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## **High on PISA, Low on Entrepreneurship? What PISA Does Not Measure**

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**ABSTRACT** The authors discuss the hypothesis that high achievements on standardized tests may reflect a school system's efficient functioning as a disciplinary mechanism, representing the absence of independent and creative thinking. To focus the debate, they concentrate on entrepreneurialism, a key indicator of a person's ability and willingness to take risks in the pursuit of innovation, and a key prerequisite for economic prosperity. Entrepreneurialism, they argue, is not only unrelated to the attitudes and dispositions that may produce high scores on standardized tests like the Programme for International Student Assessment (PISA), it is often their exact opposite. For illustration they focus on East Asian countries often touted as paragons of high educational achievements. They find that individualist and collectivist cultural dispositions produce opposite effects on tests like PISA on the one hand and entrepreneurialism on the other. Individualism is often positively related with entrepreneurialism, but not necessarily with the disciplined obedience that produces above-average test scores. By contrast, countries whose cultural traditions emphasize the individual's subordination to the collective are naturally less well suited to preparing students for entrepreneurial careers, while the norm to subordinate oneself to the group makes the teacher's job much easier.

### **Introduction**

Education is a better safeguard of  
liberty than a standing army. (Edward Everett)

An educated people can be easily governed.  
(Frederick the Great)

The two quotes above point to a deeply ambiguous relationship between education and freedom. The Harvard-educated Edward Everett emphasizes education's emancipatory potential, while the Prussian autocrat Frederick the Great sees education as a tool to govern and control a people. In the current policy climate, analysts and administrators tend to automatically assume that the democratic function prevails in modern education systems and that high scores on tests like the Programme for International Student Assessment (PISA) reflect a nation's progress in that direction. This chapter challenges that assumption. We argue that high achievements on standardized tests may also reflect a school system's efficient functioning as a disciplinary mechanism, representing the absence of independent and creative thinking. To focus the debate, we concentrate on entrepreneurialism, a key indicator of a person's ability and willingness to take risks in the pursuit of innovation, and a key prerequisite for economic prosperity. Entrepreneurialism, we argue, is not only unrelated to the attitudes and dispositions that may produce high scores on standardized tests like PISA, it is often their exact opposite. For illustration we focus on East Asian countries often touted as paragons of high educational achievement. To take the reader inside countries like China or Singapore, where opinion is often heavily censored, we draw on non-traditional sources like blogs and web pages.

### **Chinese Discontent with a Weak Entrepreneurial Tradition**

'China needs (Steve) Jobs,' China's Premier Wen Jiabao told a group of business leaders in Jiangshu during his tour of one of the most developed provinces in China in December 2011. 'We must have products like Apple's that can dominate the world's markets.' Wen's comments reflect China's desire for innovative and entrepreneurial talents. A few days after Job's passing, China's Ningbo City of Zhejiang Province, for example, announced that it planned to spend 50 million *yuan* to cultivate innovative entrepreneurial talents in October 2011. The city government planned to produce 1400 top entrepreneurs in five years, according to the *Ningbo Evening News*, a local paper of the city (Luo et al, 2011).

The news added fuel to an already raging discussion about China's lack of entrepreneurs. Kai-fu Lee, one of the most influential Chinese-American technology gurus, who has dedicated himself to incubating young entrepreneurs in China, remarked that 'the next Apple, the next Google will come, but probably not in China'. Kai-fu Lee is founder of Innovation Works, an investment company aimed at cultivating innovative entrepreneurship in China. Lee was former founding president of Google China and former vice president of Interactive Services of Microsoft after working at Apple as a research and development executive (Caijing, 2010). 'At least not in the next 50 years or 100 years there will not be an Apple or Google in China,' he said at the World Economic Forum's Summer Davos in Tianjin, China, in September 2010. Lee migrated from Taiwan to the United

States at 11 and received his undergraduate education at Columbia and earned a PhD from Carnegie Mellon University.

Lee's message was echoed in another round of heated discussion ignited by the passing of Steve Jobs a year later. 'Searching for Jobs', 'Can China Produce Steve Jobs?', 'Why Cannot China Have Jobs?' headlined blog posts and commentaries in traditional media. Education, again, was identified as the culprit. One of the most reposted articles on blogs, online forums and websites was titled 'Had Steve Jobs Been Born in China'. In this article, whose original author cannot be traced because of numerous reposts and modifications, the author or authors ponder what would have happened to Steve Jobs if he had been born in China:

If Jobs had been born in China, he would have had a very low self-esteem because he was born out-of-wedlock. He would have been mocked by his classmates all the time. To defend his dignity, Jobs would have been involved in daily fights with his classmates. As a result, his parents would have been forced to transfer him to a different school. But thanks to his talents, he had good grades and passed the exam to a decent middle school.

Jobs would not have had any interest in rote memorization of the textbooks in middle school and told his parents that he decided to quit school. His parents would have beaten him to submission after having failed to convince him with words. Jobs would have had no choice but to go on. But because he had no interest in studying, his grades would have become so bad, and he did not do well on the exam, so he ended up in a third rate high school.

In high school, Jobs met Steve Wozniak. The pair had a great passion for electronic products. They won first prize in the national innovation contest. Nevertheless, because of his poor test scores in English, Chinese, and Chemistry, both Jobs and Wozniak ended in a no-name three-year college.

Ironically, many of the details in this hypothetical story are reinforced by the picture Jobs' biographer, Isaacson, draws of him in his recent biography (Isaacson, 2011). There he points out that Steve Jobs, who was often bored by the mechanical routine of the school day, was best known in his school for pulling ingenious pranks that, more often than not, got him into trouble with teachers and administrators.

The above criticism stands in sharp contrast to China's reputation derived from results at international tests. Its stunning No. 1 showing on the most recent PISA in math, sciences and reading has convinced many that it is an 'education giant' (Tucker, 2011b). 'Surpassing Shanghai' has become a goal of American educators, as suggested by the title of a recent book authored by leading experts in the United States and published by Harvard Education Press (Tucker, 2011a). But why is such an 'excellent education

system' held responsible for China's failure to produce entrepreneurial talent? Apparently there is a mismatch of understanding of educational excellence.

### **The Singapore Puzzle: education giant, entrepreneurial dwarf**

The mismatch goes beyond China. The passing of Steve Jobs also incited a round discussion about creativity and entrepreneurship in another Asian country. On 14 December 2011, Steve Wozniak, who founded Apple with Steve Jobs, said during an interview on the UK radio network BBC that a company like Apple could not emerge in structured countries like Singapore:

When you're very structured almost like a religion ... Uniforms, uniforms, uniforms ... everybody is the same. Look at structured societies like Singapore where bad behavior isn't tolerated. You are extremely punished. Where are the creative people? Where are the great artists? Where are the great musicians? Where are the great singers? Where are the great writers? Where are the athletes? All the creative elements seem to disappear. (Wozniak, 2011)

Wozniak's comments quickly got the attention of Singaporeans, who have been working hard at promoting creativity and entrepreneurship (Mahtani & Holmes, 2011; Wee, 2011; Ong, 2012). As expected, there are some who disagreed with Wozniak's assessment, but the overall reaction is that he told the truth. Singaporean entrepreneur Willis Wee wrote:

I'm not sure how much Wozniak knows about Singapore and its system. But as a Singaporean, who grew up in this tiny island, I have to agree with his words ...

We're big thinkers and very ambitious. What's really lacking is the guts to do things. Only few have the balls to do what they really want. And unfortunately, most Singaporeans who aren't that courageous end up as Thank-God-Its-Friday laborers, or folks who are always looking forward to Friday and the paycheck. They are the people who complain about their lives the most, not the entrepreneurs and creative minds. (Wee, 2011)

Alexis Ong, a Singaporean journalist, wrote on CNN in January 2012, 'At first glance, it made the small pseudo-patriot in me annoyed, but for the most part, the great and mighty Woz speaks the truth.' Ong goes on to suggest that it is Singapore's education system that is to blame:

Wozniak's comments are really a scathing indictment of the Singapore education system, its strictly regimented curriculum and by-rote study techniques that sustain the city's 'formal culture.' He points out that everybody is 'educated,' but clearly the Singaporean education isn't the kind of education that gives rise to the people like Sergey Brin and Mark Zuckerberg ... This mindset is cultivated from youth. But in Singapore, where

children are streamed into different academic tracks and under pressure to get into a reputable school before the age of 12, the push to conform is enormous. (Ong, 2012)

Singapore is supposed to have an excellent education system as well. Like China, Singapore has been a country of envy and admiration by outsiders for its consistent high performance in international tests. Since the early 1990s, Singapore has ranked in the top five in the Trends in International Mathematics and Science Study (TIMSS). In the most recent PISA, Singapore took the second place in math, fourth place in sciences, and fifth in reading, whereas China was first in all three areas. Singapore thus represents another case of contradiction between test scores and creative entrepreneurship.

### **The Inverse Relationship of Test Scores and Entrepreneurial Attitudes**

This contradiction also exists in other high-performing countries. Korea and Japan are two other Asian countries that have consistently produced outstanding scores in international tests. In the most recent PISA administered in 2009 in over 60 countries, Korea ranked fourth in math, sixth in sciences and second in reading, while Japan was ninth in math, fifth in sciences and eighth in reading. As impressive as their test scores, these countries have not traditionally shown a level of creativity and innovation-driven entrepreneurship that matched their test scores. According to the 2010 Global Entrepreneurship Monitor (GEM) report, out of the 22 innovation-driven, economically developed countries (which China is not part of; also, Singapore did not participate in the GEM study), Korea and Japan were at the bottom, taking 19th and 21st place, respectively, in terms of 'nascent entrepreneurship rate' or percentage of people actively seeking to establish businesses in the next three years. In terms of 'total early entrepreneurship ownership rate', or percentage of individuals who started and are still managing a business, Korea ranked seventh and Japan 21st. The same pattern was found in the 2011 GEM report.

An even more telling figure is the small proportion of opportunity entrepreneurship that exists among the total number of early entrepreneurs. Less than half of all the early entrepreneurship activities in Korea and Japan were driven by opportunity and improvement; the rest were driven by necessity. In this category, Korea ranked 16th and Japan 18th.

The contradictory relationship between test scores and entrepreneurship activities is further affirmed by an analysis of PISA performance and entrepreneurship activities of nations. Thirty-eight out of the 53 countries surveyed by the Global Entrepreneurship Monitor in 2010 also participated in the 2009 PISA. Thirty-nine countries out of the 54 economies surveyed by the GEM in 2011 participated in the 2009

PISA. Table I displays the correlation between PISA raw scores and new entrepreneurship activities in these countries.

	Reading		Math		Sciences	
	2010	2011	2010	2011	2010	2011
Entrepreneurial intentions	-.57**	-.71**	-.52**	-.72**	-.59**	-.73**
Nascent entrepreneurship rate	-.69**	-.73**	-.64**	-.74**	-.68**	-.73**
New business ownership rate	-.37*	-.73**	-.37*	-.70**	-.39*	-.66**
Total entrepreneurial activity	-.66**	-.77**	-.62**	-.79**	-.66**	-.78**
Discontinuation of business	-.58**	-.53**	-.57**	-.54**	-.61**	-.56**

\*\* $p < .01$ ; \* $p < .05$ .

Table I. Correlations between PISA raw scores and new entrepreneurship activities.

As Table I shows, PISA scores in all three areas – reading, math and sciences – are negatively correlated with entrepreneurship indicators in almost every category at statistically significant levels. In other words, countries that have higher PISA scores have lower entrepreneurship attitudes. Specifically, those countries that show better performance on the PISA tend to have fewer people who intend to or plan to start businesses and fewer people who have started new businesses.

The inverse relationship between PISA scores, often perceived as the measure of a nation's education quality and its students' academic abilities, and entrepreneurship activities, an indicator of a nation's entrepreneurial actions, seems to affirm the contradiction exemplified by Singapore and China. That is, the commonly used measures of educational quality have negative or no relationships with entrepreneurship.

Additional data suggest that entrepreneurship activity may be related to schooling. For example, the Kauffman Index of Entrepreneurial Activity produced by the Kauffman Foundation shows that during the period from 1996 to 2010, the group with less than high school education showed a consistently higher rate of entrepreneurial activity than all other groups (high school graduates, those with some college, and college graduates) in the United States (Fairlie, 2011). A Harris Poll conducted in 2010 for the Kauffman Foundation found that although there is no difference in the percentage of individuals who said they may start a business someday among three youth groups – 8-12-year-olds, 13-17-year-olds, and 18-24-year-olds – a lot more 18-24-year-olds (29%) than 8-12-year-olds (15%) said no. The 18-24-year-olds certainly have more schooling than the 8-12-year-olds (Harris Interactive, 2010).

The Global Entrepreneurship Monitor report included data concerning entrepreneurial qualities – that is, personal factors that affect people's potential engagement in entrepreneurial activities. These factors have been established to predict to what degree one may decide to start a business. They include personal perceptions of the availability of entrepreneurship opportunities, to what degree a person has the capability to succeed in

business, the degree of fear of failure, whether entrepreneurship is a good career choice, whether successful entrepreneurs enjoy high social status, and how much the media pays attention to entrepreneurship. Table II summarizes the correlations between these factors and the 2009 PISA results of 38 countries that participated in both PISA and GEM in 2010 and 39 countries that participated in both the 2009 PISA and the 2011 GEM.

	Reading		Math		Sciences	
	2010	2011	2010	2011	2010	2011
Perceived opportunities	-.35*	-.40*	-.33*	-.39*	-.38*	-.43**
Perceived capabilities	-.60**	-.69**	-.59**	-.72**	-.61**	-.72**
Entrepreneurship as a good career choice	-.50**	-.64**	-.45**	-.63**	-.53**	-.66**

Table II. Correlation between PISA raw scores and entrepreneurial qualities (all countries).

The results show a clear pattern of negative correlations between countries' PISA performance and entrepreneurial qualities. In countries that have higher PISA scores in math, reading and sciences, fewer people believe there are entrepreneurial opportunities, fewer people believe they have the capability to start and succeed in entrepreneurship, and fewer people believe entrepreneurship is a good career choice.

Educational practices and societal factors that help students to achieve academically may hamper entrepreneurial qualities, making them believe there are few entrepreneurial opportunities or that they do not have entrepreneurial capability. Standardized testing and a focus on rote memorization, for example, are perhaps the biggest enemies of entrepreneurial capability.

A contrast between Finland and the East Asian countries illustrates this point. Since the end of the Cold War, which also ended decades during which Finland lived economically and socially in the shadow of its mighty neighbor, the Soviet Union, entrepreneurial innovation has risen dramatically, with companies like Nokia taking the lead. Not coincidentally, the Finns possess a much higher level of perceived entrepreneurial capability than the East Asian countries. In the 2011 Global Entrepreneurship Monitor Survey, 37.3% of Finns reported having the capability for entrepreneurship, more than 20 percentage points higher than the Japanese (13.7%), more than 10 percentage points higher than the Koreans (26.7%) and Singaporeans (24.1%), and nearly 10 percentage points higher than the Taiwanese (28.6%). This difference may come from the different style of education in Finland compared with the East Asian countries. Unlike the high-performing education systems in East Asia that have a well-known reputation for authoritarian and standardized-test-driven education that emphasizes rote memorization, Finnish students do not take standardized tests until the end

of high school. Finnish schools are a standardized-test-free zone, according to Pasi Sahlberg in his book *Finnish Lessons: what can the world learn from educational change in Finland?* (Sahlberg, 2011). As a result, students in Finland are not pushed toward rote memorization. Finnish education is certainly not nearly as authoritarian as its Asian counterparts. Most important, as education historian Diane Ravitch observed, ‘the central aim of Finnish education is the development of each child as a thinking, active, creative person, not the attainment of higher test scores, and the primary strategy of Finnish education is cooperation, not competition (Ravitch, 2012).

The data suggest that high PISA scores may be the result of ‘forced excellence’.

### **Early Childhood Socialization: ‘the nail that sticks out ...’**

In this section we provide evidence for the idea that the above-documented differences are not the result of teaching styles, but are, in fact, deeply rooted in culture and, in particular, early childhood socialization. Research documents the differences in early childhood socialization that produce an individualistic habitus in countries like the United States and a conforming, harmony-seeking habitus in many Asian cultures. A good example is the study *Pre-school in Three Cultures* by Tobin et al (1989). They describe how patterns of collectivism and individualism are instilled in children via pre-school teaching practices early on. Their study focuses on China, Japan and the United States. In the case of China it shows high degrees of regimentation of the pre-schooler’s life. Not only do these children learn, eat and sleep together, they even go to the bathroom as a group and in lockstep.

The book also shows the case of Hiroki – a five-year-old boy in a Japanese pre-school. Hiroki tends to keep to himself, rejects attempts to include him in activities, and interacts with his peers only to start a fight. The Japanese pre-school teachers not only refused to give special treatment to him, they also encouraged the group to find ways of coping with the boy and the problems he created (pp. 16-17). In stark contrast to American practice, Japanese teachers focused their efforts on assisting the group to integrate their various members – however much they might at first resist conforming.

These examples illustrate the emphasis on integrating themselves with and subordinating themselves to the larger group. In the context of the present study, we also note the propensity of collectivist cultures not to individualize certain students by attaching labels to them (‘emotionally disturbed,’ ‘learning difficulty’) or by segregating them from the majority of their peers. Instead, Japanese or Chinese educators expect that even ‘difficult’ students can be brought in line with the group.

Hiroki’s case forms an interesting contrast to a similarly ‘difficult’ child in an American pre-school. In that case the teachers isolate the child from the



group, and treat him with a mixture of warnings and punishment ('time out').

Cases like these illustrate how collectivist and individualist cultures instill norms about the self/group relationship early on, minimizing individual differences in one case, and reinforcing them in the other; subjecting the child to the discipline of the group in the former, while isolating him from the group in the latter; applying group norms in the former, while reasoning with the child in the latter.

In fact, anthropological researchers have identified 'harmonious interdependence' (Markus & Kitayama, 1991), cooperation, solidarity and social conformity (Frager, 1970) as characteristics of *collectivism*. Members of collectivist cultures feel secure when they are well integrated into their community because it leads them to believe they might achieve harmony, while members of individualist cultures always reserve the right to 'go their own way'.

The pursuit of harmony has both positive and negative effects. While providing a sense of belonging, it also leads to devaluing what is new, different or unfamiliar. Those who are not like others in their community may become the object of discrimination. Robert LeVine, a prominent researcher on comparative early childhood socialization, has pointed out how 'separateness, self-sufficiency, and self-confidence' are 'pervasive theme[s] of American child rearing ideology' (LeVine, 2003, p. 93). 'The emphasis on separateness begins at birth among middle-class Americans...'

#### **Discussion: individualism, collectivism and 'forced excellence'**

Cultures shape behavior. Through intermediary institutions like schools, pre-schools and the family, they instill lasting differences among the normative orientations of students (Meyer, 2002). Countries like the United States, which tend to garner 'mediocre' scores on tests like PISA, are high on traits like individualism and low on traits like collectivism (Triandis, 1990; Hofstede, 2001; Schimmack et al, 2005). Individualism goes along with the willingness to stand out from the group. It also is associated with a stronger sense of self-confidence. Both the willingness to engage in non-conformism and the willingness to believe in oneself are characteristics of entrepreneurialism, as entrepreneurs must be ready to take risks and to deviate from the beaten path.

Confidence is a key factor in entrepreneurship, as Gary Rabbior, longtime entrepreneurship educator and executive director of the Canadian Foundation for Economic Education, writes:

There is no more important attribute of entrepreneurship than a sense of self-confidence, the belief in oneself and one's own ideas. Entrepreneurs are agents of change, and change is usually resisted. Entrepreneurs will continually confront roadblocks and resistance

from individuals who do not support or believe in their ideas. ...  
To confront and overcome the resistance they will encounter, it is  
imperative that entrepreneurs have a sense of self-confidence.  
(Rabbior, 1990, p. 61)

By contrast, countries whose cultural traditions emphasize the individual's subordination to the collective (DeBarry 1991; Greif, 1994; Weber, 1988) are naturally less well suited to prepare students for entrepreneurial careers. On the other hand, the norm to subordinate oneself to the group makes the teacher's job infinitely easier. Students are compliant and even docile, exhibiting reverence and deference for their teacher in and out of the classroom. To challenge the teacher is largely unheard of.

Nations' scores in international tests do not go the same way as their entrepreneurship activities, their perceived entrepreneurial capabilities, and their students' self-confidence. In other words, superior test scores do not result in more creative entrepreneurs. On the contrary, they may hamper the development of entrepreneurial and creative activities.

True knowledge begins with a moment of confusion and puzzlement – puzzlement that needs to be honored, cultivated, and built upon. Having a two-digit number returned as a machine's answer to a student's three- or five-hour wrestling with a multiple-choice test is not a way to cultivate puzzlement. Steve Jobs is on record as saying that the California school system almost broke his curiosity. What kept him engaged with the schools were (a) his incessant pranks (landing him regularly in suspension), and (b) the one or two exceptional teachers who recognized his creative energies and provided him with opportunities to deploy them constructively.

Socrates famously warned against the Sophists who went around Athens promising to turn inarticulate youngsters into effective rhetoricians – for a fee. A well-trained Sophist could argue any cause, regardless of its merits, by framing facts and legitimizing them as incontrovertible evidence, backed by expert authority. Socrates opposed the Sophists' overconfidence and arrogance. He may have been the first to oppose the 'sage on the stage' model of learning, instead opting for learning as *open-ended conversation*. We will stand in the best tradition of western rationalism if we question the authority of global assessments, contextualize their meaning, and delineate their utility, thereby increasing the wisdom of both test-makers and test-consumers.

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