issue of the leap from variables that break the moral character of individuals down into differentiated virtues to a holistic argument referring to the presence of individuals that are virtuous because each of them displays an integrated set of virtues. Nevertheless, we mitigate this problem by means of a factor analysis of nationwide data that suggest a linkage between the different dimensions of the moral character of the agents in question; anyway, this should not come as a surprise to any reader of Aristotle's *Nicomachean Ethics* (2001 [4th century BC]). We touch, here, on the larger issue of the unity, or coherence, of virtues as a requisite of moral agency, as a precondition for a narrative suited to the unitary character of human life (MacIntyre 2007: 147 ff.; Adams 2006), and as a feasible goal under the conditions of advanced modernity.

2. Empirical evidence on the relation between virtues and innovation

In this section we deal, first, with the virtue of intelligence, second, with fortitude and temperance, and third, with justice and the connected issue of the width of life horizons. In each case, we elaborate on the theoretical connections between the practice of a virtue and innovation, and, then, see whether the association between that virtue's indicators and the patent rate speaks for or against the plausibility of such connections.

2.1. Cultivation of intelligence

Level of formal education

The cultivation of intelligence means developing capacities for abstract reasoning, selecting the relevant problems, observation and sustained attention to detail, imagining theories, and engaging in debating and following complex arguments as required for obtaining specific knowledge. Assuming this cultivation may develop in the formal education system (among other instances), we take a population's mean level of education as a measure of the degree in which those intellectual capacities have been acquired. We use the percentage of people between 15 and 74 years old in 2007 who had completed at least upper secondary education, calculated with Eurostat data.

We do not take into account just the university level, because an innovative economy requires a fairly large critical mass of people with the adequate intellectual capacities, well beyond the core of scientists and technicians playing the leading role. The creative core needs an

8. Calculated with OCDE data. For the reasons we prefer this indicator see Pérez-Díaz and Rodríguez (2010: 21-22).

environment of people who stay informed about discoveries made by others and are able to adapt them to the needs of their own company or working conditions, and to extract practical, or theoretical, consequences that escaped to the original researchers. This support staff may not need a higher university degree, but it will probably require a vocationally oriented degree. As for qualified workers, they would be expected not to apply innovations in a mechanical way but to contribute to the innovation process, thanks not only to their practical training and the imitation of more experienced workers, but also to skills acquired within a more formal framework, such as that of secondary education.

As table 1 shows, this formal education indicator is clearly ($r=0.80$) associated with the patent rate, so that, in the EU15 countries, the higher the share of people with a minimum of upper secondary education, the greater the patent rate.

Table 1

Europe of the 15. Pearson coefficients for the correlations of the indicators of virtue with the innovation variable (triadic patents per million inhabitants, 2004-2008 average) and with the factor that resumes these indicators

	Correlation with the patent rate	Correlation with the resuming factor
Prudence		
Population between 15 and 74 years old at least with upper secondary education (2007; Eurostat)	0.80***	0.72**
Average number of correct answers in a set of 13 questions on scientific knowledge (2005; EB 63.1)	0.89**	0.92***
Has read books more than 5 times in the last year (2007; EB 67.1)	0.73**	0.84***
Number of artistic activities carried out over the previous 12 months (2007; EB 67.1)	0.92***	0.94***
Fortitude and temperance		
Not living with parents, 18-35 year-olds (2002-2006; ESS 123)	0.73**	0.83***
"It is important to him/her to live in secure surroundings. He/she avoids anything that might endanger his/her safety": he/she is very much like me (2002-2006; ESS 123)	-0.81***	-0.87***
"It is important to him/her to be rich. He/she wants to have a lot of money and expensive things": he/she is very much like me (2002-2006; ESS 123)	-0.70**	-0.79***
"It is important to him/her to show his/her abilities. He/she wants people to admire what he/she does": he/she is very much like me (2002-2006; ESS 123)	-0.76**	-0.84***
Justice		
Generally speaking, most people can be trusted, or you can't be too careful in your dealing with people (scale of 10 to 0) (2002-2006; ESS 123)	0.67**	0.85***
Most people would try to take advantage of you if they got the chance, or they would try to be fair (scale of 0 to 10) (2002-2006; ESS 123)	0.75**	0.91***
Number of associations respondent belongs to, out of a total of 14 types (average, 2006; EB66.3)	0.86***	0.79***
How much the management at your work allows you to decide how your own daily work is organized (scale of 0 to 10) (2002-2006; ESS 123)	0.77**	0.86***
Disagrees with "entrepreneurs think only about their own wallet" (2010; FEB 283)	0.70**	0.86***
Trust in politicians (scale of 0 to 10) (2002-2006; ESS 123)	0.57*	0.77**
Very or quite interested in politics (2002-2006; ESS 123)	0.82***	0.85***

Table 1

Europe of the 15. Pearson coefficients for the correlations of the indicators of virtue with the innovation variable (triadic patents per million inhabitants, 2004-2008 average) and with the factor that resumes these indicators

	Correlation with the patent rate	Correlation with the resuming factor
Wide vital horizons		
The cultural life of (COUNTRY) is generally undermined or enriched by people coming to live here from other countries (scale of 0 to10) (2002-2006; ESS 123)	0.71**	0.76**
Enjoys eating foreign cuisine (2007; EB 67.1)	0.80***	0.89***
Has travelled abroad at least three times in the past three years, for leisure or business (2007; EB 67.1)	0.75**	0.89***

Source. Own elaboration with cultural variables data from Eurostat, several Eurobarometers and the three first waves of the European Social Survey, and patent data from OECD. See Data Sources.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Scientific knowledge

Obtaining certain educational qualifications does not mean that the necessary cognitive skills have been acquired and maintained. To build an indicator of the cognitive skills of Europeans we have used the Eurobarometer 63.1 survey, in which respondents were asked a set of 13 questions about the truth-contents of scientific statements on various disciplines (astronomy, geology, biology and physics). For each respondent, we calculate the number of correct answers and, then, we calculate its average for each country. This gives an indication of the effectiveness of the education system in transmitting scientific knowledge, and the extent to which post-school experience requires the use of such knowledge or facilitates its recall. Our hypothesis is that the higher the average level of a population's scientific knowledge, the greater the innovation capacity, for the same reasons applied to the first indicator of intelligence (level of education).

The data confirm this hypothesis. In fact, there seems to be a stronger association of the patent rate with the level of scientific knowledge than with the level of formal education ($r=0.89$).

Book reading

Maintaining, activating or enhancing knowledge acquired in the school requires cultural practices such as that of following a relatively sustained argument or narrative, as usually implied by the practice of book reading. This practice should be positively related to a country's innovation capacity, because, first, the assimilation of written theoretical and practical material constitutes an important part of scientific discovery and technical innovation in companies, and, second, in general, the more one reads, the greater one's capacity to imagine and to create, as long as imagination and creation are not produced in a vacuum but emerge from a combination of experiences and ideas, including those brought from afar by means of reading texts.

Our comparative book-reading indicator reflects the percentage of the adult population who has read more than five books in the previous year, as measured by the Eurobarometer 67.1. Table 1 shows its positive association with the patent rate, which is not so strong as with previous indicators ($r=0.73$).

Art practices

So far, very little attention has been paid to the question of artistic creativity in connection with productive innovation, even though its relevance should seem obvious. The work of art is the result of a search for a work well done, and done for the sake of it; and the habit of doing a good piece of work for the pleasure of doing it well may be very important for the development of innovation in any sort of activity. People can be expected to transfer their innovative habits and inclinations from one sphere, such as the arts, to another, such as scientific research or technological development, or to express their creativity in different fields, at least sequentially. It follows that a cultural environment that stimulates artistic creativity will produce higher percentages of innovators in other areas.

We have measured effective artistic creativity using an indicator taken from the Eurobarometer 67.1, in which the respondents were asked if during the previous year they had practiced, in an amateur capacity, any artistic activities, such as playing a musical instrument or singing, writing literary texts, or sculpting, drawing or painting. We have counted the number of activities performed by each respondent and calculated the average for each country. We assumed that an increase in this average would be associated with an increment in the patent rate. The data corroborate this hypothesis very convincingly ($r=0.92$).

2.2. Two virtues of character

Next we deal with various indicators regarding the development of the traditional moral virtues of fortitude and temperance. These two virtues are needed for productive innovation. Fortitude provides the level of self-confidence that is necessary for assuming responsibility, engaging in cooperative behavior and risk-taking, all of which benefit innovation. Also, the more self-confident people are, the less they may fear or distrust others, as they feel better equipped to confront possible deception and being let down by others, and the more likely they are to fulfill their own commitments. In turn, temperance, or moderation, checks excessive individualism, and allows for the self-control that makes for cooperation to be sustainable in the long run.

Early emancipation and lower uncertainty avoidance as indicators of fortitude

One of the most important decisions with respect to the affirmation of one's own responsibility and autonomy is that of leaving the family home. In principle, the later young people leave the parental nest, the longer it takes for them to take on all the responsibilities and the risks inherent in adult life, and, therefore, full adulthood is delayed. The timing of emancipation (whether early or late) is affected by the economic situation and regulation of the labor and housing market, but it also reflects long-standing cultural differences between Northern Europe (early emancipation not linked to marriage) and Southern Europe (late emancipation, linked to marriage), which have been documented since the mid-nineteenth century, and may date back to the Middle Ages (Reher 1998).

We have no data available on the emancipation of all the adult population, but, given the continuity of the patterns and the relative stability of the differences in Europe, we can take as an approximation the percentage of population between 18 and 35 years old who no longer live with their parents, a figure that is easily calculated with data from the European Social Survey (ESS). The relation between this indicator and the patent rate is clear, with both of them increasing together in a consistent way ($r=0.73$).

According to Kaasa and Vadi (2008; following Hofstede 2001), uncertainty avoidance refers to whether ambiguous situations are either tolerated or avoided, and to the extent it is believed that what is different is dangerous. In societies with low levels of uncertainty avoidance, controversy is considered to be something natural, and ambiguous situations are looked at as interesting; in societies with high levels of uncertainty avoidance, the opposite tendency prevails. So, to the extent that innovation is associated with high doses of change and uncertainty, the greater the level of uncertainty avoidance, the lower the doses of innovation and the more likely rules reducing ambiguity will be applied, thereby reducing the search for imaginative solutions and discouraging the expression of new ideas.

International surveys provide several useful indicators in this respect. We have selected one that leaves little room for ambiguity, related to the importance of living in a secure environment. It concerns the percentage of adult population responding to the ESS which highly identifies with the following statement: "It is important to him/her to live in secure surroundings. He/she avoids anything that might endanger his/her safety". As can be seen in table 1, its relation to the patent rate is markedly negative ($r=-0.81$).

Moderate vs. excessive individualism

In the moral discourse of the Scottish Enlightenment a distinction is usually drawn between, on the one hand, moderate individualism, allowing for an enlightened self-interest compatible with a fair dose of altruism and a feeling for the common good, which facilitates cooperation and loyal competition, and, on the other hand, the excesses of self-centered, egotistical individualism associated with selfishness, greed, envy and arrogance. Adam Smith and the other Scottish thinkers understood that, given human nature, any attempt to overemphasize the altruistic dimension, or to over-moralize human behavior could meet its limits in real life, but that, anyway, self-interest needed to be counteracted by moral sentiments and civilized by means of reasonable institutions, such as those of the market economy or, as we would say today, those of liberal democracy, assuming they function properly (Pérez-Díaz 2009; Robertson 1983). Whatever the case, the more selfish, greedy, envious and arrogant people there are in a society the more difficult it is for market and democratic institutions to work properly, take root and become firmly established. The same applies to innovative environments, which are hindered by the presence of too many morally disorderly, self-centered individuals, which may be tempted to get all the credit for the innovations at the expense of others and conceal information from others, imagining the others' attitude to greed being similar to their own, all of which hinders the necessary cooperation for attaining high levels of innovation.

Measuring the abundance of this type of person in a country is not easy as people do not usually acknowledge selfishness or greed in themselves. Yet, it is possible to obtain approximations from answers to questions referring to people's inclination to displays of wealth and status, such as the following ones. We know from the ESS the percentage of the

adult population who state they are very much like someone described in the following terms: “It is important to him/her to be rich. He/she wants to have a lot of money and expensive things”. This could be used as an approximate indicator for greed in the European cultural context. The truth is that this indicator is associated negatively with the patent rate in a marked way ($r=-0.70$). Likewise, we also know from the ESS the percentage of the adult population that fully identifies with someone described as follows: “It is important to him/her to show his/her abilities. He/she wants people to admire what he/she does”. Although this statement gives room for a range of interpretations, it may be taken to suggest the type of person who expects excessive “social” rewards (such as recognition, prestige) for his or her contributions. The association of this indicator with the patent rate is markedly negative ($r=-0.76$).

2.3. Justice, trust and life horizons

Generalized trust and associationism

We may infer the level of people’s practice of the virtue of justice from the degree of trust they have in each other and in the organizations they belong to. Without a sufficient amount of trust and the corresponding connections (social capital), some basic conditions for innovation would be lacking, as they are required to foster the cooperation and loyal competition needed to make innovation communities work. The lesser the level of trust the greater the tendency to share less of the knowledge obtained, because of a fear that others will make opportunistic use of it or, perhaps more significantly, uncertainty as to whether they will comply with what is required, which is specially important when collaboration involves sharing the high-level and specialized knowledge that is very specific to the collaboration in progress (Tabellini 2008). Distrust hinders the formation of research teams within an institution (a university school, a public research center or a company), and collaboration between different actors (two companies or a company and a university team) or between different departments in the same institution. It may also hinder the formation of companies of a certain size, which tend to be more innovative because they have more specialized researchers and workers available.

Generalized trust is usually measured from the answers to questions in which the respondent has to choose from two options: “in general, most people can be trusted” or “you can’t be too careful in your dealing with people”. On other occasions, these options are presented as the two extremes of a continuous scale from 0 (“one can’t be too careful”) to 10 (“most people can be trusted”). Here we use the second type (the version included in the ESS), calculating the average for each country. Its association with the patent rate is positive, though moderate ($r=0.67$). A more revealing indicator comes from an ESS question on how inclined others are seen to act unfairly to the respondent, who answers using a scale going from 0, “most people would try to take advantage of you if they could”, to 10, “[most people] would try to be fair”. We take this answer as reflecting a perception of the practices prevailing in society. As expected, the relation between the indicator and the patent rate is positive and likely stronger than that of the generic trust indicator ($r=0.75$).

Another common indicator of social capital is the rate of membership of voluntary organizations, under the assumption that taking an active part in them strengthens and enriches the network of social relations, making it more likely that the resources of trust mobilized will increase. Our indicator uses data from the Eurobarometer 66.3, in which

questions of participation in 14 types of association were asked. We have calculated the number of associations each respondent takes part in and the average for each country. This average has a positive and strong association with the patent rate ($r=0.86$).

Power distance in organizations, and in societies

As used by Kaasa and Vadi (2008: 7), the concept of power distance refers to the degree power is unequally distributed within organizations and other institutions. A high power distance is characteristic of highly centralized organizations in which decisions strictly follow a set of formal rules, while in more decentralized organizations, and in those in which the chain of command is not rigidly followed, power distance is low. If power distance is high and information flows primarily along hierarchical lines, it is more difficult to share information among departments, hindering the conversations that define innovation communities, such as research institutes, universities or companies (Pérez-Díaz and Rodríguez 2006: 63-67).

Power distance within the company may be inferred from the margin of autonomy given to workers, an indicator of which is the extent to which they believe that company management let them decide how to organize their daily work (on a scale of 0 to 10), calculated from the ESS. In principle, the more autonomy there is in a company (or the less dependency on hierarchical relations), the more favorable are the conditions for innovation. As predicted, the association is positive and substantial ($r=0.77$).

The concept of power distance can also be applied at the society level. In a society with high power distance, politicians are not usually accountable for their actions, there is a lack of transparency and an excess of rigid state bureaucracy, and citizens have little interest in politics and hardly participate in public discussion because they consider that it is not their business. Such an atmosphere is hardly conducive to developing an innovative business fabric or to cultivating a disposition to science or engineering in the general population.

Here we recur to three indicators of power distance at the societal level. First, the Flash Eurobarometer 283 provides us with a very clear question regarding the image of companies. Respondents are required to express to what extent they agree with the statement “entrepreneurs think only about their wallet”. As the percentage of those who disagree with the statement increases, which means that private firms’ image is more positive and/or the entrepreneurs are actually less selfish, the innovation rate is substantially greater ($r=0.70$).

Second, a relatively direct measure of the distance between citizens and the political class is the level of trust that the former have in the latter, an issue that has been dealt with in numerous surveys. From the ESS, we can obtain the average level of trust in politicians on a scale of 0 (minimum trust) to 10 (maximum trust). A high value would indicate low power distance, and vice versa. Table 1 shows that the greater the trust in the political class, the greater the innovation rate, although the strength of this relation is rather moderate ($r=0.57$).

Finally, another measure of power distance on an aggregate scale, and of the sense of belonging to a community, has to do with the interest in politics shown by the citizens, which depends, among other factors, on people’s level of commitment to the public good, on the effectiveness imputed to such commitment, and on the trust that politicians inspire in them. Our indicator is the percentage of the adult population that is very or quite interested in

politics, calculated from the ESS. Again, we see a positive relation with the patent rate of considerable strength ($r=0.82$).

Life horizons and circles of sociability

We end our analysis on the virtue of justice with some observations on the extent of the sociability framework to which it is applied. A crucial difference in people and societies lies in how broad or narrow are their life horizons or the circles of sociability that serve them as a reference. Broad life horizons imply experiences lived in foreign countries or with foreign people, contacts with foreign cultures, or being favorably disposed to contact with such people and cultures. These experiences or predispositions may have a triple effect on the creative potential of individuals. First, individuals with broader vital horizons have more opportunities to cultivate their intelligence as they are open to the influence of a greater diversity of ideas, beliefs and behaviors than people with narrower horizons. They are able to combine the greater number of diverse elements they have at their disposal and make use of them to imitate and create. Second, their wider knowledge of different people and things makes people surer of themselves and less fearful of what is new, unknown or alien, factors that might otherwise cause certain anxiety and provoke defensive attitudes and rejection. Finally, they feel as if they form part of an ever-widening social sphere, which makes them more willing to cooperate as they are less afraid of others who are outside their intimate circle of family and friends. In general, therefore, people with broader vital horizons tend to be more innovative, as do societies in which such people abound.

The three indicators below reflect attitudes and experiences linked to open- or closed-mindedness towards what is foreign. The first one refers to people's attitude towards the cultural influence of foreigners. With the ESS, we can calculate countries' averages on a scale that ranges between two poles: "the cultural life of (France, Spain, etc.) is generally undermined by people coming to live here from other countries" (0) or "the cultural life of (France, Spain, etc.) is enriched..." (10). This average clearly has a positive association with the patent rate ($r=0.71$).

Second, an indicator of openness towards what is foreign is the percentage of the adult population that claims to enjoy eating foreign food. This can be calculated with the results of Eurobarometer 67.1 and shows a marked association with the triadic patent rate ($r=0.80$). We can assume that, apart from measuring openness to different experiences, it is also a sign of a culturally diverse environment, in which there are plenty of opportunities available for experiencing expressions of different cultures at the local level.

Finally, indicators of the experience of life abroad can be obtained from surveys that include questions on the frequency of foreign travel.⁹ Using Eurobarometer 67.1 we can calculate the proportion of the adult population that has traveled abroad at least three times in the last three years, either for business or pleasure. As can be seen in table 1, as this proportion increases the patent rate also increases, showing there is a substantial association ($r=0.75$).

9. The positive importance of living in a foreign country has actually been proved experimentally with North American and European university students (Maddux and Galinsky 2009).

3. Concluding remarks, an integrated moral factor, and three Europes

Virtues do correlate with productive innovation

The evidence we have put forward supports the plausibility of our initial hypothesis, namely, that a greater intensity of productive innovation will be found in a more virtuous society in which there is a higher prevalence of the virtues of prudence, of fortitude and temperance, with their implications for self-confidence and trust in others, as well as of justice and of open life horizons. The considerations in the previous sections give us an idea of some of the connecting mechanisms at play. When it comes to explaining productive innovation, among other factors, we have to take into account a set of interlinked noetic and moral virtues. Ordered and systematic intelligence counts, as do (and very much so) aesthetic intelligence, with its attention to the beauty (inner coherence, harmony) of a job well done, and effort and continuity in one's studies. The feeling of self-confidence also counts, reflected in emancipation at an early age, which may be associated with lower risk-aversion, in other words, greater courage or fortitude and perhaps avoidance of the excesses of vanity and ostentation, interpretable as intemperance and lack of self-control. Another factor that counts is a set of indicators regarding trust in others, linked to a sense of justice and the desire to live in a world in which justice is done and issues related to a common good are given due importance. Finally, the widening of circles of sociability also counts, measured with indicators of trips abroad or tolerance for exotic tastes or people.

A framework of virtues, and the common cultural factor of a virtuous character

The conclusion reached after analyzing the evidence, indicator by indicator and virtue by virtue, is supported by a factor analysis highlighting the complementarity of these virtues and their interlocking as if they all related to a single moral cultural factor. This points precisely to a relatively consistent virtuous moral character, to the plausibility of a unified virtue, perhaps along the lines of the Enlightenment tradition of moderate, reasonable individualism combined with a fair dose of love or altruism, as mentioned above (the "more-than-prudence" McCloskey [2006] refers to), or perhaps along lines that question or go beyond that modern tradition, and point to a world of mainly local social milieus that would operate within and without the nation-states, and that would be sort of inheritors to a larger and older Classical and Christian tradition (MacIntyre 1990).

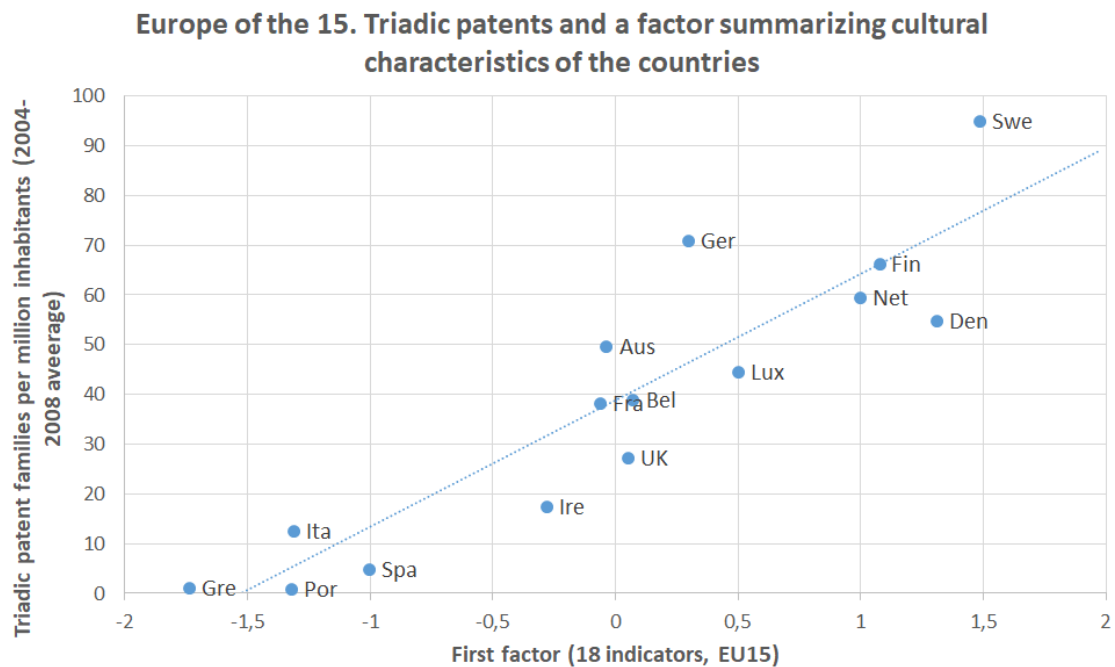
In Pérez-Díaz and Rodríguez (2010) we argued that the cultural features in young people that were most associated with innovation were highly interrelated, forming a cultural core that was reducible, grosso modo, to a single dimension or statistical factor. Applying the same technique we used then, that of a factor analysis,¹⁰ applied this time to a set of 18 indicators measured for the adult population, we have obtained a very similar result. The first of the three factors extracted suffices for summarizing the information as it accounts for 71.5% of the variance in the indicators analyzed.

The correlations of this common, unified factor with the original variables (see table 1) suggest that it adopts high values if there are high levels of intellectual capacity, creative skills, open horizons, self-confidence and trust in others, as well as active engagement with a community,

10. We have applied the principal components technique. The analysis is based on a correlation matrix with a maximum of 25 iterations for convergence, without rotation. Information has been gathered on factors with an eigenvalue greater than 1.

and this also happens when uncertainty avoidance and power distance are low. This intimates that all those cultural features are part of a sort of cultural syndrome, in which there seems to be mutual reinforcement of a collection of habits and dispositions. Obviously, the relationship between the score for this first factor and the triadic patent rate is positive and substantial ($r=0.90$) (figure 1).

Figure 1



Source: same as Table 1.

Three Europes: Nordic, Central and Mediterranean

Contrary to much too somber expectations on the morality of advanced modern societies, some of them seem to have developed various and interconnected virtuous dispositions which result in attaining, at least, a widely shared moral good such as productive innovation. Yet, virtues and innovation capacity are not shared equally among nations. In fact, within Western Europe, countries may be ranked in three fairly differentiated segments according to their moral culture and their innovation capacity.¹¹

The upper segment is made up of three Nordic countries such as Sweden, Denmark and Finland, together with the Netherlands; they seem more virtuous and with a greater propensity to innovate than the rest. The intermediate segment includes three countries which are prominent in terms of demography, wealth and power, and are usually seen as forming Europe's core: Germany, France and the United Kingdom. They come together with smaller countries which are geographically, historically and culturally close to them: Austria (to Germany), Belgium (to France), Luxembourg (to France and Germany), and Ireland (to the United Kingdom). In the lower segment, we find the Mediterranean countries, Spain, Italy, Portugal and Greece. Their moral and innovative performance seems lower. They are also

11. Our grouping is close to the one found in Pryor (2007).

somehow used to look to other European countries as their role models, regarding which we conclude with a practical suggestion.

Euromediterranean countries have usually taken as a model the core countries of intermediate Europe, which are nearer to them, and more ostensible to imitate. Alternatively, they might rather look at the Nordic countries, farther away and less visible, but probably of more interest to them, as they could reconsider the rationale for choosing their models. Instead of betting for models in terms of status, wealth and power, and try to emulate countries such as the big three European countries, they could try to follow the more modest Nordic countries, models of virtue, which in the present circumstances comes hand in hand with considerable levels of wealth. Next, they could ask themselves why success in the promotion of a country to a position of centrality in the system of nation-states and in the world market does not necessarily translate into that country becoming a model in virtue, nor, therefore, in innovation, as much as could be expected. This points to a discussion which we cannot develop here but hope to develop along the lines we have argued so far.

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