

The Shift Towards a Digital Culture? Postindustrialism, Values, and Digital Fitness

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Abstract

Whereas Inglehart and Baker (2000) try to show the relationship between economic development and systematic changes in basic values, this paper attempts to test the existence of a relationship between a certain set of values and “digital economic fitness” in a changed global economic environment now dominated by digital technology. Digitalization has impacted political agency, economic and social participation, as well as cultural parameters, and as a consequence individual behavior. Social norms and values, the argument goes, have altered the establishment and impact of social networks. Whether those values seem to translate into national “digital cultures,” or put differently whether certain values seem to be clustered more strongly within some countries than within others or whether they tend to balance each other out. Before we can look at the aggregate nation-level, we must establish a clear relationship between individual attitudes and a culture leading to a society better equipped for the “Digital Economy” and do so by investigating data from the latest waves of the World Value Survey and European Values Survey conducted from 2002-2014.

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Introduction

The concept of political culture contains that the values, beliefs, and skills of the public significantly impact the politics of societies, particularly their (democratic) institutions. The evolution and persistence of mass-based democracy requires the emergence of certain supportive habits and attitudes among the general public (Almond and Verba 1963; K. L. Baker, Dalton, and Hildebrandt 1981; Eckstein 1964; Inglehart and Baker 2000; Pye and Verba 1965). This paper argues that the same holds true for the evolution of economic development of nations in a globalized digital economy. Successful competition in the modern world economic system seems to be associated with certain supportive habits and attitudes as well. This does not imply that all wealthy (as well as poor) countries are alike: several attitudinal elements in unique national combinations characterize countries within similar developmental stages. Another note of caution relates to the casual link between culture and development. Does economic development change the cultural landscape of nations or does the cultural setting of a country constitute the basis of its economic development, as Max Weber has proposed? A reciprocal relationship seems most likely, although the historical development of cultural institutions, both formal and informal, remains an important factor both for the translation of cultural traits into economic activity as well as perceptiveness of national institutions to change (Inglehart and Baker 2000).

Whereas Inglehart and Baker (2000) aim to show the relationship between general economic development and systematic changes in basic values, this paper attempts to test the existence of a relationship between a certain set of values and economic fitness (analogous to the concept of economic fitness proposed e.g. by Hidalgo and Hausmann 2009) for a digital and networked

economic environment, what we call “e-fitness”¹. The paper also tests whether those values seem to translate into common “national cultures,” or more accurately, whether certain values seem to be clustered more strongly within some countries than within others or whether they tend to balance each other out. In addition, it also wants to test, whether those values are clustered within or across generational cohorts. This paper therefore takes a two-step approach: before we can look at the aggregate nation-level, we must establish a clear relationship between individual values and e-fitness. After establishing this micro-macro-level link, we identify cross-national differences that leave some countries better equipped than others to meet the challenges of a transition to a new economic environment dominated by digital and network technologies, identifying value clusters that characterize in specific national contexts—for which we use the shorthand “culture”—investigating data from various waves of the World Value Survey (WVS 2017) and data from the World Economy Forum (WEF) from their Global Information Technology Reports that aims to capture resource- and institutionally based e-fitness (Baller, Dutta, and Lanvin 2016; Kirkman et al. 2002).

Development and Culture

The incompleteness of models of economic development that ignore cultural factors has been evident for quite some time. Religion in particular remains an important factor in shaping the behavior and agency on all levels of analysis (R. McCleary and Barro 2003; R. M. McCleary and Barro 2006). The continued importance of religion in both, developing countries and advanced industrialized democracies for political behavior is one indication; while social class voting seems to be receding, religious cleavages remain well and alive. Other factors, in particular those affecting levels of trust and participation in society, have long been shown to play an important role in facilitating or hindering economic development (Putnam 1993). This paper follows Inglehart’s (1989) argument that different societies are characterized to very different degrees by a specific syndrome of relatively enduring (but not immutable) political cultural attitudes that in turn have major political consequences. However, these cultural characteristics do not only affect political institutions. They also affect the economic development of those countries, in part as a result of their impact on the political institutions but in part also as a direct consequence on the varying national economic structures (Alesina and Giuliano 2015).

Industrialization, Modernization or Cyberculture?

Well into the twentieth century, modernization—here understood as the adaptation to a changed global social-economic environment—was widely viewed as a uniquely Western process that non-Western societies could pursue only in so far as they abandoned their traditional cultures and assimilated technological “superior” Western traditions (Lerner 1958; Weiner 1966). Beginning in the 1960s, a school developed that argued that democracy was the crucial factor for economic development. Martin Seymour Lipset is attributed with what has become known as

¹The concept of “e-fitness” combines the attributes of “e-readiness” and “network readiness.” We use the term “fitness” analogous to the conceptualization found in Hidalgo and Hausmann (2009), who argue that “the productivity of a country resides in the diversity of its available nontradable ‘capabilities,’ and therefore, cross-country differences in income can be explained by differences in economic complexity, as measured by the diversity of capabilities present in a country and their interactions” (10570). The term e-readiness has established itself since 1990 with a clear uptake since 1998 (see <https://goo.gl/Z6zxfx>) as the main term for capturing the factors generally attributed to the successful participation in the digital or internet economy (Alaaraj and Ibrahim 2014; Bui, Sankaran, and Sebastian 2003). After a maturation of e-businesses since the 2000s and an increased emphasis on network attributes, the term “network readiness” has gained more prominence in the development of indicators (Altmann, Heshmati, and Al-Athwari 2017).

“modernization theory” when he discovered a broad and multistranded relationship between economic development levels and democracy (Seymour Martin Lipset 1960, ch. 2). This view of course has been challenged since (Bradshaw and Wallace 1996; Chase-Dunn 1998; Chirot 1994; Evans 1979; Frank 1966; O’Donnell, Schmitter, and Whitehead 1986; Wallerstein 1974). Although cross-national studies of the effects of democracy on economic development seemed inconclusive (Leblang 1997; Sirowy and Inkeles 1990), others remained what they identified as strong theoretical grounds for expecting that political participation, liberty, accountability, and pluralism “would be conducive to economic achievements by industrious persons, particularly entrepreneurs,” and to improvements in basic human needs as well (Sklar 1987, 709, 711). Others, however, have pointed out that democracies are not necessarily more efficient economically, more efficient administratively, and form more open economies than other forms of government (P. C. Schmitter and Karl 1991).

This however leaves open the question why there continues to exist a wide range of economic models and levels of economic success even among established democracies. The comparative development strategy literature has explored the economic motivations and consequences of diverse actors including the state, capital and, to a lesser degree, labor. Scholars have fruitfully compared newly industrialized countries (NICs) in Asia and Latin America and offered explanations for regional differences in economic strategy and performance (Bates 1997; Gereffi and Wyman 1990; Haggard 1990). The central claim of modernization theory is that economic development is linked with coherent and to a certain extent predictable changes in culture and social and political life [TODO: look up modernization literature in Inglehart and Comparative Oxford. Reader]. Bell (1999, see also 1978) and Dahrendorf (1959) have shown that changes in the socio-economic paradigm have led to major political and cultural consequences. Inglehart (1989) has argued that this has given rise to an intergenerational shift and the development of postmodern and postmaterialist values. This paper suggests that rather than looking at democratization as the crucial factor for economic development, the underlying cultural setup of countries is a better explanatory variable to determine a countries economic fitness in a changing economic environment.

Culture and Institutions

Political culture studies are enjoying a renaissance (Jackman and Miller 1996) of academic interest (Dalton 2000; Inglehart and Welzel 2005; Putnam 2000; Reisinger 1995; Tarrow 1996). As Jackman and Miller (1996) pointed out, cultural differences drive significant elements of political and economic life. In their test that (1) effective governance hinges critically on traditions of civic engagement; (2) political culture fundamentally drives economic performance and democratic stability, they find little empirical evidence to indicate a systematic relationship between political culture and political and economic performance. Inglehart and Baker (2000) look at the relationship between culture and economic development but argue a different causal relationship. They find evidence of both massive cultural change (convergence of values) and the persistence of distinctive cultural traditions. They argue that that economic development is associated with shifts away from absolute norms and values toward values that are increasingly rational, tolerant, trusting, and participatory. Cultural change, however, is path dependent; thus historical development leaves an “imprint” on values that endures modernization. In a similar fashion, North (2003) argues that norms play a critical role in constraining the choice set at a moment of time and in the evolution of institutions through time. It is thus important to look at the underlying values, as well as attitudes, and economic “cultures” and various domestic institutional settings filtering and translating these values and attitudes into domestic and international policies.

This lends support to our earlier argument of a reciprocal effect between economic development and cultural environments and explains why we are able to identify distinct national societal arrangements despite common cultural changes, sometimes referred to as modernization. These differing cultural contexts are captured in the unique institutional national settings resulting in differently structured economies as well.

The involvement of national governments in the economic structure of both the domestic and international economies is manifested in many ways. Governments might be directly involved as economic actors through majority or minority ownership of corporations. Governments, however, play a significant—if not even more important—role in many other ways. By channeling the allocation of important scarce resources through the creation of regulatory frameworks to certain sectors (and thus denying them to others), they create an economic environment that allows certain actors to gain more influence over the allocation of scarce resources than others and thus to distort the market mechanisms of a given economy (both positively and negatively). This in turn creates different domestic economic settings that compete against each other on a regional and ultimately global scale within one existing world system.

As Putnam (1988), Bates (1989) and others (Frieden 1991; Gourevitch 1986; Rogowski 1989; Simmons 1994; Verdier 1994) have shown, the policy choices of nations are not just a function of the preferences of elite-level players, and thus of the payoffs they assign the outcomes resulting from these choices. They are also affected by the constraints these players experience. Thus, without information about the domestic politics of the nations, we cannot fully understand their behavior within the world-system level. If we would accept Bates' conclusion that "the policies of nations toward the international marketplace are not defined . . . by the nation's location in that environment [but rather] are defined domestically, and in a political process that is structured by institutions" (Bates 1997, 8) it would be sufficient to study only the domestic structure and the translation of domestic preferences into policies.

This view, however, ignores the reciprocal relationship between the position in the world system environment and the domestic environment of actors. It does, indeed, matter whether countries are "catching up" or defending a lead position. As Olson (1982) has shown, the interest of organizational leaders insures that only a few organizations for collective action in stable societies will dissolve and as a result, these countries will accumulate entrenched special-interest organizations over time. Far from developing incentives to make the societies more productive as a whole, these distributional coalitions have instead powerful incentives to seek a larger share of the national income even when this greatly reduces social output. As a consequence, barriers to entry, increases in regulation, bureaucracy, and political intervention in sectors and markets established by these distributional coalitions, in combination with their slowness in making decisions and mutually efficient bargains reduces the dynamism and rate of growth of the entire country (Olson 1982). In other words, established leading countries, but also countries trying to catch up to a perceived rival lead economy (and its leading sectors) will have far more highly organized interests defending the status-quo than challenger states that hinder the allocation of resources to new, more productive sectors and their development. New economic sectors, then, should be more easily developed in countries without these entrenched interests or in settings where these coalitions have less leverage over the domestic political environment.²

Thus, we need to address the following questions: How important are the existing values in the domestic environment for innovational development? How important are institutional structures for the creation and development of new economic sectors? In other words, is the

²A third explanation, of course, would be the case, where the entrenched coalitions are not acting because they perceive no threat from the newly developing sector. This, however, is rather unrealistic, since newly developing sectors with high-growth potential are unlikely not to be perceived as "a threat" by these collations.

economic “fitness” of countries a result of its position within the world system (challenger, leader, hinterland)? Or is there, in the words of Mancur Olson, an “institutional comparative setting” (Olson 1982) that allows some countries to achieve more innovations and growth in leading sectors than others? If so, what would the optimal setting for the development of the new leading sector in the world economy be?

Economic Change and the Rise of a Postindustrial Values

Both changes of the role of information and networks in the domestic economies as well as global economy have led to the development of a newly emerging economic framework. The new global economic paradigm is characterized by the digitalization of economic processes and goods, as well as a change in the role and structure of information and its application together with an increased importance of creativity of human resources in the value-adding process. This changed environment can be summarized as the “informational network economy” (Rennstich 2002). If we do accept the assumption that technological change (i.e., clusters of innovations leading to the creation of new leading sectors) drives not only the global political economy (Freeman and Perez 1988; Freeman and Soete 1997; Modelski and Thompson 1996; Perez 2002; Rennstich 2008; Thompson 2000) but also domestic economic and political environments, we would expect to find the corresponding change in attitudes (if not values) to be manifested in the domestic arena as well. Thus, we should be able to identify a “postindustrial value attitude” (if not cleavage) in those countries most successful in the development of the newly emerging leading sector (i.e., informational networking).

As Seymour M. Lipset and Rokkan (1967) have shown in their study of developments of party systems in Europe, the major cleavage structures characterizing the political landscape in modern democracies are grounded in the developments of three historical phases (Reformation; Democratic Revolution; and Industrial Revolution) and direct products of what they term the “National Revolution” resulting in four critical lines of cleavages: center versus periphery and church versus state. The Industrial Revolution resulted in the emergence of urban versus rural and worker versus owner cleavages. What is also important, they identify a time lag between the emergence of those cleavages and the development and manifestation of party-systems. What is important for the context of this paper is the likelihood of the emergence of new cleavages as a result of a possibly forth historical phase (coinciding with the emergence of a new long cycle somewhere around 1970), the “Digital” or “Postindustrial Revolution,” resulting from technological, social, and economic changes comparable only to those of the Industrial Revolution. We would thus expect a change in the development of the political institutional setup, mainly in the form of changes in the political party system and a shift in mass political behavior as a result of this Digital Revolution. Several developments suggest that this is indeed the case.

Political parties are without question the most important link between domestic—not necessarily mean voter³—preferences and policy choices. Today, however, many authors point out to evidence indicating a declining role for political parties in shaping the politics of advanced industrial democracies combined with decline in party identification (Dalton and Wattenberg 2000). Inglehart has argued for some time that this dealignment is in fact a result of changing structures of political cleavages in western societies (Inglehart 1977, 1997). He argues that the polarization between materialist and postmaterialist issue preferences approaches now the salience of the preferences resulting out of the industrial revolution cleavages. In addition, Inglehart finds evidence for a new group polarization that exists alongside the familiar working

³For the classical debate on “special” or organized interest influences see Olson (1965).

class versus middle class polarization (Inglehart 1984). In other words, the expected change in the institutional framework of countries is indeed taking place.

A number of authors have pointed to an increase in issue-voting independent from conventional cleavage structures (Franklin, Mackie, and Valen 2012). It might well be that the rise of issue-based voting, made possible by the increased sophistication of voters as political actors as a result of the social and economic changes associated with the digital or postindustrial social and economic revolution does not indicate the rise of one or more issues as new cleavages but instead is a reflection of a new cleavage of postindustrial knowledge-workers and industrial workers (including services from the industrial period) or put differently the divide between informational haves and have-nots. In other words, not only the institutional setup, but also the political mass behavior is changing and does so in a large number of countries where democratic structures have been formerly established (Dalton 2000). Thus, in order to get a better understanding of the changes taking place it is important to study the underlying values and attitudes that will determine the domestic preferences (micro-level) which will be translated into issues (mezzo-level) and finally into policies (macro-level) in order to identify a “attitudinal” or “cultural comparative advantage.”

Using data from the World Values and European Values Surveys, this paper tests the question of whether there exists a relationship between the development of new leading sectors and domestic political and economic institutional settings. In order to do so, we look at the cultural environment (independent variables) on the one side and the economic environment at the other (dependent variable). To test the existence of a cultural competitive advantage (Beugelsdijk, Klasing, and Milionis 2017) we use several indicators from the combined World Values and European Values Survey and look for evidence of a postindustrial versus industrial “mindset” of countries that affects its ability to foster (or hinders) the development of the newly evolving leading informational networking sector.

Data and Measurement

This research uses the combined World Values Survey (WVS) (WVS 2017) and European Values Surveys (EVS) (EVS 2015) data to measure postindustrial attitudes in combination with data from the Network Readiness Index (NRI) by the World Economic Forum (Baller, Dutta, and Lanvin 2016) which represents measures that allow to assess countries’ preparedness to reap the benefits of emerging technologies and capitalize on the opportunities presented by the digital transformation and beyond to measure the Informational Network economy fitness of both, developed and less developed nations.⁴

The WVS and EVS are coordinated efforts of data collection in 112 countries and regions, 104 of which are examined in this paper in the total combined dataset.⁵ The choice of waves four

⁴For more information on the composition of the NRI dataset, see <http://reports.weforum.org/global-information-technology-report-2016/1-1-the-networked-readiness-index-2016/>. In existence since 2001 (Kirkman et al. 2002), the NRI has been adapted over time in terms of included measurements and weights has in line with the evolving shape of the informational network economy. Countries are assessed over four categories of indicators: (1) the overall environment for technology use and creation (political, regulatory, business, and innovation); (2) networked readiness in terms of ICT infrastructure, affordability, and skills; (3) technology adoption/usage by the three groups of stakeholders (government, the private sector, and private individuals); and (4) the economic and social impact of the new technologies. Whenever relevant, the Index looks at what the different actors in society, both private and public, can do to contribute to the country’s networked readiness. See Baller, Dutta, and Lanvin (2016) and especially the Appendix for more detailed information on the creation of the dataset.

⁵The World Values Survey (www.worldvaluessurvey.org) is a global network of social scientists studying changing values and their impact on social and political life, led by an international team of scholars, with the WVS association and secretariat headquartered in Stockholm, Sweden. The survey, which started in 1981, seeks

to six (WVS) and the fourth EVS wave is a result of the hypothesis we want to test: is there a relationship between the cultural makeup of countries and their preparedness to compete in the informational network economy? In evaluating the general business environment in any of countries under study, the NRI data combines information on the political and regulatory, as well as business environments relevant for the informational network economy, including skills, affordability and usage by all core stakeholders, as well as their economic and social impacts regarding the e-fitness of a society based on a broad measure.

In order to test this relationship we have decided to pool all individual responses across survey waves, tying information on the year in which the individuals were interviewed to the corresponding value of the NRI for the respondent’s country. This resulted in a loss of countries under study given the more limited number of countries investigated in the NRI dependent variable, ranging from 75 to 148 countries with data for any given year. Building on previous research utilizing WVS/EVS data, the paper examines the relationship between indicators assessing publics’ materialist-postmaterialist value-dimension (Inglehart and Welzel 2005) and the e-fitness of countries and introduces a new alternative dimension, that allows a more accurate measure of cultural and behavioral attitudes and their relationship with “readiness” for the information network economy.

Micro-macro link between post-materialism and socio-economic development

As mentioned earlier, the political culture literature argues that the evolution and persistence of mass-based democracy requires the emergence of certain supportive habits and attitudes among the general public (Inglehart 1988, 1204). Here we hypothesize that this proves correct not only for mass-based democracy, but also for certain forms of economic fitness (Guiso, Sapienza, and Zingales 2006). If the new economic paradigm stresses the importance of the human factor in the wealth creating process, differences in attitudes will be crucial for the development of a comparative advantage of economies (Alesina and Giuliano 2015). Interpersonal trust is a prerequisite to the formation of secondary associations, which in turn is not only essential to effective political participation in any large democracies (Almond and Verba 1963), but also essential for the establishment of successful modern mass economies (North 1981). In addition, Inglehart (1988) argues that life satisfaction also constitutes a major part of the political culture that is the crucial link between economic development and democracy.

Table 1: Traditional/survival and secular/self-expression dimensions, democracy and HDI

	Model 1 HDI	Model 2 HDI
<i>Intercept</i>	-2.758*** (0.349)	-4.203*** (0.340)

to use rigorous, high-quality research designs in each country. The WVS consists of nationally representative surveys conducted in almost 100 countries which contain almost 90 percent of the world’s population, using a common questionnaire. Analogous to the WVS, the European Values Study is a large-scale, cross-national, and longitudinal survey research program on basic human values. Starting in 1981, it provides insights into the ideas, beliefs, preferences, attitudes, values and opinions of citizens all over Europe. Every nine years, the survey is repeated in a variable number of countries. The fourth wave in 2008 covers 47 European countries/regions, from Iceland to Georgia and from Portugal to Norway. In total, about 70,000 people in Europe are interviewed. The WVS in combination with the EVS are the largest non-commercial, cross-national, time series investigations of human beliefs and values ever executed, currently including interviews with almost 400,000 respondents. Moreover the WVS is the only academic study covering the full range of global variations, from very poor to very rich countries, in all of the world’s major cultural zones. The actual number of responses to some of the questions differs at times, depending on the survey wave and country surveys. This yields a relatively high number of non-responses (NAs) in some countries for some of the items used in the analysis presented here, skewing the results somewhat for those countries when creating averages for responses grouped by country.

	Model 1 HDI	Model 2 HDI
TRADITIONAL VALUES VERSUS SECULAR-RATIONAL		
Importance of God in your life	-0.006*** (0.000)	-0.005*** (0.000)
Autonomy Index	-0.013*** (0.001)	-0.012*** (0.001)
Justifiable: abortion	0.002*** (0.000)	0.002*** (0.000)
How proud of nationality	0.018*** (0.001)	0.016*** (0.001)
Future changes: Greater respect for authority	-0.000 (0.001)	.001 (0.001)
SURVIVAL VERSUS SELF-EXPRESSION		
Post-Materialist index 4-item	0.005*** (0.001)	0.003** (0.001)
Feeling of happiness	-0.005*** (0.001)	-0.002** (0.001)
Political action: signing a petition	-0.016*** (0.001)	0.008*** (0.001)
Justifiable: homosexuality	0.007*** (0.000)	0.004*** (0.000)
Most people can be trusted	-0.016*** (0.002)	-0.020*** (0.002)
Country/region	-0.000*** (0.000)	-0.000*** (0.000)
Year survey	0.002*** (0.000)	0.002*** (0.000)
Sex	0.014*** (0.001)	0.012*** (0.001)
Age group	0.024*** (0.000)	0.021*** (0.000)
Education level	0.021*** (0.001)	0.023*** (0.001)
POLITY2		0.008*** (0.000)
<i>R-squared</i>	0.221	0.285
<i>N</i>	33906	33419

Table 1 lists the empirical evidence supporting this expectation. Using the dataset we have constructed from the combined WVS/EVS surveys, we are testing for the hypothesized relationship between cultural dimensions and socio-economic development, using a widely-used measure of socio-economic development, the UNDP's Human Development Index (HDI), which attempts to reflect human well-being and development experiences of people as individuals, and members of a community, state or nation beyond per capita income or any of its variant (Jahan 2002; for a more detailed discussion of the dataset and its historical evolution since its introduction since 1990, see Mahajan 2013).

The analysis presented here—using simple linear model regressions⁶—presents the two main dimensions identified by Inglehart and others (see discussion that also highlights alternative measures in Minkov 2013) that make up the “postmaterial” value space. Model 1 of Table 1 correlates the two main dimensions of traditional values versus secular-rational and survival versus self-expression values in addition to a number of control variables (country, gender, age group, and education level of respondent) to the respective HDI values for each respondent’s country. Model 2 includes also the Polity2 score (Marshall, Gurr, and Jaggers 2017) as an additional control variable to reflect the level of democratic or autocratic governance environment of a respondent. The results are in line with what we expect and what was shown in previous analysis using data from earlier waves. The question we turn to now is whether the same dimensions help us explain a relationship between e-fitness and cultural positions that individuals inhabit.

Micro-macro link between individual attitudes and e-fitness

One of the unique advantages of the WVS data is the ability to test the hypothesis of the existence of a link between individual attitudes and fitness in the new informational network economy as opposed to simply aggregated data on the national level. In order to employ aggregated data for a comparison by country we must first establish an individual link between the micro level (individual attitudes) and the macro level (e-fitness) before we can make any meaningful inferences from the aggregated data.

We would expect that (H1) high levels of trust and (H2) positive life satisfaction are prerequisites for high levels of economic fitness in the new economic paradigm.

H1 High levels of trust are positively correlated to high levels of e-fitness

H2 High levels of happiness are positively correlated to high levels of e-fitness

We also test Inglehart’s thesis that the former “Protestant work ethic” in many advanced Western countries with its stress on predominately materialist priorities has been replaced in many parts by postmaterialist goals and values. However, in opposition to Inglehart’s argument of postmaterialists as “economic underachievers” we argue here that these observed changes in attitudes if measured as an industrial-postindustrial rather than material-postmaterial attitudinal change are in fact necessary (but not sufficient) changes that determine success in the new information network economy. Similar to the dimensions Inglehart and Baker (2000) discover in their survey of modernization and cultural change, we argue here for a combination of the two along the single value dimension industrial (traditional/survival) versus postindustrial (secular/self-expression). Following in the tradition of Max Weber and Inglehart and Baker (2000) who utilized dominant religious tradition as an indicator of preindustrial cultural heritage, religious attitudes are used as an indicator for industrial/postindustrial values. However, we do not distinguish between different religious traditions but rather employ the question of “importance of God in your life”—which has been shown to represent as a single variable levels of religiosity—as a single indicator of “traditional” (industrial) value dimension in combination with a set of variables—concern about children’s education, attitudes towards science and technology, importance of friends over family, and the number of children—that stands in contrast to the survival/self-expression dimension, replacing the traditional/secular-rational value dimension as the key dimension explaining societal e-fitness. The expressed religious traditions should be negatively correlated with high levels of e-fitness (H3).

H3 High levels of religiosity are negatively correlated with high levels of e-fitness

⁶All the analyses presented here have been tested with several methods and the usual robustness tests, leading to highly similar results.

By contrast, values of self-expression (indicators of postindustrial attitude) should be positively correlated to e-fitness (H4).

H4 Self-expression variables are positively correlated to e-fitness

With the increased emphasis on advanced technological developments in the new economic environment, we would also expect a positive correlation between support for technological development as societal goal and our e-fitness measure (H5).

H5 Positive attitudes toward science and technology are positively correlated with higher levels of e-fitness

In sum we argue, that Inglehart’s materialist-postmaterialist indicator as employed in the WVS/EVS data captures the cultural change from industrial to postindustrial attitudes only partially. In order to get a better hold on the polarization between traditional/survival versus secular/self-expression cleavage we created an alternative dimension by adding our hypothesized indicators for industrial/postindustrial attitudes (expressed attitudes towards the importance of friends and religion, as well as the level of trust in other people and the support for technological development and educational attitudes) to the materialist-postmaterialist measures computed from the WVS/EVS waves in our dataset.

Table 2: Traditional/survival and secular/self-expression, network dimensions, NRI

	Model 1 NRI	Model 2 NRI	Model 3 NRI	Model 4 NRI
<i>Intercept</i>	7.597*** (2.247)	277.556*** (10.077)	129.819*** (5.857)	117.582*** (10.574)
TRADITIONAL VALUES VERSUS SECULAR- RATIONAL				
Importance of God in your life	-0.045*** (0.002)	-0.021*** (0.003)	-0.051*** (0.001)	-0.019*** (0.003)
Autonomy Index	-0.075*** (0.008)	-0.067*** (0.012)		-0.060*** (0.011)
Justifiable: abortion	0.011*** (0.002)	0.016*** (0.002)		0.005* (0.002)
How proud of nationality	0.083*** (0.006)	0.046*** (0.009)		0.048*** (0.008)
Future changes: Greater respect for authority	0.061*** (0.006)	0.006 (0.009)		0.014 (0.009)
SURVIVAL VERSUS SELF- EXPRESSION				

	Model 1 NRI	Model 2 NRI	Model 3 NRI	Model 4 NRI
Post-Materialist index 4-item	0.025*** (0.006)		0.018*** (0.005)	-0.005 (0.009)
Feeling of happiness	-0.073*** (0.005)		-0.008* (0.004)	-0.005 (0.007)
Political action: signing a petition	-0.142*** (0.005)		-0.146*** (0.004)	-0.123*** (0.007)
Justifiable: homosexuality	0.023*** (0.002)		0.036*** (0.001)	0.018*** (0.002)
Most people can be trusted	-0.166*** (0.010)		-0.166*** (0.007)	-0.172*** (0.014)
INDUSTRIAL VERSUS POSTINDUSTRIAL				
Worries: education of own children		0.113*** (0.005)	0.110*** (0.003)	0.113*** (0.005)
Science and technology provide more opportunities for next generation		-0.022*** (0.002)	-0.008*** (0.001)	-0.020*** (0.002)
How many children do you have		-0.017*** (0.004)	-0.020*** (0.002)	-0.016*** (0.003)
Important in life: Friends		-0.054*** (0.007)	-0.061*** (0.004)	-0.042*** (0.007)
Country/region	-0.000 (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
Year survey	-0.002 (0.001)	-0.136*** (0.005)	-0.062*** (0.003)	-0.056*** (0.005)
Sex	0.037*** (0.007)	0.014 (0.011)	0.022*** (0.006)	0.025* (0.010)
Age group	0.084*** (0.002)	0.067*** (0.004)	0.064*** (0.002)	0.057*** (0.004)
Education level	0.042*** (0.005)	0.078*** (0.008)	0.045*** (0.004)	0.046*** (0.007)
POLITY2	0.013*** (0.001)	-0.000 (0.001)	0.026*** (0.001)	0.018*** (0.001)

	Model 1 NRI	Model 2 NRI	Model 3 NRI	Model 4 NRI
<i>R-squared</i>	0.187	0.177	0.397	0.245
<i>N</i>	30493	13190	38930	11578

Table 2 lists the relationship between the level of fitness for the informational network economy and magnitude of micro-level correlations for each predictor listed in the table. Nearly all of the correlations are highly significant (at the .001 level), not surprising considering the large number of data points. Model 1 of Table 2 replicates the previous analysis shown in Table 1 using the original two dimensions of the post-material space and their possible correlation with levels of e-fitness, also adding the same control variables found in the previous analysis. Model 2 uses the first dimension (traditional vs secular-rational) and connects it to our proposed new dimensional industrial vs postindustrial measure. Model 3 uses the original second dimension (survival versus self-expression) and connects it to the our new dimension (industrial vs postindustrial). Note, that in Model 3 the measure for religiosity from the original traditional vs secular-rational dimension is added to the measures for the newly proposed industrial vs postindustrial dimension (see discussion below why). Model 4 adds all three dimensions together.

Models 1 and 2 explain roughly the same amount of variance as the models in (??). In fact, Model 2 of Table 2 explains slightly less variance than the original two postmaterial dimensions. Model 3 more than doubles the variance explained through the hypothesized two dimensions aiming to capture what we propose to be an industrial versus postindustrial space rather than a material-postmaterial one. Model 4 including all measures demonstrates the need to differentiate the expressions of the dimensions, as the various measures are seemingly capturing similar elements, thus explaining far less variance than Model 3 and featuring higher levels of multicollinearity.

Trust, life satisfaction, attitudes toward religion measuring industrial values and postindustrial values (“friends important”), as well as attitudes toward technological development are all moderately correlated with the level of economic fitness. Because of the way the questions are phrased in the WVS, negative values indicate a positive correlation with the e-fitness indicator. As expected, higher levels of happiness are moderately associated with higher levels of e-fitness, and the same holds true for the level of trust. This fits with Inglehart’s finding of a correlation between trust and life satisfaction and economic development (Inglehart 1988). A higher emphasis on self-expression values (“friends important”), our measure for postindustrial values, has a moderate impact on higher level of economic fitness. Our measure for industrial values (“God important”) shows a strong relationship. Those respondents aligning themselves along the traditional side of the cleavage tend to be situated in contexts less well equipped for the economic challenges of the informational network economy.

The negative sign of the attitude towards technology and science measure again is the result of the wording of the question and therefore indicates a positive, albeit much weaker relationship between e-fitness and support for technological development than expected. One explanation might be that those individuals favoring “technological advancement” understand it to be advancement in the industrial sense (machines for manufacturing, etc.) whereas individuals being more skeptical to this kind of advancement are those kind of “knowledgeworkers” that in fact produce technological advancement but do so with their own human skills instead of technological tools. In other words, the worker manufacturing cars in a factory favoring “advancement in technology” would represent more “industrial” technology, whereas the designer of phones associating technological advancement with industrial production in the same manner as the manufacturing worker will be more cautious of this kind of development.

Overall these findings lend (admittedly moderate) support to our assumption that there is indeed a link between individual attitudes and level of economic fitness for the informational network economy. We can thus turn to our aggregated data now and test whether industrial and postindustrial values cluster within countries or whether those attitudes tend to level each other out. In other words, are we able to identify countries that feature a more “postindustrial” or “industrial” culture? Are those postindustrial countries are indeed better equipped for the challenges of a changing global techno-economic paradigm?

Macrolevel Analysis: Satisfaction, Trust and e-Fitness

As pointed out earlier, Inglehart finds evidence for the stable relationship—relatively unaffected by economic swings—between high levels of satisfaction and prosperity (Inglehart 1988) but can we expect to find the same relationship between the development of a new economic environment and satisfaction with life? The data presented here are based on average values grouped by country. This obviously has drawbacks, as pointed out earlier, given the relatively high number of NAs in some countries for some of the questions asked and the availability of NRI scores for some of the countries under study. One should also be aware that the averaging of values especially in the NRI score potentially overemphasizes the score value for countries with fewer datapoints. With these caveats in mind, the analysis of the data is nonetheless helpful to draw conclusions about individual measures of our identified dimensions and their predicted relationship with values that reflect the e-fitness grouped by country.

Figure 1 plots the our indicator for life satisfaction on the y axis together with levels of e-fitness based on the NRI score grouped by country on the x axis. Higher values on the y axis represent lower values of happiness (the result of the wording of the question). Higher levels of e-fitness are presented on the right-hand side of the x axis, lower levels of left-hand side. The evidence as presented in Figure 1 points to the expected direction. The level of life satisfaction and levels of e-fitness are positively correlated, that is, lower levels of life satisfaction can be found in countries with lower levels of e-fitness. The results are skewed by some outliers that feature high levels of life satisfaction with relative low e-fitness scores (Ecuador, Mexico, and Qatar) and vice versa (Germany, Bahrain, Estonia and Lithuania, and to a lesser degree also Taiwan and Finland). These findings are congruent with earlier findings investigating the relationship between life satisfaction and general measures of economic development showing no simple linear relationship. In sum, we find some limited positive relationship between levels of satisfaction and level of e-fitness in the informational network economy.

Following Banfield (1958), Almond and Verba (1963), and Inglehart (1988) we now turn to the relationship between interpersonal trust and the development of a cultural context conducive to change into a new informational network society (i.e., network fitness). As Inglehart has shown, enduring intercultural differences do indeed exist in interpersonal trust and matter for the viability of democratic systems (Inglehart 1988). But is this also the case for the evolution of a new economic paradigm? As Putnam et al. (1983) have shown, this civic culture can have an enormous impact on the economic success of any given environment (regional or national). Figure 2 demonstrates, the relationship between interpersonal trust and fitness in the informational network economy is far more explicitly expressed than in the previous relationship. Higher values on the y axis correspond (again as a result of the wording) with lower levels of trust. As we would expect, higher levels of fitness correspond to higher level of interpersonal trust, again especially so at the top ranks of informational network fitness. Some outliers are remarkable; China and Viet Nam both feature relatively high numbers of personal trust coupled with relatively low scores of e-fitness, whereas Singapore and Taiwan feature the opposite relationship. This can be explained largely as the result of the importance

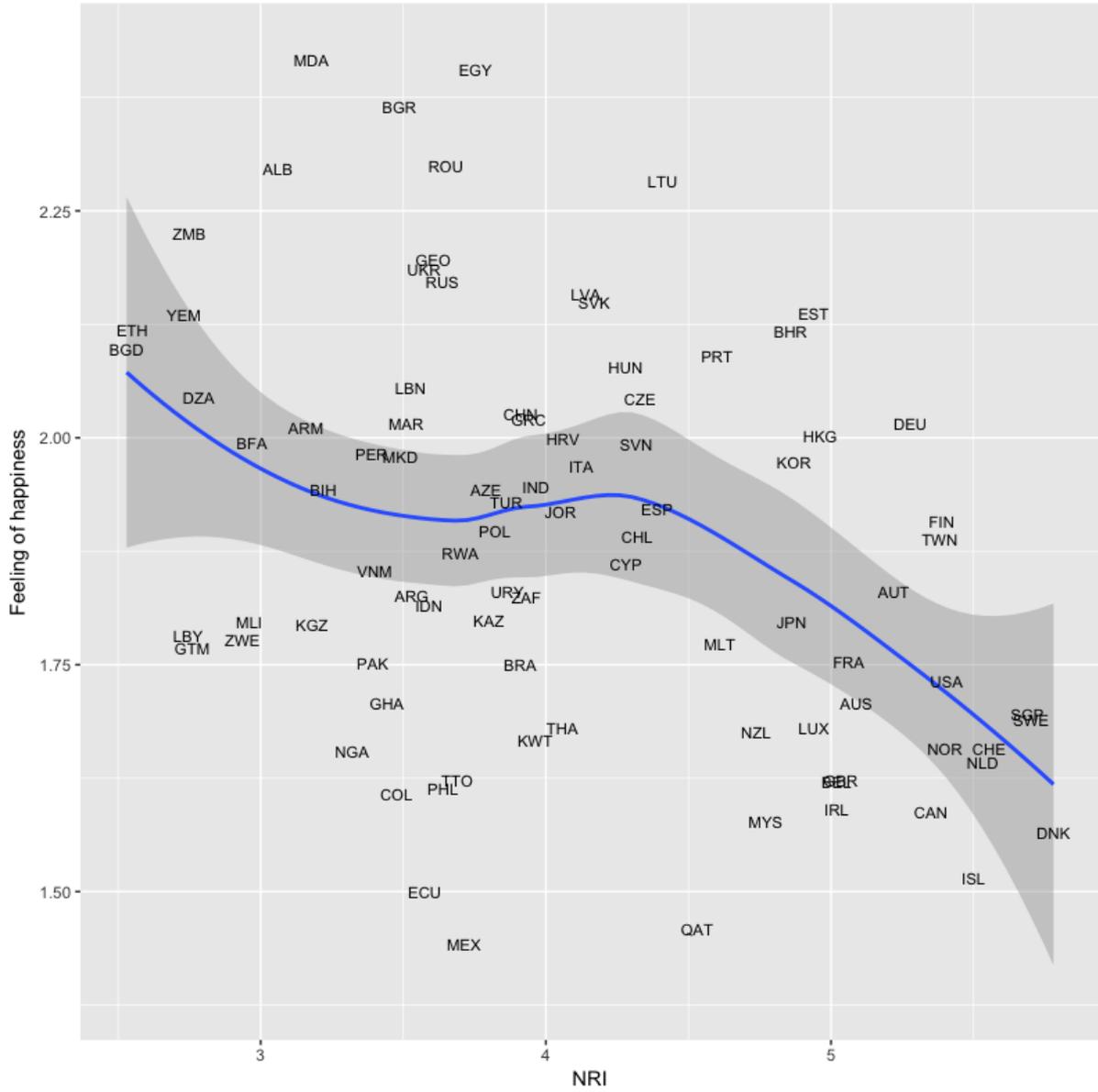


Figure 1: Life satisfaction and NRI value, mean values by country, 2002-2014

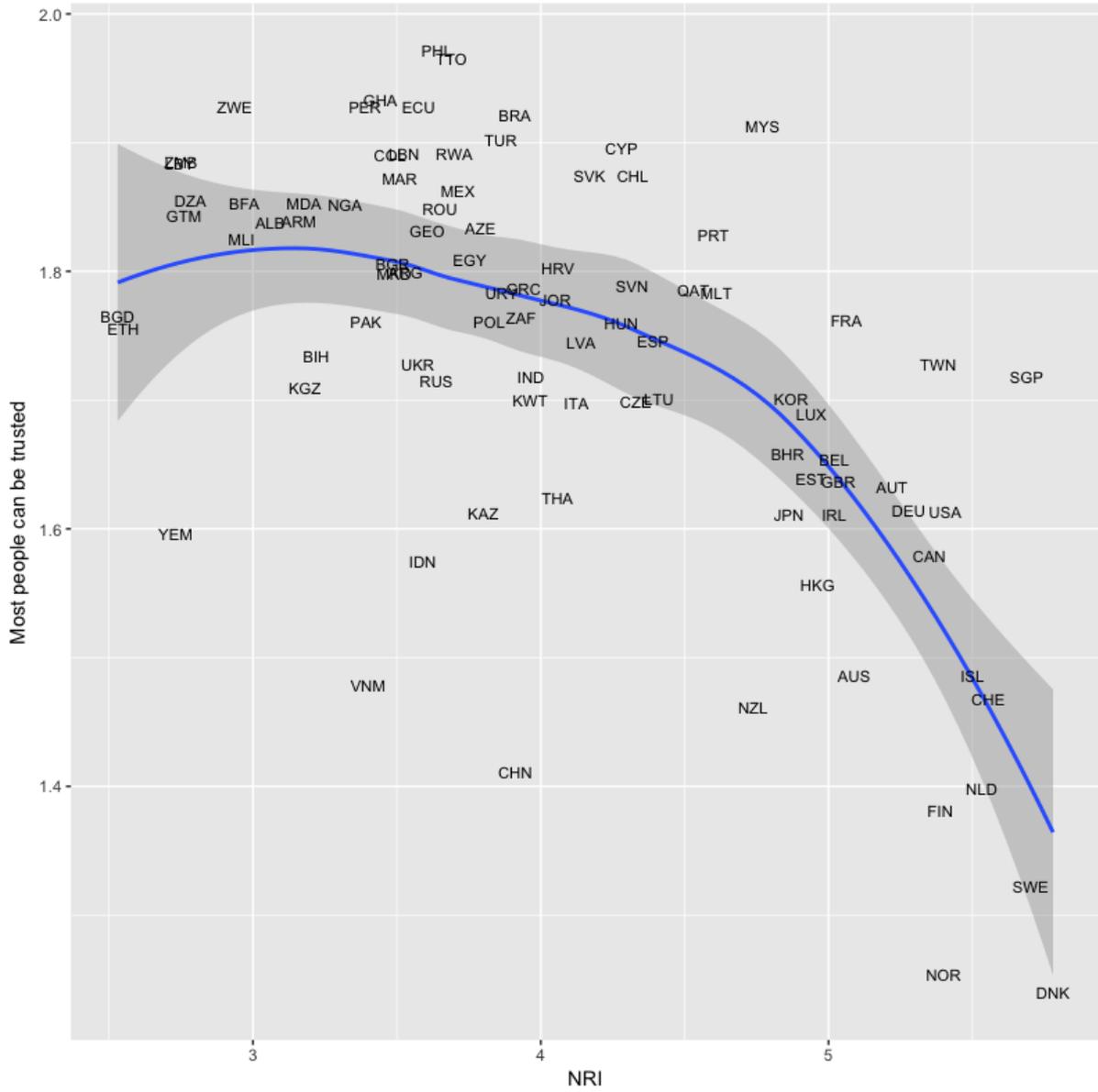


Figure 2: Level of trust and NRI value, mean values by country, 2002-2014

of institutional and infrastructure in the NRI score. The relationship is largely very much in line with previous findings and what we would expect.

Macrolevel Analysis: Postmaterialism, Postindustrialism, and e-Fitness

Figure 3 shows the relationship between attitudes toward science and technology and levels of e-fitness. Analogous to the previous graphs, higher levels on the y axis represent lower levels of positive attitude toward science and technology. The pattern that emerges is similar to the relationship between life satisfaction and e-fitness. Whereas countries with attitudes high in support of science and technology hover at the higher end of the e-fitness spectrum, countries scoring on the lower-mid level on the e-fitness level seem to be more skeptical of technological development. Some countries such as Russia, Azerbaijan, Kazakhstan, Poland and not surprisingly Rwanda tend to be far more supportive than what would be expected from their e-fitness score. Others, such as Bahrain, Singapore and Taiwan tend to be far more skeptical despite relatively high levels of e-fitness.

The development of postmaterialist values (as discussed earlier) might, as Inglehart points out, lead to an environment in which individuals place less emphasis on economic (i.e., industrial) growth and more on quality-of-life-aspects (such as personal fulfillment and environmental concerns). We would expect this attitudinal change to be conducive to the development of informational network e-fitness.

Figure 4 shows that this is indeed the case. Higher values on the y axis represent higher levels of the postmaterial score from the combined WVS/EVS score. The graph shows, that higher levels of postmaterial attitudes are clearly associated with higher fitness in the informational network economy.

The industrial-postindustrial index described earlier seems to be a much better predictor of the fitness in the informational network economy. As Figure 5 shows, the higher a country scores on the postindustrialist index, the higher it is ranked on the informational network fitness ranking. This relationship is almost linear.

Figure 6 further lends support to a need focus on a different dimension that combines levels of religiosity and social tolerance rather than separating them into two different dimensions. Analogous to that the findings shown in the previous chart, we find a near linear positive relationship between low levels of religiosity (reflected in high values on the y axis) and high levels of e-fitness.

Conclusion

The political culture literature contends that the evolution and persistence of mass-based democracy requires the emergence of certain supportive habits and attitudes among the general public. This paper has shown that this is also true for the socio-economic environment that determine a countries level of modernization or put differently, its fitness in the newly emerging global world economy. We have lend evidence to the argument that successful competition in the modern world economic system seems to be associated with certain supportive habits and attitudes as well. This does not imply that all wealthy (as well as poor) countries are alike. Differences exist and they are important. The relationship between the cultural landscape and economic development is reciprocal. Cultural change does affect the political and economic structure of societies. At the same time, however, the cultural landscape of a country is important for the development of new leading sectors. Countries that show a greater emphasis on traditional

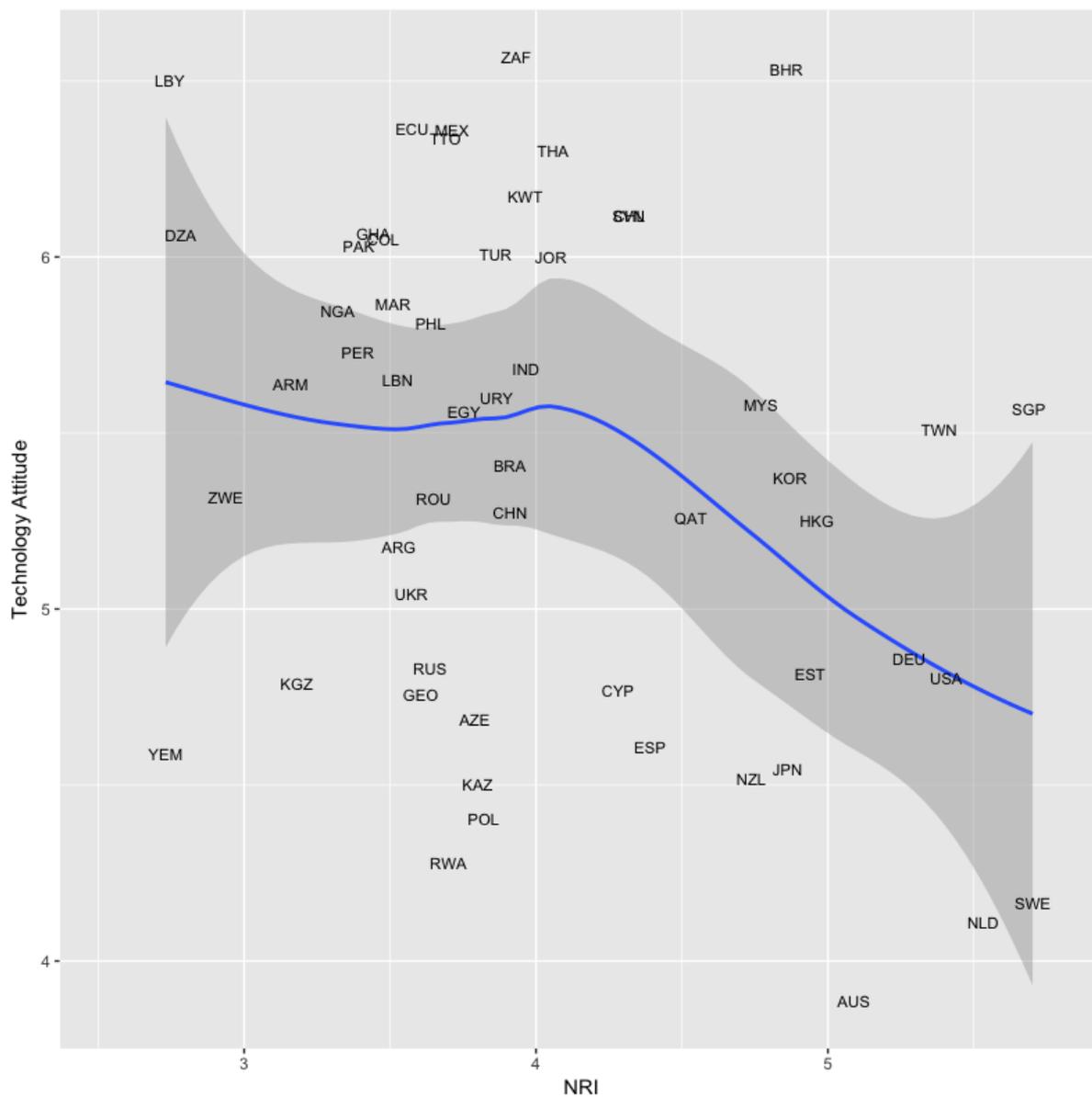


Figure 3: Technology attitude and NRI value, mean values by country, 2002-2014

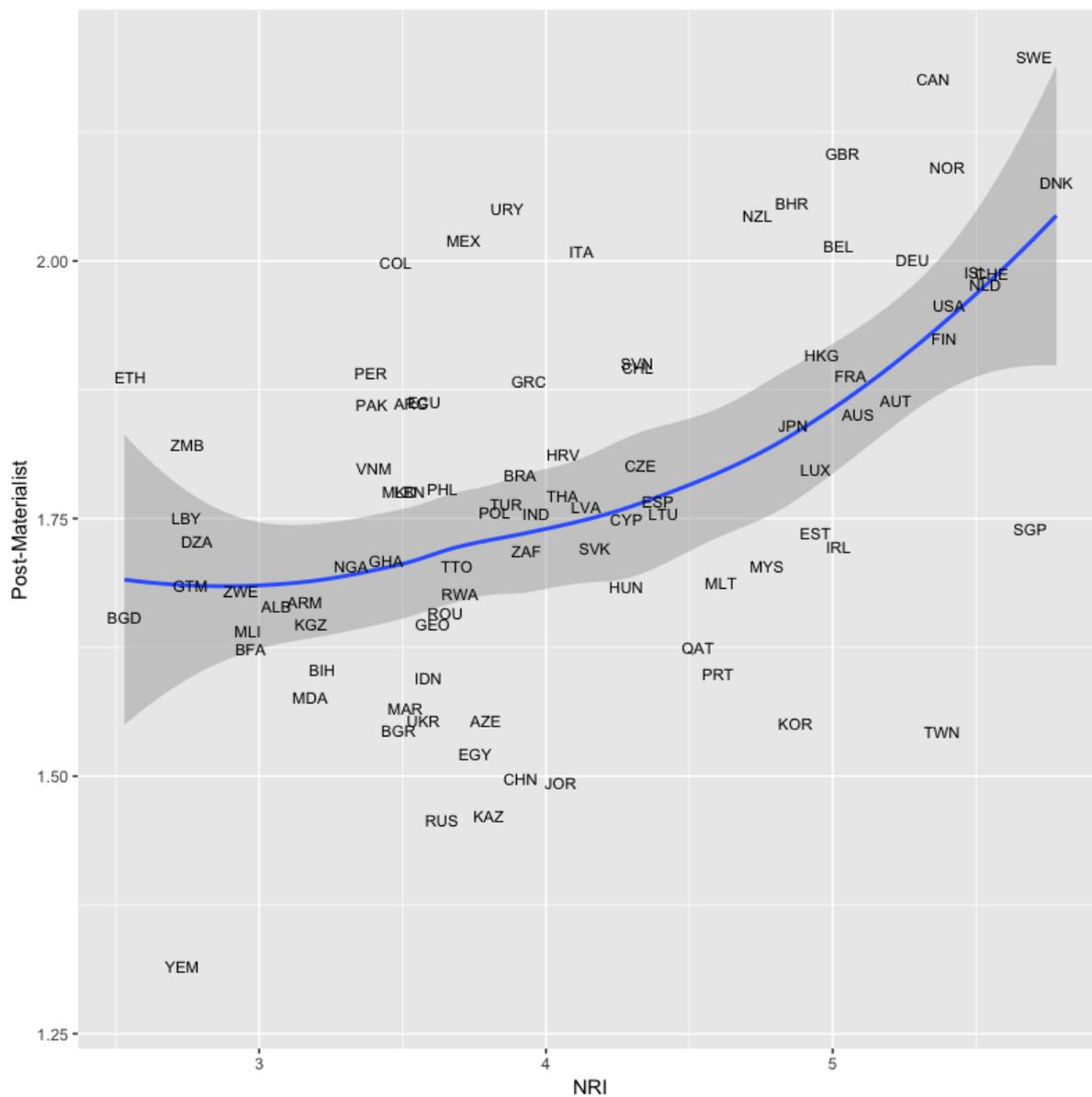


Figure 4: Postmaterialism and NRI value, mean values by country, 2002-2014

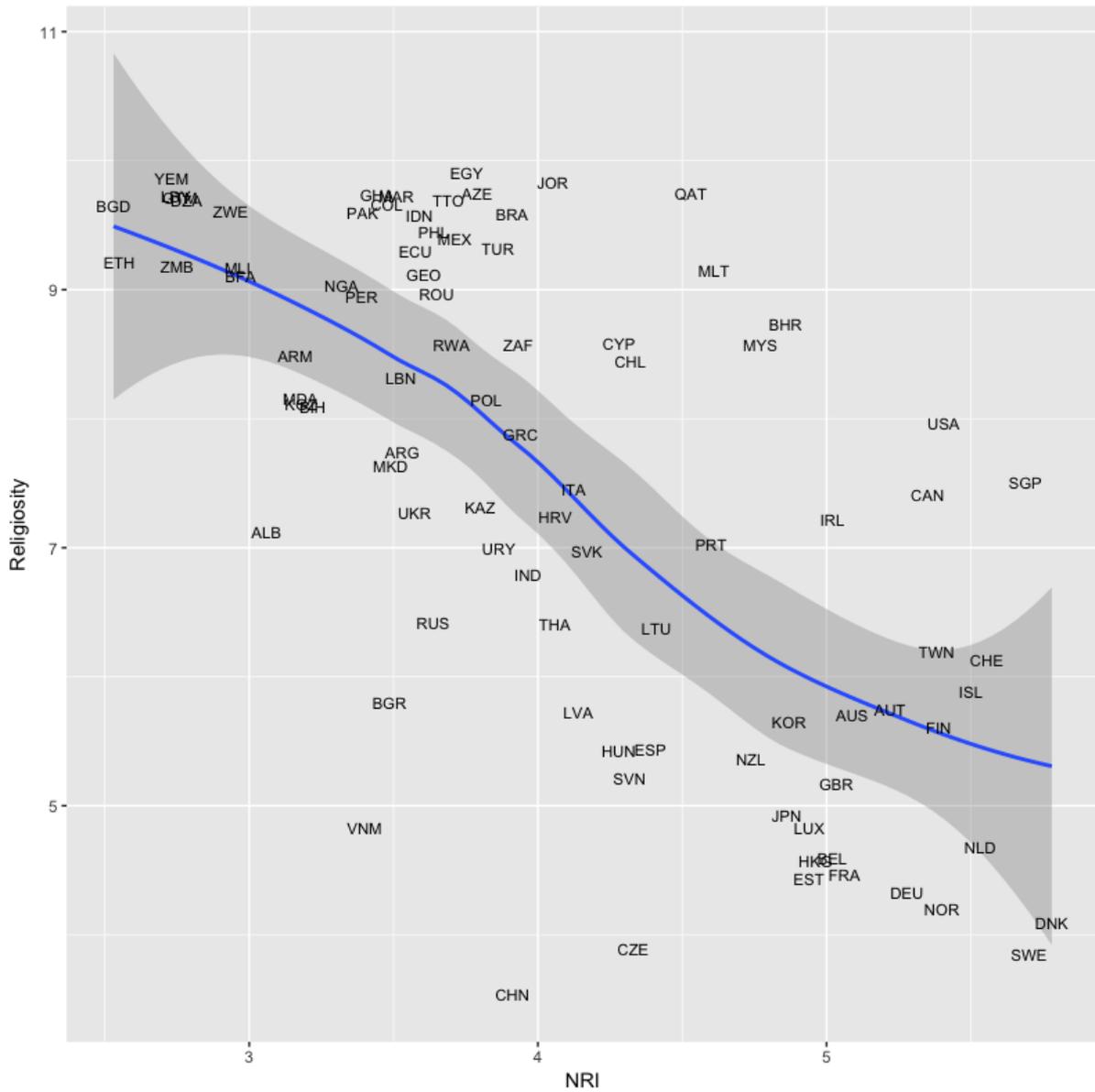


Figure 6: Religiosity and NRI value, mean values by country, 2002-2014

structures and align themselves more along the industrial rather than the postindustrial dimension that exist on a global scale tend to be less able to develop an environment that allows for the creation of new ways of doing things. The level of fitness for the newly emerging global techno-economic paradigm seems to be closely associated with secular/self-expression side of this divide.

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