

Chapter 10

Principles that guide innovation: Predicting the Global Innovation Index score with dimensions of human values

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10.1 Introduction

It is, perhaps, a truism that there is value in innovation. This belief is the reason so many governments and private businesses encourage and, more critically, support invention and the marketing of those inventions. However, it is also likely true that there is value *behind* innovation. More accurately, one could say that there are values driving the innovation process.

This paper examines the human values that, at a national level, may be associated with greater innovation. We start with a brief overview of definitions of human values, and then discuss two models that have multinational data available. The theoretical links between these models and innovation are presented, then we go on to suggest hypotheses that can be derived from these links and from the relevant empirical work to date. These hypotheses are next tested with extant data sets. The paper ends with a discussion of the implications of the findings of those tests.

10.2 Definitions

First, though, we begin with working definitions of the two topics of interest. The term ‘values’ has been a point of confusion in the social sciences for some time. As others have pointed out (see, e.g., Cheng and Fleischmann, 2010; Rokeach, 1973), this is likely due to the many ways in which the concept is used across the many disciplines within social science. It may also be due to a conflation of what a value is with what a value hypothetically does; for example, Hutcheon’s (1972, p. 184) specification of values as “operating criteria for action”, Brathwaite and Blarney’s (1998, p. 364) “principles for action”, and Cheng and Fleischmann(2010)’s “guiding principles”. One other common feature of current and past definitions is an apparent unipolarity; most classic or well-cited definitions emphasise the positive aspect of value. Thus, we have Kluckhohn’s (1951, p. 395) “conception...of the desirable”, or Hage and Dewar’s (1973, p. 280) “preferences about desired organizational outcomes”.

In fact, a value is none of these. It is, quite simply, the worth of something. It is not the thing being evaluated. It is the place of that thing (in psychological terms, a *thought object*) on a continuum from negative to positive. The metric of that continuum will necessarily shift depending on how the worth is being assigned; e.g., whether in financial, emotional, or utilitarian terms. The phrase ‘human values’ is, essentially, meaningless, except in the specific case where one is determining the worth of a person or persons.

If we separate the value from what is being evaluated, then we arrive at the working definition used in this study. The current investigation examines the relative importance of various national level principles that guide behaviour. Thus, when we refer to values in this paper, we mean the rank order of, or scores assigned to, these principles. As we will see

later, this is not how the authors of the two evaluation measures refer to values, but it is logical outcome of the instruments they use to collect data. This leads to a small problem. Inasmuch as nearly all the extant literature in this area uses the term ‘values’ in an incorrect sense, we may unwittingly cause confusion if we suddenly start referring to ‘principles guiding human conduct’ when speaking about what is normally called human values. We will, therefore, use the colloquial, if somewhat incorrect, meaning of ‘values’ as it has been traditionally defined in the psychological literature.

Fortunately, the term ‘innovation’ is somewhat easier to deal with, most likely because intensive study of topic by social scientists has only begun comparatively recently. There is, though, one point that needs clarification before a formal definition will be offered. There has been a tendency in the recent literature to reify innovation; i.e., to regard it as a thing. This is not the case. One cannot meaningfully speak of ‘an innovation’. Rather – and here we move to our definition – innovation is a process. Studies by members of our research group (see, e.g., Lambert and Fairweather, under review) have suggested that this process consists of a interlocking steps that begins with the spark of an novel idea, moves to invention (the manifestation of that idea), spreads from the inventor along a social network of support agents, and ends in the adoption of the idea by those other than the inventor. This latter phase can be widespread or very local, or even not at all (in which case the process has failed). Like the principles referred to, above, the success of the process can be measured in a variety of metrics. Most usually, the measure of success is financial, but it can also be expressed in terms of social capital, environmental benefit, and others.

10.3 Current relevant models

Of the several classifications of principles (nominally, ‘values’) currently being used in research, there are two – Schwartz’s circumplex and Inglehart & Welzel’s two-dimensional model – that that have received the greatest amount of theoretical attention and empirical support (Beckers, Seigers, and Kuntz, 2011). In addition, data collection based on these models has been conducted in several nations. Thus, these are the best suited to the study of national innovation.

10.3.1 Schwartz’s hierarchical taxonomy

Since 1992, Shalom Schwartz and his colleagues (Schwartz, 1992, 1994, 2007; Schwartz and Bilsky, 1990; Schwartz and Sagiv, 1999; Schwartz et al., 2001) have amassed a body of evidence supporting the hypothesis that the structure of human values tends to be largely invariant across cultures and nations. The hierarchical model that he forwards has three levels of values. The third level consists of 56 basic values. These make up the 10 value types of the second level, which, in turn, are subsumed by 4 value dimensions. These overarching dimensions can be thought of as two pairs of approximate opposites: conservation versus openness to change, and self-enhancement versus self-transcendence. Tradition and conformity are endorsed by those who hold place a high value on conservation. Openness to change is self-explanatory, as is self-enhancement. Self-transcendence incorporates such value types as benevolence (a concern about the welfare of those proximate in one’s social network) and “universalism”, which is an “understanding, appreciation, tolerance, and protection for the welfare of all people and for nature” (Schwartz, 1994, p. 22).

10.3.2 Inglehart & Welzel's two-dimensional taxonomy

Ronald Inglehart and Christian Welzel's (Inglehart and Welzel, 2005) conceptualisation of values holds that there are two fundamental dimensions: Traditional/Religious versus Secular/Rational, and Survival versus Self-expression. Their key argument, explicated in earlier work (Inglehart, 1997; Welzel, Inglehart, and Klingemann, 2003), was that increasing socioeconomic development leads to increasing secularization, as people gain greater understanding of, and control over, their environment. Socioeconomic development also leads to increasing value placed on self-expression, as people are freed from the basic activities necessary to survival.

This model of human values is relatively new and, therefore, has not received much in the way of empirical attention. However, testing of the model against a large, multi-year data set, drawn from the on-going World Values Survey (<http://www.worldvaluessurvey.org/>), has shown reasonable support for the existence of the two dimensions (Inglehart and Welzel, 2005, 2010).

10.4 Values and Innovation: Theoretical connections and hypotheses

Although there have been studies investigating the relationships between values and innovation, most of these have focused on the organisational culture in private companies (see, e.g., Hage and Dewar, 1973; Khazanchi, Lewis, and Boyer, 2006) rather than nations. These studies have also tended to focus on highly specific types of organisations, such as hospitals (Nathanson and Morlock, 1980; West and Anderson, 1992). In addition, few of these studies have used an *a priori* model of values, instead opting to attempt to tease out values from the sample under study. This has led to a plethora of disjointed findings that lack theoretical cohesiveness.

Two studies that did examine the link between innovation and cultural values were reported by Shane (1992, 1993). He investigated the relationship between national innovation and Hofstede's (1980) four-dimensions of culture (Power Distance, Masculinity, Individualism, and Uncertainty Avoidance) and. His research showed a reliable, positive association between national mean scores on Individualism and the number of patents issued in a nation. A negative relationship was found to exist between Power Distance and the number of patents (Shane, 1992). In a second study, a similar pattern of results was found when the number of trademarks issued was used as the proxy measure of innovation. This second study also suggested a negative relationship between this measure and Uncertainty Avoidance. A more recent study by Rinne et al. (in press) has also examined Hofstede's values, but using a more comprehensive and complex measure of innovation (the Global Innovation Index; INSEAD, 2010]. This study found support for Shane's (1992) results regarding Power Distance and Individualism but not the relationship between innovation and Uncertainty Avoidance reported in Shane (1993).

The theoretical rationale for using Hofstede's model in the three studies described immediately above rested on the observation that Individualism, as a cultural value, supported the pursuit and presentation of non-mainstream ideas, whereas Power Distance, with its emphasis on obedience to those in authority, was more likely to encourage novelty. Research just recently completed by Rinne and her colleagues has also shown a positive relationship between Hofstede's Individualism and national levels of creativity, which is a necessary precursor to the innovation process.

Empirical work by Luk and Bond (1993) and Olver and Mooradian (2003) has suggested an empirical connection between three of the “Big Five” personality traits and Schwartz’s values. Most pertinent to the current study, the personality trait of Openness to Experience has been shown to be predictive of endorsement of Openness to Change (Olver and Mooradian, 2003). Steel et al. (in press) have demonstrated a strong connection between the national mean scores on the personality trait of Openness to Experience and national scores on innovation. Thus, it seems reasonable to expect that the Openness to Change value dimension would also be positively related to innovation, Conservation, on the other hand, would be inversely related to innovation because of its emphasis on stability and maintenance of the *status quo*.

A similar argument can be made with respect to Inglehart and Welzel’s Traditional/Religious versus Secular/Rational dimensions. Those cultures that support the maintenance of traditional ways are less likely to welcome and be supportive of innovation. Further, subsistence cultures tend to place a greater emphasis on interdependence rather than independence, and are associated with slower growth and less innovation (Greenfield et al., 2003). This interdependence/independence distinction is reflected in Inglehart and Welzel’s Survival versus Self-expression dimension. Thus, we would expect that higher scores on this dimension, which indicate greater self-expression, would be predictive of higher national innovation scores.

These results, taken together, suggest a relationship exists between innovation and cultural values that encourage self-expression. The consistent finding regarding individualism also suggests that cultures that encourage individual ambition may also have higher scores on innovation measures. Conversely, cultures that place a higher value on conformity and tradition are less likely to be amenable to the novel ideas. This leads us to hypothesise the following relationships:

H₁: National levels of innovation will be positively related to national mean scores on Schwartz’s Openness to Change value dimension.

H₂: National levels of innovation will be negatively related to national mean scores on Schwartz’s Conservative value dimension.

H₃: National levels of innovation will increase as scores move from Inglehart and Welzel’s Survival values to Self-expression values

H₄: National levels of innovation will increase as scores move from Inglehart and Welzel’s Traditional/Religious values to Secular/Rational values.

10.5 Method

Two data sets were assembled to test the hypotheses. For the first, scores for the Schwartz Value Survey (SVS) across 50 countries were drawn from a data set published by David Ralston and his colleagues (Ralston et al., in press). These were then matched by country with Innovation Input and Output scores from the Global Innovation Index (GCI) (INSEAD, 2010). This aggregation yielded complete GCI and SVS scores on 47 countries. One constraint upon this data set needs to be acknowledged. Ralston et al. (in press) describe their sample as consisting of respondents who were all “part of the business community of their country”. This limits generalisation of the results. On the other hand, the fact that the

respondents were actors in the business community means that they were more likely to be actively involved in decisions and behaviours that had an impact on innovation.

The second data matrix also used scores from the GCI, but this time these scores were matched by country to scores on the two Inglehart and Welzel dimensions (Traditional/Religious versus Secular/Rational (TRvSR), and Survival versus Self-expression (SvSe)). The data for these two value dimensions were downloaded from the World Values Survey website (<http://www.worldvaluessurvey.org/>). The merging of these two data sets yielded complete data for 46 countries.

10.6 Results

Both data matrices were analysed using multiple linear regressions. In the first analysis, the raw score means for the two Schwartz value dimensions of interest (Openness to Change, and Conservation) served as predictor variables. The GII total score was the criterion variable. In the second analysis, the GII total was once again used as the criterion, but the Inglehart and Welzel dimensions of replaced the Schwartz value dimensions as predictors.

The result of the first analysis was significant (adjusted $R^2 = .244$, $F(2,44)=8.40$, $p=.001$). Examination of the standardised beta weights showed that only one of the dimensions, Conservation, reliably predicted the GII score (beta=-.551, $t = -3.78$, $p<.001$). Openness to Change did not reach significance (beta=.06, $t=.40$, *n.s.*). The second multiple regression was also significant (adjusted $R^2 = .244$, $F(2,44)=8.40$, $p=.001$). In this instance, however, both predictor variables were reliably associated with the GII total (TRvSR: beta=.609, $t=7.34$, $p<.001$; SvSe: beta=.499, $t=6.02$, $p<.001$).

10.7 Discussion

10.7.1 Schwartz's Value Dimensions

There was only partial support for our hypotheses regarding the Schwartz value dimensions. The finding regarding Openness to Change was puzzling. Our earlier work on the personality trait of Openness to Experience showed a reasonably strong and positive relationship with the same innovation measure used in this study. There are three possible explanations for the apparent lack of a relationship between this value dimension and national innovation levels. The first has to do with the distinction between values and personality traits. The former captures one's beliefs about what should be pursued; the latter is an indication of the disposition to behave in a particular way. Values are thought to be an antecedent of personality; expressed in one or more personality traits that, in turn, give rise to behaviour. Thus, a personality trait is closer to the actual behaviour than a value, and would arguably have greater, and more specific, predictive power.

The second explanation resides more with the nature of the Openness to Change dimensions, itself. It is possible that openness is indicative of a more passive set of beliefs rather than active; i.e., while the dimension reflects a welcoming of change, it does not necessarily entail actively creating that change. If this is true, then high scores on Openness to Change in a population would predict adoption of new ideas and inventions, but would not be related to creation of those ideas and inventions, nor to the process of bringing them to adoption. In blunt terms, such a population would be a good market for many new things, but would – other things being equal – have fewer to sell.

Our last explanation for the Openness to Change finding has to do with the two levels on which the sample is based. As mentioned, the original Ralston et al. (in press) data set was based on business people. It is quite possible, even likely, that this group does not, in important ways, represent the greater population of a country. Why this difference would manifest itself in the lack of relationship between openness to change and innovation is a matter for further research. Similarly, the countries that comprised our data set for this analysis were based on the data that were available to us; not, by any means, a perfectly representative sample of all nations in the world. A relationship between Openness to Change and national innovation levels may yet appear with larger data sets.

The value dimension of Conservation, on the other hand, was clearly related to national levels of innovation, even in the relatively minimal data set used in this study. The relationship, as hypothesised, was inverse; as Conservation scores rose, innovation levels fell. This suggests that Conservation may act like a brake on the innovation process. However, this finding is correlational and, thus, we hesitate to make any firm directional statements. It may be, for instance, that rising innovation somehow affects the overall Conservation value of a nation. Younger generations, exposed to greater and greater changes in the world around them via global media and marketing, may place less value on 'the old ways' and embrace alternatives. If so, then this suggests a way forward for those leaders of conservative nations who wish to increase innovation levels in their countries. This would need to be a longer-term, multi-generational plan, though, as it relies on changing cultural values.

10.7.2 Inglehart and Welzel's Value Dimensions

Both hypotheses regarding Inglehart and Welzel's value dimensions were supported. In light of the theoretical rationale presented earlier in this paper, this finding was not terribly surprising but it does lead to some interesting implications. The Traditional/Religious versus Secular/Rational dimension is, in several ways, similar to Schwartz's Conservation dimension, and some of the same suggestions apply. Those nations who endorse traditional ways seem less likely to be open to innovation. Inglehart and Welzel's dimension differs from Schwartz's, though, because the other end of the dimension is not simply a lack of conservatism but, rather, an increased endorsement of independent thinking, based on observable events. Such a worldview is the bedrock of the scientific endeavour and creativity. This set of values emphasises, in part, a willingness to engage in knowledge-seeking and stands in opposition to unquestioning acceptance of received wisdom. This search for knowledge should, almost invariably, spawn novel thoughts and lead to greater innovation. Thus, unlike Conservation, this dimension not only carries with it a braking effect at one pole (traditionalism) but may also an acceleration aspect (secular rationalism) at the other.

The notion that innovation is related to self-expression was also supported. It seems intuitive that nations in which self-expression has a high value would also be at the top of the innovation table, and the results bear out this intuition. It is worth considering why this might be the case. Quite simply, it may be a matter of probability. There are a greater number of individual opinions in any nation than there are group opinions. Thus, it is far more likely that there will be a greater incidence of novel ideas in a nation that places a higher value on self-expression, and, most importantly, that those ideas will be allowed to be presented.

If this is true, then it is encouraging for nations that currently are at the Survival end of the values dimension. Innovation is not a matter of lack of talent but rather a lack of voice. Combined with a move away from authority to autonomy – that is to say, from a Traditional/Religious stance to a Secular/Rational one – it seems probable that these nations will increase their innovation.

One final note needs to be sounded, however. Inglehart and Welzel's theory of values relies on socioeconomic development. Thus, it is difficult to disentangle to what extent this development leads to innovation, and how much innovation leads to development, especially when considering economic growth. It may be that the theoretical line is actually a spiral, moving from changes in autonomy and self-expression that result in increased innovation, which leads to economic development, which, in turn, then lead to further changes in autonomy and self-expression. If one is looking to increase the wealth of a nation, this would be a fortuitous path to be on.

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