

How Important Is Creativity? The Impact Of Age, Occupation And Cultural Background On The Assessment Of Ideas

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ABSTRACT

Since the early work of Schumpeter (1950), the role of the entrepreneur has been integrally linked with innovation, the bringing of a new idea to the firm to improve either its products or its processes. Schumpeter's entrepreneur is a person who has conceived of a new product or process or has recognized the value of new products or processes that have been invented elsewhere. The recognition of the value of a creative concept is a precondition to innovation. The role of the manager as a conduit for introducing potentially innovative concepts to the firm is to be able to recognize and appraise creative accomplishments, assess whether and how they might give the firm a competitive advantage, and to design the ways in which that might be accomplished. The current study seeks to identify how people view creativity as they age, and across occupations and cultures. The concept of creativity was found to vary with these three characteristics and changes qualitatively with age and occupation. Suggestions for further research are outlined.

Keywords: Creativity; Innovation; Entrepreneurship; Knowledge Management

INTRODUCTION

As Quinn, Anderson and Finkelstein aptly characterized one of the key challenges of engaging businesses in knowledge economies: “Managing human intellect and converting it into useful products and services is fast becoming the critical executive skill of the age.” (2006, p. 71). Since the early work of Schumpeter (1950), the role of the entrepreneur has been integrally linked with innovation, the bringing of a new idea to the firm to improve either its products or its processes. Schumpeter's entrepreneur is a person who has conceived of a creative idea or has recognized the value of one that has been invented elsewhere. The recognition of the value of a creative concept is a precondition to innovation.

As a conduit for introducing potentially innovative concepts to the firm, the manager must be able to recognize and appraise creative accomplishments, assess whether and how they might give the firm a competitive advantage and to design the ways in which that might be accomplished. A number of studies have focused on the degree of creativity that managers possess and the relevance of this metric in bringing innovation to the firm (Reid, King and DeLorme, 1998; Simons, 1995, Homak, Lee and Riccio, 2005; Uhl-Bien, Marion and McKelvey, 2007). Other studies have considered the role managers play in opportunity assessment (Quinn, Anderson and Finkelstein, 1996). Kickul and Gundry (2001) saw opportunity assessment as mediating the interactive effects of managerial diversity and creativity, a process that influences the adoption of innovative practices. If a critical role of management, then, is in the recognition and assessment of creative achievement, it becomes important to understand the factors that shape and/or limit a manager's ability to perform this assessment.

Creativity has itself been associated with a wide range of cognitive styles (Guastello, Shissler, Driscoll and Hyde 1998) and has been correlated with age, work experience and travel experience (Zhang, 1999). It is more closely associated with a holistic mode of thinking than with one that is analytical (Zhang, 2002) and is positively correlated with psychosocial growth (Helson and Pals 2000). A model of creativity proposed by Martindale (1995) characterized it as a connectionist activity – the bringing together of concepts in ways that had not been anticipated

beforehand. Dietrich (2004) created a typology of creative insights, systematizing the relationship between knowledge and creative thought, and in doing so, suggested that this is a relationship that changes with both domain and age.

The current study seeks to further investigate the relationship of an ability to recognize and assess the value of creative thought with three demographic variables, and asks: Does the perceived value of creative thought change with age, occupation and cultural background?

Gundry, Kickul and Prather described two sets of individual capabilities needed by managers in order to build a creative organization: (1) conceptual skills, including visioning and generating ideas, and (2) individual attributes, including risk-taking and openness to new ideas (1994, p. 29). This study begins with an assessment of the literature on the effect of age, occupation and cultural background on creativity itself and continues with a review of works that have considered the conditions and circumstances under which people are or are not open to new experiences. A series of hypotheses concerning the value people place on creativity is then proposed and tested against data available in the World Values Survey database. Suggestions for further research are then offered.

THE RELATIONSHIP OF CREATIVITY TO AGE, OCCUPATION AND CULTURAL BACKGROUND

Coming into the 1970's and 1980's, writers often expressed a notion that Lehman (1960) identified as the common wisdom that creativity declined with age. Embodied in the statement that "Older men may be more scholarly, but they do not usually exhibit more originality than do younger ones" (Lehman, 1960, p. 134), creativity was felt to be the province of the young (Ruth and Birren, 1985). Moreover, this relationship was felt to be true across cultures and over time (Simonton, 1975). More recent studies, however, have begun to examine this relationship more closely and have viewed creativity not as operating on a linear scale, but as a multi-dimensional concept (Cohenshalev, 1992; Sassercoen, 1993).

Age and Creativity

Creativity may not advance or decline with age so much as it undergoes certain qualitative changes (Abra, 1989; Cohenshalev, 1992; Sassercoen, 1993; Helson, Agronick and Roberts, 1995). In a comparative study of younger and middle-aged adults, Reese, Lee, Cohen and Puckett (2001) found that the middle aged group performed better than their younger counterparts in terms of ideational fluency, flexibility and originality. Self-perception of creativity does not diminish with age (Reed, 2005), rather, as Dollinger and Dollinger (2003) described, the "self" becomes more uniquely individualistic and complex. Wisdom and creativity were found to be differentiated on the basis of personal and social aspects of a person's perceptions rather than on cognitive and intellectual aspects (Knight and Parr, 1999). This distinction is particularly relevant because creative temperament has been found to be relatively stable over a person's lifespan (Helson, Roberts and Agronick, 1995; Soldz and Vaillant 1999), as was the specific domain of creativity in which a person is likely to engage (Park, Lubinski and Benbow, 2007). Creative activity fosters a sense of competence, purpose and growth in youth as well as among older adults (Fisher and Specht, 1999).

Whether creative output declines with age is not entirely settled. Ng and Feldman (2008) found that age was largely unrelated to core task performance and creativity in training programs. Other studies have shown that quantitatively measured creative output declines with age while qualitatively measured output does not (Alpaugh, Parham, Cole and Birren, 2006; Shimonaka & Nakazato, 2007). The qualitative measurements included assessments of fluency and originality scales of thinking ability. Christensen et al (2007) investigated the relationship of brain burden (i.e., atrophy) and measures of reserve (education, creativity and intelligence) and found no association between cognitive declines and brain burden. Roskos-Ewoldsen, Black and McCown (2008) identified two phases of creative activity – generating an idea and exploring the implications of that idea – and associated each with different cognitive processes. While the authors identified age-related declines in the first activity, there was no corresponding decline with age in the second (2008). In describing "mature creativity," Shimonaka and Nakazato (2007) found that openness to experience and practical problem solving were correlated with scores of creativity and that personality and problem-solving ability influence mature creativity.

To the extent that people measure creativity by the number of new ideas they generate, then their perceptions of the role and value of creativity in their lives is likely to decrease with age. If, however, as people age they begin to define creativity as openness to experience and practical problem solving, then their self-assessments of the value of creativity should not vary significantly with age, which leads us to:

Hypothesis 1: People's perceptions of the importance of creativity vary with age.

Creativity and Occupation

People begin to form relationships between their personal identity and potential careers beginning at very early ages (Gottfredson, 1981; Sastre, Mullet and Semin, 1999). Social cognitive career theory holds that people select their careers partially on the basis of their expectations that aspects of their chosen professions will help them fulfill or reach their interests, abilities and goals (Lent, Brown and Hackett, 1994). This concept was elaborated by Collins, Harrison, Mason and Lowden (2011) who described how the use of creativity enables students to develop their professional socialization through a process of role identification.

The practical implications of this association have been demonstrated in three ways: First, organizational creativity may be viewed in four distinct stages: generation, conceptualization, optimization and implementation (Basadur and Basadur, 2011), each of which may be associated with particular occupational roles. Second, and as relates to job characteristics, job satisfaction, organizational commitment and productivity have been positively associated with the degree to which a person is able to express creativity through his or her work (McNeese-Smith and Crook, 2003; Kidder, 2006; Robinson and Beesley, 2010). And third, people whose energies are focused on the generation stage of creativity are more often found outside or on the periphery of business organizations than working for them (Basadur and Basadur, 2011).

Based on the association of occupational identification and creativity, it is proposed that:

Hypothesis 2: People's perceptions of the value of creativity vary with occupation.

Further, it is possible that there is an interactive effect between age and occupation within the context of this discussion. For those people whose occupations involve creative problem solving late into their careers, the value of creativity may be stronger as people age than for those people whose careers do not require the same. It is therefore proposed that:

Hypothesis 2a: At any given age, people's perceptions of the value of creativity may be modified by their occupations.

Creativity and Cultural Background

A number of studies have attempted to associate a national culture with inventiveness and/or innovativeness. One of the most commonly used systems of measures of cultural characteristics is that proposed by Hofstede and includes individualism versus collectivism, power distance, masculinity, uncertainty avoidance, and as was recently added, long term orientation (2010). While these metrics have received some criticism, notably by Ailon (2008), who suggested that Hofstede's foundational study was itself subject to many of the same cultural biases it was intended to expose, these cultural comparatives have been used in much cross-cultural research, and underlies further research done by House, Quigley and de Luque (2010), and Trompenaars and Turner (1997).

As Dennis (1993) posited, the number of new business ventures started in any one society are an indicator of that society's national creative effort. Shane (1992), for example, compared the number of invention patents per person to Hofstede's indexes of individualism and power distance and found individualistic and non-hierarchical societies to be the more inventive. Mueller and Thomas (2001) also associated innovativeness with individualism, arguing that an entrepreneurial orientation is based on an internal locus of control and low uncertainty avoidance. Likewise, Thatcher, Stepina, Srite and Liu (2003) found an indirect relationship between two aspects of culture – uncertainty avoidance and power distance – and personal innovativeness. The Shane study was confirmed and

expanded by Williams and McGuire (2010) who likewise compared patents per person to Hofstede's indexes of individualism and power distance and went on to compare the indicator to the remainder of the Hofstede metrics. The authors similarly found that individualistic countries were likely to have more patents per capita than collectivist countries.

Other aspects of societal structure have been related to innovativeness and inventiveness, some of which can be described in terms of social capital (Hendricks, 1999). Shane (1992), for example, argued that a rigid social hierarchy would act to decrease inventiveness, while societies that encourage open communication work to enhance it. Odeh (1994) described how in the Djamiat, an Arab industrial "university," the principles of professional efficiency, creativity, competence and entrepreneurial initiative are taught as core values. On the other hand, in examining the regulatory systems of Singapore, Carney and Zheng (2009) argued that conflicting government incentive systems undermine innovative activity resulting in a culture of risk aversion and a lack of creativity. National and cross-cultural factors influencing creativity, then, are varied and complex and cross-border comparatives should be made with the understanding that a national level of creativity may be the product of a confluence of cultural, economic, educational and technological factors.

Given this, we offer the following hypothesis:

Hypothesis 3: People's perceptions of the value of creativity vary with:

- a. Individualism
- b. Power Distance
- c. Uncertainty Avoidance
- d. Masculinity
- e. Long Term Orientation

Assessing Creativity / Openness to Experience

Part of what shapes a person's ability to assess the value of creative thought may be his or her openness to it. As Barber (1997) argued, the intentional orientation of an audience to a speaker may be a determinative component of the listeners' receptivity to new ideas. In a longitudinal study of openness to experience, Roberts, Walton and Viechtbauer (2006) demonstrated that openness remains constant throughout adulthood but declines slightly after the age of 60, while Zimprich, Allemand and Dellenbach (2009) found that openness to experience was relatively invariant between middle-aged and older adults. Hennessey (1994) also found that judgments of the creativity of a product as well as the process used to create that product were consistent across cultures.

One factor which may help to influence a person's receptivity to new ideas is the person's innate intelligence. Education has been shown to increase work creativity (Ross and Mirowsky, 2006) and individual differences in cognitive ability were found to be predictive of creative potential in science and technology within populations that have advanced educational degrees (Park, Lubinski and Benbow, 2008). The receptivity to new ideas may not, however, be a linear function of absolute intelligence. Dialectical and relativistic thinking were positively correlated with creativity, while formal thinking was not (Wu and Chiou, 2008). Moreover, an ability to exert cognitive control in a context sensitive manner may be predictive of overall creative ability (Zabelina and Robinson, 2010).

METHODOLOGY

For this analysis, data were drawn from the most recent wave of the World Values Survey (WVS), which was conducted between 2005 and 2008. Data were retrieved from and processed on the WVS website (<http://www.worldvaluessurvey.org>). Country level values for cultural dimensions were retrieved directly from: <http://www.geert-hofstede.com/>, the website created by Geert Hofstede in which he shares some of the results of his research.

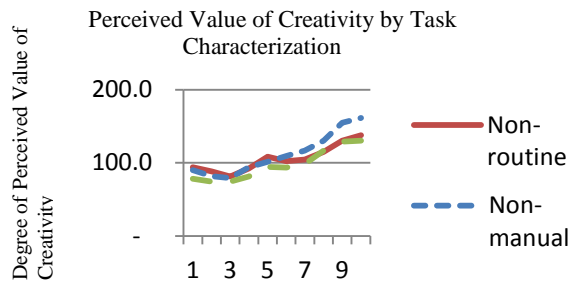
In this section there is an analysis of question V80 of the World Values Survey, namely: "Now I will briefly describe some people. Using this card, would you please indicate for each description whether that person is

very much like you, like you, somewhat like you, not like you, or not at all like you? Q: *It is important to this person to think up new ideas and be creative.* The questions called for a Likert scale response which was then converted into an index value (as described in Appendix A) so that results could be compared across the demographic indexes. The answers to the question are sorted by demographic data including age, occupational categories and country of residence. The occupational categories include categories of jobs, as well as descriptors of the degree to which those jobs are characterized by routine or manual tasks, and whether they are carried out independently or under close supervision.

RESULTS

The data indicates that the perception that it is important to think up new ideas and be creative declines with age. The data also indicate that the importance of thinking of new ideas varies greatly with occupation. Those employed as professionals as well as managers – regardless of the size of the organization- placed the highest value on creativity; the lowest values were ascribed by semi-skilled, unskilled, and agricultural workers.

The characterization of the tasks performed on a job as non-manual versus manual, non-routine versus routine and independently performed versus closely supervised are also correlated with the perceived importance of creativity. In general, non-manual labor and non-routine work are more positively associated with the perceived importance of creativity than manual labor and routine work. Also, work that is performed independently versus that which is performed under close supervision is also more closely correlated with the perceived importance of creativity.



Degree to which a job is assessed as non-routine, non-manual, or performed independently (1=low, 10=high).
World Values Survey, 2005-2008
n = 47.5K

With respect to Hofstede’s cultural indicators, the perceived value of creativity was not correlated with power distance, individualism, masculinity or uncertainty avoidance. It did, however, have a negative correlation with long term orientation, albeit with a medium effect size.

DISCUSSION

In answering the question of whether it is important for a person to “think up new ideas and be creative,” each respondent was being asked to assess the value of creativity in his or her own life. If creativity were needed in order for another person to effectively function in the role of the respondent, then creativity would likely be identified as a valuable and needed trait. For most respondents, the test of creativity is likely to be consistent with the commonly held definition of creativity, namely, that of having the ability to bring something new into existence, or to produce something through imaginative skill (American Heritage, 1982).

The question posed by the World Values Survey does not differentiate between the phases of creative activity – from generating an idea to exploring its implications – as were described by Roskos-Ewoldsen, Balck and McCown (2008). The second half of the definition offered by these authors is one that is more often associated with

innovation than invention. For managers and professionals, it may be the linking of two disparate ideas or the reapplication of an idea seen elsewhere to the context of one’s own environment that defines the “new.”

In the context of management literature, the distinction between inventiveness and innovation is sometimes blurred. With respect to education, Ellis (2011) defined creativity as the perception and analysis of opportunities for learning; Hill and Johnson (2003) refer to “applied creativity” (2003, 221-222) to characterize innovation. Organizational creativity has been defined to include aspects of novelty as well as usefulness of their outputs (Amabile, 1983, Runco, 2004, Simonton, 2000a). For these authors, the creativity of an idea is found in the interplay of the newness of an idea and its practical applications; the value of a creative input is measured by its usefulness. Similarly, Basadur and Basadur (2011) split organizational creativity into stages beginning with generation and conceptualization and ending with optimization and implementation. The authors found that people focused on the generation stage of creativity are more commonly found on the periphery of organizations than within them, but also characterized the evaluation of the usefulness of an idea and its adaptation to the firm as the creative role of managers. The manager or professional, then, may be operating from a different conceptual basis than the non-managerial and non-professional population.

The Hypotheses

The first hypothesis – that people’s perceptions of the importance of creativity vary with age – was supported by the data. Aging is associated with declines in certain types of brain activities including creative output as measured by the number (as opposed to the quality) of new ideas that are generated (Shimonaka and Nakazato, 2007; Roskos-Ewoldsen, Black and McCown, 2008). That a person would be willing to explore the implications of a new idea implies that the idea has first passed through a threshold – that it has been recognized as potentially having some value. The ability to be innovative, then, may not decline as rapidly with age as does the ability to be inventive. The “mature creativity” described by Shimonaka and Nakazato (2007) envisions an openness to experience that may be enhanced through middle age (Reese, Lee, Cohen and Puckett, 2001).

The second hypothesis – that people’s perceptions of the value of creativity vary with occupation – was also supported by the data. Those people who were employed as managers or professionals were more likely to identify creativity as important to someone acting in their occupational roles than were people employed in jobs as semi-skilled or unskilled labor. The association of the importance of creativity with people who characterize their work as non-manual, non-routine and independently conducted (i.e., not under close supervision) further helps to clarify these differences.

Importance of Thinking of New Ideas and Being Creative

Occupation	Age			Total
	15-29	30-49	50+	
Professional / Manager	146.0	130.6	117.1	128.6
Skilled/Semi-Skilled	122.9	98.0	69.6	96.1
Administrative (non-mgr)	119.0	107.7	70.0	101.1
Unskilled	107.9	80.0	44.1	75.4
Total	127.5	109.4	81.2	105.2

See: Appendix B, Tables 1 & 2
 Index calculation described in Appendix A.

For those people who are principally engaged in a profession or in managing a business, the concept of creativity may include creative problem solving. This association has been demonstrated with professional service firms (Hargadon and Bechky, 2006), as well as with executives (Richard, 2003). For executives, managers and professionals whose work may be characterized as non-manual, non-routine, and independently conducted, linking ideas that had never before been connected or that had not been used in the context of their own organizations defines entrepreneurship.

Correlation of Hofstede’s Cultural Indicia with Creativity Index

	Correlation	Value of r²
Power distance	-.08	.01
Individualism	.12	.02
Masculinity	-.19	.04
Uncertainty Avoidance	-.34	.12
Long Term Orientation	-.64	.41

See: Appendix B Table 3

Moreover, this is a distinction that persists throughout one’s professional career. While the perceived value of creativity may decline over an adult’s lifespan for all categories of employment, its value for managers and professionals remains above the average for the entire population for all age categories. Given this, hypothesis 2a – at any given age, people’s perceptions of the value of creativity may be modified by their occupations – is supported by the data.

The survey results show little, if any, correlation between Hofstede’s metrics of individualism, power distance, uncertainty avoidance and masculinity with the perceived value of creativity. Only the longer term orientation indicator showed a negative correlation with the perceived value of creativity, and this with a medium effect size.

The methodology employed by Shane (1992) as well as by Williams and McGuire (2010) was to compare patents filed per person at a country level to Hofstede’s indexes of individualism, power distance, masculinity and uncertainty avoidance. A difficulty with using this method is that developed countries have an educational and technological framework for encouraging idea development as well as a legal structure for protecting its ownership. The more developed countries of North America and Europe tend to be individualistic rather than collectivist and so the association of individualism with invention may be bound to a level of economic development as much as it is to culture. Studies predicting the effect of culture on dependent variables that could be tied to a level of economic development might benefit from holding the level of economic development constant in making these comparisons (Klonoski, 2011). In this vein, Tiessen (1997) had argued that individualism and collectivism neither categorically encourage nor discourage entrepreneurship; rather, they may act to shape how the functions are accomplished.

Hypothesis 3 (a), (b), (c) and (d) – that people’s perceptions of the value of creativity vary with individualism, power distance, uncertainty avoidance and masculinity – were not supported by the data. Hypothesis 3 (e), however – that people’s perceptions of the value of creativity vary with long term orientation – was supported.

The negative correlation of long term orientation and the perceived value of creativity suggest that the introduction of new concepts to an environment implies that change is an anticipated consequence of creative input. While it may not be presumed that all new ideas lead immediately to environmental changes, the link between the generation of “useful” new ideas and their implementation may be inevitable in the longer term. A long term orientation rests more comfortably on a premise of stability than on an environment of innovation and change; placing a high value on creativity, then, may imply a short term orientation.

Limitations

The methodology employed in this study has several limitations. First, the World Values Survey question being analyzed here is one which asks respondents for a self-assessment of a personal value, and it does so across national and cultural lines. Second, only three of the myriad influences on creative assessment are analyzed. While the analysis of age, occupation and national culture are important contributions to our understanding the topic, nothing here is intended to suggest that other variables might not also contribute to it as well. Further, studies demonstrating differences in perceptions based on age are, by proxy, also based in cultures, economies and political events peculiar to each generation. A longitudinal analysis might provide a more accurate assessment of the impact of the age, occupation and national culture as well as other relevant independent variables on how managers assess creative ideas.

CONCLUSION

While certain creative capacities decrease with age, the ability to appreciate, evaluate and make use of creative concepts lingers throughout adulthood. Viewed in this way, Bandura's assessment that "cognitive development is better analyzed in terms of specialized cognitive competencies than discrete uniform ways of thinking," provides a rationale for why innovative more so than inventive capabilities persist as people age (1989, p. 9). The taxonomies of creativity of Gundry, Kickul and Prather (1994) as well as Roskos-Ewoldsen, Balck and McCown (2008) both separated two distinct cognitive functions – the ability to generate a new idea and to explore its implications. The second of these two functions assumes an openness and receptivity to new ideas -- an ability to understand the process of creativity, its products or its application to an existing set of circumstances is a discrete cognitive function separate and apart from a new way of thinking. The first of the functions has generally been referred to as invention and the latter as innovation.

Those involved in innovation may appreciate its creative aspect more so than those whose routine, manual and supervised activities give them fewer opportunities to do so. Managers and professionals, perhaps more so than unskilled labor or administrative personnel, may be called upon to solve problems that had not been encountered before, to become increasingly more efficient in the work they manage, or to bring new products or services to market. The data taken from the World Values Survey shows that people employed as professionals and managers are the more likely than others to appreciate the value of creativity. While as a demographic category, professionals and managers may not be the most inventive group (Basadur and Basadur, 2011), their appreciation of the creative suggests that as a group they may be called upon to be the most innovative of the occupational categories. Similarly, they may be more likely than others to appreciate the challenge of problem solving and innovation and to associate these activities with creativity. The higher positive response to the survey question by managers and professionals tends to strengthen this association.

The data showed little association of creativity with national culture. Unlike prior studies, however, only one of the examined cultural characteristics was found to be associated with creativity, namely, that of short term orientation. While other investigations had shown that countries characterized as "individualistic" were more inventive than those that were "collectivist," these studies focused on the generation of new ideas across countries as measured by patent applications. Given that the current level of economic and technological development in individualistic countries is generally higher than that of collectivist countries, the results of these studies may be influenced by non-cultural contextual factors.

Further study would help to clarify and develop these issues. For example, a longitudinal study assessing inventive as distinct from innovative capabilities as people age, and across occupational, cultural and other pertinent characteristics would help to delimit how different groups of people identify and view creativity. If, as Quinn, Anderson and Finkelstein (2006) suggested, managing the flow of inventiveness to innovation is the next critical executive skill, the study of what shapes managers' capacities for inventiveness and innovation is worthy of much additional study.

AUTHOR INFORMATION

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APPENDIX A: World Values Survey Questions

V80: Schwartz: It is important to this person to think up new ideas and be creative

Now I will briefly describe some people. Using this card, would you please indicate for each description whether that person is very much like you, like you, somewhat like you, not like you, or not at all like you? (Code one answer for each description): It is important to this person to think up new ideas and be creative; to do things one's own way.

Answers:

- | | | |
|----|--------------------|-------------------------|
| 1. | Very much like me | -1. Don't know |
| 2. | Like me | -2. No answer |
| 3. | Somewhat like me | -3. Not applicable |
| 4. | A little like me | -4. Not asked in survey |
| 5. | Not like me | -5. Missing; unknown |
| 6. | Not at all like me | |

V242: Profession/job

In which profession/occupation do you or did you work? If more than one job, the main job? What is/was your job there?

Answers:

- | | | |
|-----|--|-------------------------|
| 1. | Employer/manager of establishment with 10 or more employed | -1. Don't know |
| 2. | Employer/manager of establishment with less than 10 employed | -2. No answer |
| 3. | Professional worker | -3. Not applicable |
| 4. | Supervisory Non-manual office worker | -4. Not asked in survey |
| 5. | Non-manual office worker | -5. Missing; unknown |
| 6. | Foreman and supervisor | |
| 7. | Skilled manual | |
| 8. | Semi-skilled manual | |
| 9. | Unskilled manual | |
| 10. | Farmer: has own farm | |
| 11. | Agricultural worker | |
| 12. | Member of armed forces | |
| 13. | Never had a job | |

V244: Nature of tasks: Manual vs. Cognitive

Are the tasks you perform at work mostly manual or non-manual? Use this scale where 1 means "mostly manual tasks" and 10 means "mostly non-manual tasks".

Answers:

- | | | | | |
|----|---------------------|-----|-------------------------|-------------------------|
| 1. | Mostly manual tasks | 6. | 6 | -1. Don't know |
| 2. | 2 | 7. | 7 | -2. No answer |
| 3. | 3 | 8. | 8 | -3. Not applicable |
| 4. | 4 | 9. | 9 | -4. Not asked in survey |
| 5. | 5 | 10. | Mostly non-manual tasks | -5. Missing; unknown |

V245: Nature of tasks: Routine vs. Creative

Are the tasks you perform at work mostly routine or mostly not routine? Use this scale where 1 means “mostly routine tasks” and 10 means “mostly not routine tasks”.

Answers:

1.	Mostly routine tasks	6.	6	-1.	Don't know
2.	2	7.	7	-2.	No answer
3.	3	8.	8	-3.	Not applicable
4.	4	9.	9	-4.	Not asked in survey
5.	5	10.	Mostly not routine tasks	-5.	Missing; unknown

V246: Nature of tasks: Independence

How much independence do you have in performing your tasks at work? Use this scale where 1 means “no independence at all” and 10 means “complete independence”.

Answers:

1.	No independence at all	6.	6	-1.	Don't know
2.	2	7.	7	-2.	No answer
3.	3	8.	8	-3.	Not applicable
4.	4	9.	9	-4.	Not asked in survey
5.	5	10.	Complete independence	-5.	Missing; unknown

In order to create a single ordinal score for questions V80, V244, V245 and V246, the following formulas were employed:

V80: Index = 100 x ((Very much like me x 3) + (Like me x 2) + (Somewhat like me) – (A little like me) – (Not like me x 2) – (Not at all like me x 3)) where values for question answers were expressed in terms of the percentage of valid responses given.

V244: Index = 100 x ((Mostly manual tasks) + (“2” x 2) + (“3” x 3) + (“4” x 4) + (“5” x 5) + (“6” x 6) + (“7” x 7) + (“8” x 8) + (“9” x 9) + (Mostly non-manual tasks x 10)) where values for question answers were expressed in terms of the percentage of valid responses given.

V245: Index = 100 x ((Mostly routine tasks) + (“2” x 2) + (“3” x 3) + (“4” x 4) + (“5” x 5) + (“6” x 6) + (“7” x 7) + (“8” x 8) + (“9” x 9) + (Mostly non routine tasks x 10)) where values for question answers were expressed in terms of the percentage of valid responses given.

V246: Index = 100 x ((No independence at all) + (“2” x 2) + (“3” x 3) + (“4” x 4) + (“5” x 5) + (“6” x 6) + (“7” x 7) + (“8” x 8) + (“9” x 9) + (Complete independence x 10)) where values for question answers were expressed in terms of the percentage of valid responses given.

Country Levels of Creativity: Index = 100 x ((Very much like me x 3) + (Like me x 2) + (Somewhat like me) – (A little like me) – (Not like me x 2) – (Not at all like me x 3)) where values for question answers were expressed in terms of the percentage of valid responses given.

Retrieved from: <http://www.wvsevsdb.com/wvs/WVSanalyzeQuestion.jsp>. Results directly retrieved from the website and processes online.

APPENDIX B: Cross-Tabs

Table 1 – Creativity Index by Task Characterization

World Values Survey Database			
Breakdown by Characterization of Tasks / Independence of Task Performance	Non-manual	Non-routine	Independent
Scaled value = 1 (manual, routine, or not independent at all)	90.10	94.00	78.20
2	81.50	88.10	74.40
3	79.20	81.10	74.10
4	93.90	92.10	81.10
5	101.50	108.40	94.20
6	109.00	102.10	93.50
7	116.70	104.20	98.20
8	130.40	115.00	116.60
9	154.60	130.40	128.80
10 (Non-manual, not routine, or completely independent)	161.20	137.70	130.00
Total	104.70	103.90	104.80
N =	47,536	47,462	47,535

Index calculation described in Appendix A.

**Table 2: World Values Survey Database
V80: Schwartz: It is important to this person to think up new ideas and be creative**

Breakdown by Age and Employment	15-29	30-49	50+	Total
Employer/manager of establishment with 10 or more employed	144.90	140.00	115.40	130.90
Employer/manager of establishment with less than 10 employed	151.70	143.10	135.10	142.00
Professional worker	161.20	136.10	122.10	137.80
Supervisory Non manual -office worker	147.40	121.00	105.60	119.90
Non manual -office worker	119.00	107.70	70.00	101.10
Foreman and supervisor	125.00	112.70	107.10	112.30
Skilled manual	130.50	110.20	83.10	107.00
Semi-skilled manual worker	115.30	85.80	56.00	85.10
Unskilled manual	118.40	89.00	51.40	86.90
Farmer: has own farm	107.10	108.10	79.40	96.80
Agricultural worker	97.30	70.90	36.70	63.90
Member of armed forces	143.00	116.00	88.70	116.40
Never had a job	124.60	91.80	47.40	103.00
Other (cs)	127.30	126.40	67.70	106.90
Total	127.50	109.40	81.20	105.20

Index calculation described in Appendix A.

N= 44,063

Table 3: Comparative of the Creativity Index to Hofstede’s Cultural Indicators

	n=	Creativity Index	Power Distance	Individualism	Masculinity	Uncertainty Avoidance	Long Term Orientation
France	995	78.8	68	71	43	86	
Great Britain	1,036	100.9	35	89	66	35	25
Netherlands	1,043	110.0	38	80	14	53	44
Spain	1,176	79.7	57	51	42	86	
United States	1,215	91.3	40	91	62	46	29
Canada	2,140	148.1	39	80	52	48	23
Japan	1,038	(19.2)	54	46	95	92	80
Mexico	1,502	108.0	81	30	69	82	
South Africa	2,964	176.9	49	65	63	49	
Australia	1,391	80.2	36	90	61	51	31
Norway	1,018	104.7	31	69	8	50	20
Sweden	1,001	146.3	31	71	5	29	33
Argentina	958	53.3	49	46	56	86	
Finland	1,005	114.1	33	63	26	59	
South Korea	1,199	17.7	60	18	39	85	75
Poland	981	81.3	68	60	64	93	32
Switzerland	1,240	126.7	34	68	70	58	
Brazil	1,492	124.7	69	38	49	76	65
Chile	955	133.3	63	23	28	86	
India	1,593	144.8	77	48	56	40	61
Bulgaria	926	29.2	70	30	40	85	
Romania	1,546	90.3	90	30	42	90	
China	1,919	39.1	80	20	66	30	118
Taiwan	1,222	47.4	58	17	45	69	87
Turkey	1,309	160.8	66	37	45	85	
Russia	1,911	40.3	93	39	36	95	
Peru	1,458	90.9	64	16	42	87	
Uruguay	994	117.0	61	36	38	100	
Ghana	1,521	206.1	77	20	46	54	16
Thailand	1,528	37.5	64	20	34	64	56
Indonesia	1,948	104.9	78	14	46	48	
Viet Nam	1,383	98.8	70	20	40	30	80
Morocco	1,162	156.1	70	46	53	68	
Iran	2,652	134.6	58	41	43	59	
Trinidad	1,000	123.1	47	16	58	55	
Malaysia	1,201	88.0	104	26	50	36	
Mali	1,501	167.8	77	20	46	54	16
Germany	2,029	88.8	35	67	66	65	31
Total	70,804	104.6	60	45	47	65	49
Correlation			-0.08	0.12	-0.19	-0.34	-0.64
Value of r ²			0.01	0.02	0.04	0.12	0.41

Index calculation described in Appendix A.

Hofstede indicators retrieved from: <http://www.geert-hofstede.com>

NOTES