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# Employer Voices, Employer Demands, and Implications for Public Skills Development Policy

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## Abstract

Educators believe that they are adequately preparing youth for the labor market while employers lament the lack of skills. A possible source of the mismatch in perceptions is that employers and educators have different understandings of the types of skills valued in the labor market. This paper uses economics and psychology literature to define four skills sets: socio-emotional, higher-order cognitive, basic cognitive, and technical skills. The paper reviews the literature that quantitatively measures employer skill demand, as reported in preference surveys. A sample of 28 studies reveals remarkable consistency across the world in the skills demanded by employers. Although employers value all skill sets, there is a greater demand for socio-emotional and higher-order cognitive skills than for basic cognitive or technical skills. These results are robust across economy size and level of development, sector,

export-orientation, and occupations. Employers perceive that the greatest skills gaps are in socio-emotional and technical skills. These findings suggest the need to re-conceptualize education and training systems. Taking into consideration the developmental process to acquire the skills identified by employers, this implies the need to recognize that (a) the job-skills development process necessarily begins at birth and continues throughout the life cycle so skills policy should, as well; (b) schools play a relevant, but limited, role in skills development and the role of parents, mentors, and the work place must be defined and enhanced; and (c) the skills most demanded by employers—higher-order cognitive and socio-emotional skills—are largely taught (the former) or refined in secondary school, which argues for a general education until these skills are formed.

Produced by the Research Support Team

**EMPLOYER VOICES, EMPLOYER DEMANDS, AND IMPLICATIONS FOR PUBLIC SKILLS DEVELOPMENT POLICY[1]**

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## I.    Introduction

In recent years, there has been a flurry of activity around a merging of economic and psychological thought and research regarding the concept of "skills" and how it is related to economic success. Hundreds of papers have estimated the returns to education using "years of schooling" to measure the impact of skills acquired on labor market success (see sources cited in Hanushek and Woessmann 2008, p. 615).  Hanushek and Woessmann (2008) argues that this previous research suffers from serious measurement error[2] and should be discarded in favor of exploring the role that skills, rather than years of education, play in driving individual and aggregate economic success.  The economists, largely led by the research and writings of James Heckman and co-authors,[3] have refined the concept of "skills" to encompass "cognitive" skills – roughly measured by IQ – and "non-cognitive" skills, roughly defined as personality traits and socio-emotional behaviors.

Cognitive skills are a much better predictor of individual and aggregate income than are years of schooling (see sources cited p. 617 in Hanushek and Woessmann 2008).   For example, studies that use longitudinal data to regress labor force variables of young adults on cognitive test scores collected while the sample was in high school, find that a one standard deviation increase in a mathematics test score in 12th grade is correlated with 10-15 percent higher annual earnings by mid-twenties to early thirties (Mulligan 1999, Murnane et al. 2000, Lazear 2003).  Similar results are found for the UK (McIntosh and Vignoles 2001) and Canada (Finnie and Meng 2001).  Using literacy scores (to proxy cognitive skill measures) and labor force behaviors from the International Adult Literacy Survey (IALS), Hanushek and Zhang (2009) finds that a one standard deviation increase in literacy scores increases earnings by 9.3 percent in a 13 country sample.  The impact of school attainment falls from 7.1 to 5.9 percent after controlling for literacy scores.  A small set of papers find an impact of cognitive skills on wages in developing countries as diverse as Ghana (Glewwe 1996), Kenya (Knight and Sabot 1990), Pakistan (Alderman, Behrmann, Ross and Sabot 1996), and South Africa (Moll 1998).

Cognitive skills are necessary but not sufficient for economic success; for higher wages and greater employability, they must be complemented by non-cognitive skills.[4]  The idea that non-cognitive skills are an important driver of economic success can be traced to Bowles and Gintis (1976) that explains that

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[2] Hanushek and Woessman (2008) identify two sources of measurement error.  First, there is a great deal of heterogeneity in the skills acquired at each level of schooling across countries, regions within countries, and schools within regions.  Second, much skill acquisition occurs outside of the classroom (Hanusheck 1979).
[3] For examples, see Almlund et al. (2011) and Borghans et al. (2008) for reviews of the economics literature.
[4] Bowles, Gintis and Osborne (2001a), Mueller and Plug (2006), Carneiro, Crawford and Goodman  (2007), and Kniesner and ter Weel (2008)  find that personality traits matter more than cognitive skills for employment outcomes, especially among occupations requiring basic cognitive skills (Bowles, Gintis and Osborne 2001).

a measurable part of the variance in earnings among observationally equal individuals, particularly those with equal levels of education, are due to behavioral skills.[5] These skills are passed down, whether genetically or by mimicking, in families that benefit from the returns to these behaviors. Heckman and Rubenstein (2001) uses a completely different approach to find similar results; the paper finds that GED[6] graduates, while they have the same level of cognitive skills as high school graduates, earn wages similar to those of high-school dropouts. The authors conclude that the additional cognitive skills cannot compensate for non-cognitive skill levels shared with high school dropouts. Similarly, Carneiro and Heckman (2003) find that participants in the Perry Pre-School program, who received intensive non-cognitive development, have similar cognitive abilities but higher non-cognitive abilities as non-participants who were randomly selected out of the program; participants also have greater scholastic and labor market success as adults. Inspired by the program evaluation research, Heckman, Stixrud and Urzúa (2006) find that both cognitive and non-cognitive skills are important in explaining higher wages, shorter job search periods, and occupational choice, and that non-cognitive skills are particularly important for those with lower levels of education, women, and youth. Lindqvist and Vestman (2011) find that cognitive and, especially, non-cognitive skills are important determinants of unemployment incidence and duration, particularly for the less skilled. Wichert and Pohlmeir (2012) and Glewwe, Huang and Park (2011) find that both cognitive and non-cognitive skills affect labor supply patterns.

Technical skills are often associated with "job training" in policy circles, but the evidence of economic success due to acquisition of these skills is weak. A review by Betcherman et al. (2007) of job training programs across the world finds, at best, positive returns to technical training for women and, in some cases, youth. More commonly, technical training programs yield zero, or negative rates of return, the latter indicating that more valuable skills would have been acquired if that person had spent her time working rather than in a training course. Tan and Nam (2012) review recent studies estimating the wage premium for technical compared to general training and find higher returns to general education. However, the results are inconclusive since none of the studies reviewed control for ability

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[5] Different studies identify different personality traits that most correlate with higher wages. Kern et al. (2013) provide evidence that agreeableness and conscientiousness are associated with higher earnings. Others suggest that those two traits are more rewarded for women whereas antagonism (the opposite of agreeableness), emotional stability (the opposite of neuroticism) and openness to experience are more rewarded among men (Mueller and Plug 2006). Locus of control (motivation), persistence and self-esteem seem to play a predicting role on labor market outcomes, though the strength of the correlation differs by gender and occupation (Heckman, Stixrud and Urzúa 2006, Osborne-Groves 2005). Grit, as defined as perseverance and passion for long-term goals, seems to have great influence on professional success (Duckworth et al. 2007).
[6] The GED - General Education Development – is a high school equivalency program in the US. Those who successfully complete the GED receive the equivalent of a high school degree.

bias. New research by Prada (forthcoming) finds that vocational skills acquired in high school have a positive impact on post-graduation labor earnings, but these returns are significantly lower than returns to cognitive and non-cognitive skills.[7]

In spite of this research, most education and training systems continue to teach a 1950s facts-based curriculum in a skills-hungry labor market. Many countries are seeing falling returns to education and youth are increasingly dissatisfied by the education that they are receiving. For example, Aedo and Walker (2012) find that returns to secondary and tertiary education across the Latin America region have been falling over the past two decades; they argue that this is due to stagnant education quality rather than an increased supply of students at these grade levels.[8] While 72 percent of education providers interviewed in a global study believe that their students are prepared for the labor market, only 42 percent of employers have the same view (Mourshed, Farell and Barton 2012). A similar gap emerges in a study of employers in the Middle East and North Africa, with 20-35 percent of employers feeling that young graduates have the necessary skills for the labor market, in contrast to such a belief among almost all the education providers interviewed (IFC 2010). Students themselves are observing this trend and increasingly explaining their reason for dropping out of secondary school or not continuing to tertiary is due to a lack of relevance of what schools are teaching (Cunningham et al. 2007). As schools, particularly in developing countries, continue to focus on teaching basic cognitive skills and facts, and governments continue to equate "labor market skills" with technical skills, employers continue to lament the difficulty in finding workers even in high unemployment economies.

Notably, employer voices are absent from the debate. While one may argue that the supply-side data tell the whole story, they are not likely to capture the employer preferences for several reasons. First, supply-side surveys are necessarily a self-report of skills levels and therefore noisy data. Second, if skills are measured in supply side surveys, they are commonly confined to a subset of skills, namely those captured by standardized test scores and, in rare occasions, more comprehensive cognitive tests such as the PPVT or the Raven, to measure cognitive skills and the Goldberg Big Five to measure

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[7] Prada and Urzúa (forthcoming) shows that acquisition of more cognitive and non-cognitive skills is not necessarily income improving for all students. Instead, those with high level of technical skills and low levels of cognitive and non-cognitive skills benefit more from not going to college and staying just with the technical skills track.
[8] A related stream of work examines the evolution of the tasks content – and therefore the underlying skills – of different occupations. Autor et al. (2003) and Acemoglu and Autor (2011) find that the skills content of US occupations has moved away from routine manual tasks and toward higher-order (non-routine analytical) cognitive and socio-emotional (non-routine interpersonal) tasks. Similar trends are observed in other OECD countries (Handel 2012) and in a sample of six Latin American countries (Aedo et al. 2013). These data are derived from an observed equilibrium and are useful to understand the patterns of occupational skill content, though the results cannot be extrapolated to unmet employer demand.

personality traits.[9]  While these provide some insights, they are too aggregated to be useful for policymakers to design education and training systems and programs.  Third, supply side surveys rarely measure technical skills.  While they may ask the respondent whether she uses a technical skill in her work, this is more a measure of the skills profile of the job rather than the skills the person possesses.  Fourth, the results from the supply side data measure the equilibrium observed by the current supply and demand of skills, rather than allowing for an unconstrained revealed preference of employers.

The lack of employer voices in this debate is not surprising given how recent the economic research on this topic is and how far employers often are from education policy circles.  However, small surveys in a range of countries have produced several data points to allow us to sketch a picture of employer preferences and demands.

This paper posits that employers demand a different set of skills than traditional education and training systems are designed to deliver and that there is a gap in the types of skills that employers value in the work place and those that the labor force acquires.  Implicitly, it examines whether there is a disconnect between the skills formation system and the skills utilization system.  And, if there is such a disconnect between the supply and demand for skills, what public policies and programs can fill these gaps.  It also tests the assumptions that higher-order and non-cognitive skills are only a developed-world need and that these skills are relevant for only a sub-set of occupations.

This paper contributes to the literature in three ways.  First, it uses results from employer surveys to develop a skills demand profile of employers.  It is the first review article, to our knowledge, that systematically pulls together information on employer demand for skills across countries and various studies.  Second, it is the first review article that provides cross-country comparisons to conclude whether or not employer skills demand profiles are unique to certain countries, industries, sectors, etc. or if there are common patterns that cut across markets.  Finally, it brings together two policy lines that often move in parallel although they are intricately linked: education and labor.

## II.        Concepts and Definitions

For the purposes of this paper, "skills" are defined as the capacity to perform a specific task.  We break skills that are useful for the labor market into three categories: cognitive, technical, and socio-emotional.

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[9] A commonly used measured of personality traits is the Goldberg Big Five.  The survey instrument asks a series of questions and then uses a factor analysis to extract personality traits.  Commonly, five factors break out.  Each personality trait has been associated with labor market outcomes in various studies (Barrick and Mount 1991).

The American Psychological Association (APA) defines cognitive skills as the "ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought" (Neisser et al. 1996).  This may include intelligence, reasoning, information-processing, perception, memory, literacy, numeracy, and learning. We can differentiate between "lower-order cognitive skills," which capture basic academic knowledge including literacy and math, and "higher-order cognitive skills" that encompass the capacity to deal with complex information processing in a professional environment (Herrnstein and Murray 1994, Murnane, Willett and Levy 1995, Gottfredson 1997, Cawley, Heckman and Vytlacil 2001, Hanushek and Woessmann 2008).[10]  Measures of cognitive skills include IQ Tests and standardized achievement tests, such as the Program for International Student Assessment (PISA), that assess competency level in mathematics, science, literacy, and/or logic.[11]

The psychology literature defines technical skills as a sub-set of cognitive skills (Almlund et al. 2011). Technical skills can be defined as those abilities that are associated with the specific knowledge to carry out one's occupation.  This may be the ability to repair a car's muffler, the knowledge to identify specific bacteria under a microscope, or the know-how to sew dozens of shirts per hour.  Measurement is typically observational, where a person performs a task and the related skills are assessed.

The definition of socio-emotional skills is less standard.  Socio-emotional skills, referred to by economists as "non-cognitive skills", are behaviors, attitudes, and personality traits that determine how we do things. [12]  For example, grit to finish a job, working in teams, organization, commitment, creativity, and honesty are the abilities to apply cognitive skills and technical abilities to actually achieve the work objective efficiently.  Socio-emotional skills can be classified into three groups.  "Traits" are characteristics or patterns of thought and action that are relatively stable over the life cycle; "behaviors" are actual performance in response to stimulation; and "beliefs" encompass attitudes and values that guide skill formation and behavior.

The socio-emotional measurement tools differ by type of skill to be quantified.  A widely accepted taxonomy to measure personality traits is the Big Five Model (Goldberg 1993). Each of the five

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[10] These "new economy" skills or 21st century skills - critical thinking, problem solving, oral and written communication, collaboration and adaptive learning - are needed to perform non-routine tasks. For example, as technology upgrades in firms, repetitive, predictable tasks are automated and workers performing routine tasks are substituted by computers, which themselves need to be complemented by workers who perform non-routine problem solving (Autor, Levy and Murnane 2003).

[11] For a summary of tests to measure cognition, see Almlund et al. (2011).

[12] Although these skills clearly involve some level of cognition, they have been designated as "non-cognitive skills" by economists to differentiate them from academic/learning skills.

personality factors - openness to experience (also called intellect or culture), conscientiousness, extraversion, agreeableness, and neuroticism (or emotional stability) - summarizes a large number of distinct, more specific personality traits, behaviors, and beliefs. Measures of behaviors and beliefs focus on what individuals actually do rather than self-appraisal of skill competence.  Given the absence of an agreement on a single set of behaviors and beliefs, there are a multitude of tests measuring a range of dimensions based on the researchers' theoretical biases (Almlund et al. 2011).

### III.    Data and Methodology

### 3.1    Data

This paper is intended to be a review paper and thus does not present original research. Instead, it draws from the published literature across a range of fields.  All the sources used as data for this paper generated statistics based on raw data from employer surveys, most of which were specialized surveys collected for the purpose of understanding employer skills needs.  The sample frame for each cited study is available from the authors.

The sample was drawn from a search of five databases.  First, we conducted a search on Google Scholar using a large set of key words (see Table 1). This search produced papers from literature across various fields, including economics, human resources psychology, industrial sociology, management and education. Second, we searched in IDEAS-RePEc[13] using the set of key words in Table 1.  We conducted the search within the following JEL codes[14]: J23 (Labor Demand) and J24 (Human Capital; Skills; Occupational Choice; Labor Productivity) which are part of the J2 code corresponding to Demand and Supply of Labor. Third, we searched the EconLit database[15] using the key words listed in Table 1. Fourth, we searched the education literature through ERIC (Education Resources Information Center[16]), one of the main databases dedicated to education literature. In addition we consulted the publications of institutions dedicated to research in the education field such as the NCEE (National Center on Education and the Economy) and the IAE (International Association for the Evaluation of Educational Achievement). Finally, we conducted a search of the psychology literature through the database of the

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[13] IDEAS-RePEc (Research Papers in Economics) is the largest bibliographic database dedicated to Economics in which most of the papers are fully downloadable. http://ideas.repec.org/
[14] Classification by the Journal of Economic Literature (JEL) which is widely used in research papers in Economics.
[15] EconLit is the American Economic Association's electronic bibliography. www.aeaweb.org/econlit/
[16] www.eric.ed.gov

APA (American Psychological Association) and through PsyContent,[17] a database specialized in psychology and psychiatric journals.

We also implemented a snowball approach by searching the citations of relevant papers we found in the demand-for-skills literature even when these specifically did not base their analysis on employment surveys. Likewise, we followed a similar approach to improve the key words list. We selected key words from research documents that were relevant for our analysis and added them to our list of key words.

Finally, we employed combinations of key words in Table 1, in order to improve the likelihood of finding papers closely related to our subject of interest. This is important since in some cases only a combination of key words would bring relevant search results. For example, within the literature related to entrepreneurship there is a set of research looking into the specific non-cognitive skills that entrepreneurs have that others do not and that distinguish them from others. In this case, for relevant literature we would use in our search the key words entrepreneur and skills to obtain pertinent results. Also, we often added the words "employer survey" to other key words in order to find research based on employer surveys.

We included in the sample any study that presents data on employer demand for or difficulty in acquiring a range of cognitive and non-cognitive skills. We limit the sample to studies that examined both cognitive and non-cognitive skills to allow for a comparison of preferences between the two.

The data have several shortcomings that we cannot correct. First, employer identification of preferred skills and naming the skills most lacking is a stated preference rather than a revealed preference, perhaps introducing measurement error. Second, the questions are necessarily constrained since employers are responding to the current skills equilibrium. Thus, a skill may be ranked low in priority because it is in abundant supply, rather than because it is not necessary for the production process. Third, the employer responses are qualitative rather than quantitative so while we know that a skill is important or lacking, we do not know the extent of the demand (perceived skill gap) for that skill relative to a skill ranked just below it (Rutkowski 2010). Finally, we cannot control for labor market institutions across countries, which may affect the supply and thus the perceived shortage, of skills (Rutkowski 2010). In spite of these limitations, the data provide us with a global picture of constrained skills demand and areas where the skills formation system could further develop the supply of skills.

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[17] www.psycontent.com. It includes the following databases: PsyJOURNALS, PsycARTICLES®, PsycINFO® and PsyCOLLECTION®.

Our final sample includes 28 studies, including 3 global studies and six regional studies: one from the Middle East and North Africa Region (MENA), three from Latin America and the Caribbean (LAC), and two from Europe.  Further, we have 19 country specific studies.[18] The sample includes developed countries, including the US with a GDP per capita of $43,000 and low-income countries, such as Vietnam with a GDP per capita of $687.  The sample spans large economies, ranging from the US with a GDP of more than $38 trillion and 300 million people to Tonga with a GDP of $260 million and a population of 100,000.  The sample includes countries highly dependent on exports such as Vietnam (70 percent of its GDP) and Macedonia (47 percent of its GDP) as well as the US and Brazil, with exports valued at less than 15 percent of GDP.  Big innovators, such as the US, and small innovators, such as Macedonia and Egypt, are considered in the sample.  Among sectors, there are countries with relatively large manufacturing sectors (Romania and Macedonia with more than 30 percent of GDP) and low manufacturing economies such as Botswana and the Philippines.  Highly educated countries (Russia, US, UK) and countries with low levels of education (Botswana, Indonesia) are also in the sample.  The variance in the countries included in this review is demonstrated in the indicators in Table 2.

Table 3 presents the sample stratification by country.  A summary of the studies we reviewed, the sample characteristics, method of collection and the skill demand-related questions asked are available from the authors.

**3.2 Methodology**

We wish to identify those skills most demanded by employers and where the biggest skills gaps are.  These two questions lend themselves to a public skills development strategy that can better prepare people for the labor market.

First, we carry out a non-parametric estimate to measure the skills sets most valued by employers and the largest skills gaps.  We use results from studies that ask employers to rank the skills they most value and the skills gaps that are most pressing.  We map each skill to a skills set (basic cognitive, higher-order cognitive, technical, or socio-emotional), as defined in Table 4.  We then calculate the share of employers n=1, ..,N who, for rank $r$, identify skill $s_n$=s as the highest rank skill where s={basic, higher-order cognitive, technical, and socio-emotional}[19]

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[18] Botswana, Egypt, India, Indonesia, Lebanon, Macedonia, Peru, Philippines, Poland, Romania, Russia, Sindh province (Pakistan), Solomon Islands, St. Kitts, Tonga, UK, US, and Vietnam.
[19] We only rank up to the fifth priority since several studies limit the number of potential skills from among which employers may rank, so studies start dropping out of our sample for rankings higher than fifth priority.

$$\frac{\sum_{n=1}^{N} s_n = s \mid_{r,s}}{N}$$

We start with r=1 and then repeat the exercise for second, third, fourth, and fifth priority

rankings (r=1, …5), giving us a matrix of skill set-ranking cells.  Given the small sample size (17),[20] we can

only generate this statistic at an aggregate level rather than disaggregating by variables such as industry

or export orientation.  This methodology provides some insights, but is likely to return unsatisfactory

conclusions since results are highly dependent on our sample, which is not globally representative.

Further, a global average will mask policy-relevant country or sub-national variation.

It is useful to tease out the sample heterogeneity in order to determine if certain industries,

jobs, export-orientation, firm modernity, or other industrial structures have different demands for skills.

For example, some may argue that developed countries need higher-order cognitive skills while

developing countries only need basic cognitive skills.  Or that certain industries, such as manufacturing,

most value technical skills while others, such as services, put greatest value on socio-emotional skills.

The data permit two ways of testing these assumptions.  First, some of our data compare employer

preferences across dimensions.  For example, some studies disaggregate preferences of employers in

the service and manufacturing industries within a single country or disaggregate their skills preferences

for managers versus workers or consider skills preferences of employers in traditional as compared to

modern firms in a single country.  This disaggregation gives us insights into whether certain economic

structures, types of jobs, and so forth, have different employer demand profiles while holding constant

country-specific variables.  Second, the heterogeneity of economic structures of the countries in our

sample (small economies with few industries v. large, diverse economies, exporting versus non-

exporting countries) allows us to explore if employer skills preferences differ along these dimensions.

To capture sample heterogeneity, and given our data limitations of using study results rather

than raw data, we would like to carry out a meta-analysis by pooling the sample and estimating a

multinomial logit model to determine which skills set is the most important for different dimensions of

the data.  We would estimate:

$$\Pr(s_n = s) = \alpha + \beta_1(GDPcap_n) + \beta_2(GDP_n) + \beta_3(X_n) + \beta_4(I_n) + \beta_5(M_n) + \beta_6(BC_n) + \beta_7(E_n) + \varepsilon$$

Where for each country n, $s_n$ is the skill set most demanded by country n, $GDPcap_n$ is GDP per

capita, $GDP_n$ is gross domestic product, $X_n$ are exports as a percentage of GDP, $I_n$ is degree of innovation

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[20] Only 17 of the 28 studies in our sample can be used for this exercise since only 17 rank the top five skills, while
others rank the top skills gaps and others provide first-ranked skills but not lower level rankings.

measured by national R&D expenditures as a percent of GDP, $M_n$ is manufacturing sector as a share of all production, $BC_n$ is the share of employment in blue collar jobs, and $E_n$ is average years of education of the labor force.

This parametric methodology is not feasible for several reasons. First, the studies in the sample do not use a consistent definition of skills. Some studies ask which skill is most important while others ask which skill is most lacking and yet others ask about the most important skill in the future. This leads to error in the measure of the dependent variable. Second, many of the country-level sample frames are not nationally representative, which limits the predictive power of the national-level independent variables. Third, some studies do not present "national" averages, instead disaggregating the data along certain categories. For example, the Indonesia survey results are presented as occupation-industry disaggregations.

Instead, we perform a pseudo meta-analysis by reviewing results by each dimension that we would have included in our regression. To capture heterogeneity by level of economic development (*GDP per capita*), we summarize regional results. We explore differences by size of the economy (*GDP*) – where smaller, less diversified economies may have distinct skills demands than more diversified large economies – by comparing results from three island states to results from some of the largest economies in the world. To capture cross-industry skills differences (*M*), we compared skills demands in the manufacturing and the service industry within country, thus holding constant other factors that may affect skills demand in that country. We also aggregate results by industry across countries. Three countries allow us to explore skills demand differences within country by degree of export-orientation (*X*) of the firms interviewed. Two studies allow us to compare skills demand by employers in innovative firms as compared to more traditional firms. Similar to the analysis carried out by industry, we carry out an analysis for occupation (*BC*), comparing managers and workers both within country and by occupation across countries. Finally, we explore different expectations of employers for their workers of different skill levels, defined by education level of the worker (*E*).

We consider three sets of skills. Cognitive skills are knowledge and thinking skills. We differentiate between basic (reading, math) and higher-order (logic, abstract thinking) cognitive skills, but still recognizing that the former are the foundation for building the latter. Technical skills are job-specific skills. Many surveys do no go into detail on technical skills, so "job relevant skills", computer skills, and "work experience" are included in this set. Socio-emotional skills capture behaviors (including social skills) and personality traits. Since the individual studies do not necessarily classify their skills

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along these definitions, we assign the skills in each study to these categories as we have defined them. Table 4 presents our mapping to the four skills groups of the nearly 140 skills identified in the studies.

In each dimension of skills, we examine three questions. First, which skills are the most important (level) in a sub-set of that dimension. Second, which skills are most lacking (gap) in a sub-set of that dimension. And, finally, we compare differences across sub-sets within a dimension. Not all studies present information on levels and gaps; we do the best we can with the data available.

## IV.       Results

Of the top five skills identified by employers, more than 50 percent can be classified as socio-emotional, another 29 percent as higher-order cognitive and 15.9 percent as technical (Table 5, top panel). Considering only the top five skills reported in the 17 studies that ask employers to identify the most important skills (the skill rankings in each study were derived from an aggregation of employer stated preferences), socio-emotional skills were named 42 times by the studies in our sample. Higher-order cognitive skills were listed 24 times and technical 13 times. Basic cognitive skills were only named three times among the top five preferred skills in our 17 study sample.[21]

The global ranking of skills finds that socio-emotional skills are the first priority of 76.5 percent of the studies that rank employer skill preferences. Specifically, 13 studies (from a sample of 17) ranked a socio-emotional skill as their first priority, naming work ethic, interpersonal skills, honesty, teamwork, work attitude, integrity, life skills (negotiation, cultural diversity), punctuality, and responsibility. Another 17.6 percent ranked higher-order cognitive skills as most important, including critical thinking and efficiency. One study identified technical skills as the most important skill set, though the skill presented in this study is "job related skills" which may encompass a larger set of skills than only technical skills. No study named basic cognitive skills as the most important skill set.

The skill set defined as the second most important was again dominated by socio-emotional skills. More than 50 percent of the sample named a socio-emotional skill. Another 23.5 percent listed a higher-order cognitive skill and 11.8 percent each identified a basic cognitive and a technical skill. Socio-emotional and higher-order cognitive skills dominated the third ranked skill (35.3 percent each) (Table 5).

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[21] The studies included in the sample are Mourshed, Farell and Barton (2012), Andreasson (2009), Beneitone et al. (2007), Ogier (2009), Blom and Hobbs (2008), Arnhold et al. (2011), diGropello (2010), diGropello (2011), TCCI (2010), Close (2012), Blom and Saeki (2011), Hamid, Imaizumi and Blom (2011), Balcar (2012), Rutkowski (2010), World Bank (2011), World Bank (2012), and Zemsky (1997).

The quantitative summary of the greatest skill gaps is much less precise,[22] but it shows that while socio-emotional skills are the most frequently listed skill set among the top five skills gaps, technical skills are the most pressing skills gap (Table 5, bottom panel).[23] Fifty percent of the studies report that employers identified a technical skill as the top skills gap, including such skills as professional skills, job-specific skills, technical skills, and work experience. While we have classified all these as "technical", several likely include all four of our skills sets. For example, "professional skills" or "work experience" may include knowledge of specific equipment (technical), working with others (socio-emotional), the ability to resolve problems (higher-order cognitive), and basic math for operating the equipment (basic cognitive).

Gaps in socio-emotional skills and higher-order cognitive skills dominate the second through fifth most lacking types of skills. Basic cognitive skills are barely mentioned as an important skill gap when aggregating across countries; this may suggest that, workers' dominance of basic numeracy and literacy are adequate for employers in our sample or that other skills gaps are more noticeable to employers.

### 4.1 Global Trends

We begin by exploring results of two studies that interview employers across the world. Both studies draw from developed and developing countries in most regions. The results reviewed in this Section IV are summarized in Table 6.

Globally, socio-emotional skills are most important to employers. Mourshed, Farell and Barton (2012) survey employers in nine countries[24] and asks them to rate, on a scale of one to ten (low to high) the importance of 13 pre-determined skills.[25] Eighty percent rank work ethic or teamwork as the top

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[22] Unlike in the sample asking about the most important skills, the data on key skill gaps is disaggregated across skill level and type of industry in many of the studies. The studies present the share of employers that state that skills is their greatest skill gap, conditional on a skill level or on an industry. Since we do not know the share of the labor force in each of these categories, we cannot appropriately weight the responses. Thus, we make a very general assumption that the labor force is equally distributed across these categories and we take a simple average across skill level or industry. A further complication is that 20 percent of the sample of 16 are studies from the UK which used very similar survey instruments. Thus, the UK results may be overweighted in the small sample.

[23] The studies included in the aggregate gaps analysis are Mourshed, Farell and Barton (2012), Manpower (2010), CBI (2012), UKCES (2012), Learning and Skills Council (2008), IFC (2010), diGropello (2010), diGropello (2011), World Bank (2008), TCCI (2010), Close (2012), Balcar (2012), Rutkowski (2010), Arnhold et al. (2011), World Bank (2012), and Vasiliev (2013).

[24] Brazil, Germany, India, Mexico, Morocco, Turkey, Saudi Arabia, UK, US. 2832 employers interviewed.

[25] The skills in the survey are: English proficiency, basic math, written communication, oral communication, local language, problem-solving (cognitive skills), computer literacy, hands-on training in discipline, theoretical training in discipline (technical skills), work ethic, teamwork, leadership, and creativity (socio-emotional).

skills, meaning that 80 percent of employers give these socio-emotional skills a ranking of 8 or above. Third ranked is the higher-order cognitive skill of language and oral communication (72 percent of employers), and hands-on training in discipline (technical) is ranked fourth, with approximately 70 percent of employers citing it as very important (Figure 1). Andreasson (2009)[26] finds similar results among business executives who identify that the skills most in demand in the next decade are "life skills", defined as negotiating, networking, and working with cultural diversity (48 percent of the sample), followed by problem solving and leadership.

The two global studies that ask about skills gaps find very different patterns. The employers surveyed in Mourshed, Farell and Barton (2012) perceive a significant gap between supply and demand of all 13 skills explored in the survey. Whether a skill was ranked highly important or less important, there is a 12-18 percentage point gap between the share of employers who ranked a skill as very important and the share who ranked the new hires as very competent in the skills (figure 1). The gap between supply and demand of the most important skills – work ethic (15 percentage points) and teamwork (14 percentage points) – are similar to the gap between supply and demand of the least important skills – leadership and English proficiency - at a 13 percentage point skills gap. Manpower (2012),[27] on the other hand, finds the largest skills gap in professional skills (16 percentage points) and skilled labor (11 percentage points), both of which may include all four of our skills sets. The gaps in soft skills are much lower, where a 6 percentage point deficiency is calculated for interpersonal skills and motivational skills.

These global studies may oversimplify the patterns due to the different needs of employers in different contexts. Thus, we turn to comparisons of employers who are likely to have different skills needs, which may shed light on the mixed global results.

**4.2 Regional Skills Demands**

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[26] The sample consists of 123 private sector respondents; 28 percent from Asia-Pacific and Western Europe, each, 27 percent from North America, and 12 percent from the Middle East and North Africa.

[27] The samples consists of 38,077 employers in 41 countries where 10,323 are from the Americas, 8,786 from the Asia Pacific, and 19,059 from Europe (including Turkey and South Africa). The survey asks "what is the main difficulty in filling vacancies" with potential responses including a range of concepts related to skills – professional skills, skilled labor, operating equipment, information skills, oral communication, foreign language, interpersonal skills, motivation, teamwork, flexibility, and so forth – as well as responses that are not skill-related, such as "lack of suitable candidates", "want higher pay", "does not want to work part time", or "location not suitable".

Both developed and developing country employers rank higher-order cognitive skills as the most important skills set. Eastern Europeans also identify the lack of technical skills while developing region employers cite socio-emotional skills.

Our sample only includes one developed country study identifying employer preference of the most important skills. A survey of 3,100 US employers finds that the most important skills sought in new employees are attitude and communications skills, outranking industry-based skill credentials, years of schooling, score on the employer test, and academic performance (Zemsky 1997).

The Eastern European studies in our sample consistently highlight the importance of socio-emotional, higher-order cognitive, and technical skills. Romanian employers identify professional knowledge and skills, efficiency and problem solving as the three most important skills for new hires (Balcar 2012). Russian employers note that the most important skills when hiring new workers are technical skills (for non-managers), leadership (for managers), and decision-making, problem-solving, ability to work independently, teamwork, and conscientiousness for all workers (Vasiliev et al. 2013). Polish employers identify, in decreasing order of importance, responsibility, motivation, teamwork, and advanced technical/vocational skills (Arnhold et al. 2011). Macedonian employers ranked vocational skills much lower than their Russian and Romanian counterparts,[28] instead prioritizing responsibility, literacy, communication, and customer care (Rutkowski 2010).

In contrast, four Latin American regional studies find that employers value socio-emotional and higher-order cognitive skills the most. Beneitone et al. (2007) surveys 1,669 employers in 19 Latin American countries,[29] asking them the most important skills for the job. Using a factor analysis, the 30 skills split into four groups of skills – learning processes, social values, technical skills/internationality, and interpersonal skills. While learning processes (higher-order cognitive skills) – ability to learn, knowledge in the area of specialty, problem-solving, ability to use information, communication – were most important for educators, students, and recent graduates, interpersonal skills were ranked most important for employers. A survey of 1,176 Argentine, Brazilian, and Chilean firms that employ youth asked interviewees which of 23 (predetermined) skills[30] are most important to fill job vacancies (Bassi et al. 2012). More than 50 percent of the sample ranked socio-emotional skills as most important, as compared to 30 percent who felt cognitive skills (termed "general knowledge" in the paper) were most

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[28] Macedonian employers rank basic vocational/job-specific skills as 8th most important, use of IT is ranked 9th and advanced vocational/job-specific skills are ranked 12th of 14 skills sets.

[29] Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Dominican Republic, Uruguay, and Venezuela.

[30] The 23 skills are classified into five groups: communication, critical thinking, attitude toward work, responsibility and commitment, service to client, and technical.

important and 18 percent named technical skills (Figure 2).  Attitude[31] and responsibility[32] were both highly ranked socio-emotional skills.  Language and communication[33] were the most valued cognitive skills; both are higher-order skills.  Among technical skills, being able to adapt to new technologies was ranked most highly.[34]  Latin American executives report similar findings.  A survey of 192 business executives in 22 countries asked which of 10 skills were most important (Ogier 2009).[35]  Critical thinking was named by 76 percent of the sample, followed by life skills and problem solving (72 percent each).

Two country level studies in the Middle East and North Africa find an emphasis on socio-emotional and higher-order cognitive skills, as well.  Lebanese employers name communication skills (higher-order cognitive) and team work (socio-emotional) as the top two skills needed in their managers and employees (World Bank 2012).  Egyptian employers prioritize socio-emotional skills (honesty, punctuality), basic cognitive skills (literacy), and higher-order cognitive skills (problem solving, management) (AED as reported in Blom and Saeki 2011).

Three country studies paint a similar picture of the East Asia region.  Nearly 500 Indonesian employers from various provinces and industrial sectors prioritize "thinking skills" (70 percent) among their managers and basic cognitive skills (47 percent) among their skilled workers.[36]  Behavioral skills were ranked second for each group of workers, at 64 percent for managers and 32 percent for skilled workers (diGropello 2011).  A sample of 700 Vietnamese employers identified independent work and team work (both socio-emotional skills) as the most important skills (World Bank 2008).[37]  Similar results emerge from a survey of 3000 Filipino employers, where the most valued skill among managers is problem solving – similar to the Indonesian thinking skills – and leadership (a mix of socio-emotional and higher-order cognitive skills), both at 12 percent, while the most important skills for workers are

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[31] Ability to collaborate and cooperate with others, control emotions, and avoid negative reactions

[32] Responsibility and compromise in the context of the organization's objectives and complete assigned work

[33] Ability to listen, ask questions, and express concepts and ideas effectively.  This is different than reading and writing.

[34] One could argue that adaptability is actually a mix of higher-order cognitive skills and socio-emotional skills (see Guerra and Modecki forthcoming).

[35] Critical thinking, life skills (negotiation, networking, collaboration, working with cultural diversity), problem solving, leadership, communication, understanding business decisions, multiple languages, STEM (science, technology, engineering, and math), technological proficiency, statistical analysis.

[36] A range of specific skills were explored and then summarized into five skills groups: behavioral skills, computers, English, general skills (math, literacy), and thinking skills.

[37] A pre-determined skills set in the survey, in decreasing priority ranking, is: independent work, teamwork, communications, time management, problem solving, literacy, creativity, initiative, negotiations, math, leadership, writing, language, and computer skills.

independent work and team work (socio-emotional skills), both about 14 percent.[38] Contrary to the Indonesian survey, basic cognitive skills, while the most important skill for 5-10 percent of Filipino employers, ranked far below socio-emotional skills (diGropello 2010).

Two studies provide some information that the largest countries in the South Asian region most value socio-emotional skills. Nearly 1000 employers in the Sindh Province of Pakistan identified punctuality (86 percent), honesty (84 percent), commitment (65 percent), and reliability (83 percent) as the most important skills in hiring new workers (Hamid, Imaizumi and Blom 2011). Higher-order cognitive skills were also ranked highly, but not as highly as socio-emotional skills, with communications skills (69 percent) topping the list, closely followed by customer relations skills (68 percent). An Indian study of 157 firms that hire engineers report that "core employability" skills[39] were the most important skill set, with communications skills (higher-order cognitive) ranked second and professional skills last; this ranking is statistically significant (Blom and Saeki 2011). Within core employability skills, integrity was ranked highest.

Turning to gap analysis, Western European employers most lament the lack of technical and higher-order cognitive skills. The Western European studies only asked about skills gaps. Manpower interviewed employers in 23 countries, mostly Western European countries,[40] asking them the main reason they had difficulty in filling jobs (Manpower 2012). The employers replied that hard (technical) skills are most lacking (34 percent), followed by lack of available applicants and lack of experience. Soft skills come in a distant fourth, identified by 16 percent of respondents. The three European country studies in our sample, all from the UK, are consistent with the Manpower study results. Learning and Skills Council (2008) ranks technical skills (53 percent), communications skills (33 percent) and customer relations (32 percent) as the largest skills gaps, similar to UKCES (2012), which identifies job specific skills (49 percent) as most lacking. CBI (2012) has a slightly different ranking, with customer awareness topping the rankings (at 46-70 percent), following by knowledge of a foreign language and self-

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[38] The predetermined skills in the survey were split into two groups. The key "core" skills, which map to our higher-order, basic, and socio-emotional skills are: problem solving, leadership, communications, independent work, creativity, negotiations, teamwork, literacy, time management, initiative, math, writing, language, and computer skills. The key "job-specific" skills, which map to our technical skills, are: practical experience, local degree, experience in the same field, theory, general experience, grades, experience in a different field, secondary school diploma, technical qualifications, foreign degree, and vocational/technical qualifications.

[39] Integrity, reliability, teamwork, willingness to learn, entrepreneurship, self-discipline, self-motivation, flexibility, understand/take directions, empathy

[40] Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Greece, Hungary, Ireland, Italy, Israel, Netherlands, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK

management.  All three studies identify a significant skills gap in basic cognitive skills of 10-30 percent across surveys, although these rank far lower than the gap in technical skills.

In contrast, developing country employers identify socio-emotional and higher-order cognitive skills as most lacking.  Manpower disaggregated their global sample by region and find that the global trends are replicated at the regional level in Latin America and in Asia.  However, country-specific studies show different trends.  Among Argentine, Brazilian, and Chilean employers, a mismatch of 22 percent between the supply and demand of socio-emotional skills was calculated, as compared to 9 percent for general knowledge and 4 percent for technical skills (Bassi et al. 2012).  Similarly, IFC (2010) asks Latin American business leaders which skills are most missing in their recruits.  Of the seven skills reported in the study, half the sample identifies critical thinking as most lacking, followed by communication (33 percent), life skills (32 percent), and STEM (28 percent).  A survey of 1500 employers in five Middle East and North African countries[41] asks human resource managers whether recent vocational school graduates and university graduates possessed the appropriate skills.  Soft skills were marginally ranked as more lacking than technical skills, though the results differ by country (IFC 2010).  Filipino employers identified that the greatest skills gaps are in time management, initiative, and problem solving, i.e. socio-emotional and higher-order cognitive skills (diGropello 2010).  Polish employers are the outlier, naming advanced technical/vocational skills as most lacking, followed by a range of socio-emotional and higher-order cognitive skills (Arnhold et al. 2011).

### 4.3  Small v. Large Economies

Both small and large economies have a preference for socio-emotional and higher-order cognitive skills.  Our sample allows us to examine the economies in very small countries – St. Kitts, Tonga, and Solomon Islands – as well as countries with large economies and regions – Sindh Province in Pakistan, Indonesia, Russia, and the United States.  A survey by the Tongan Chamber of Commerce and Industry asks 153 employers about the most important characteristics in staff, drawing from a list of 14 skills.[42]  The top three responses were honesty (28 percent), punctuality/attendance (16 percent), and hard work/commitment/desire to learn (12 percent) (Figure 3).  Basic cognitive and technical skills - computer skills, degree achieved, and literacy/numeracy – all were identified by less than 5 percent of

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[41] Saudi Arabia, Yemen, Egypt, Morocco, Jordan
[42] The skills in the survey, in decreasing order of preference ranking, are: honesty, punctuality, attendance, ability to work in a team, communications, negotiations, customer skills, hard work, commitment, desire to learn, independence, initiative, problem solving skills, foreign language skills, time management, organizational skills, management, leadership skills, computer skills, degree achieved, educational institution attended, literacy, numeracy, theoretical knowledge of job, practical knowledge of job.

employers (Tonga Chamber of Commerce and Industry 2010). Similarly, Solomon Island employers who are recruiting youth gave a priority ranking to work attitude, communications skills, and experience, out of a list of eight skills; technical skills ranked last (Close 2012).[43] And more than 80 percent of Kittian employers identified honesty/integrity, work ethic, and problem solving as the most desired skills; the most technical of the skills – computer skills – was ranked last (as cited in Blom and Hobbs 2008).[44]

Large economies favor socio-emotional and higher-order cognitive skills, but some also identify technical skills as a priority, unlike the small country samples. Employers in the Sindh province identified punctuality (86 percent), honesty (84 percent), commitment (85 percent), and reliability (83 percent) as the most important personal characteristics sought when hiring, very similar to results from the three island states reported above (Hamid, Imaizumi and Blom 2011). The most important "general skills" were higher-order cognitive skills (mixed with socio-emotional): communications (69 percent), customer relation skills (68 percent), management skills (59 percent), and ability to work independently (59 percent). US employers reveal similar patterns with the highest ranking for attitude (4.6 points on a scale of 5, where 5 is "most important"), followed by communications skills (4.2 points) (Zemsky 1997). Indonesian employers identified thinking skills as most important for managers (70 percent), followed by behavioral skills (64 percent). They selected basic cognitive as most important for workers (47 percent), though behavioral and thinking skills were each identified as very important by 32 percent of employers (diGropello 2011). Russian employers identify all three skills sets, but put less emphasis on technical skills for new managers and on cognitive skills for blue-collar hires (Vasiliev et al. 2013).

There is not a common trend in identified skills gaps when comparing large to small economies. In a small and large country (Tonga and Russia), the greatest skills gaps are identified in those skills that are most prioritized while in a different set of small and large countries (Solomon Islands and Indonesia), those skills that were of least priority are identified as the most lacking. In the Solomon Islands, analytical skills were ranked last among priority skills but ranked as the most lacking of the skills in the survey. Similarly, in Indonesia, English was least valued but it is observed as the most lacking skills set.

**4.4 Manufacturing v. services industry**

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[43] Skills in the survey, in employer preference order: work attitude, communication, experience, educational level, decision making, technical skills, computer and IT, and analytical skills.

[44] The pre-identified skills sets included the following, in order of employer preference ranking: honesty/integrity, work ethic, problem solving/efficiency, communication skills, teamwork, responsibility, dependability, computer skills.

Employers in manufacturing and services industries express similar preference rankings for specific skill types; socio-emotional and higher-order cognitive skills emerge strongly for employers in both industries, with the exception of Vietnam. Our sample includes four studies that disaggregate employer demand by industry. The Indonesia, Vietnam, and Philippines studies disaggregate by manufacturing sector and by (non-education) services sector. The LAC study (Bassi et al. 2012) considers five sectors.

The manufacturing sectors demand a range of skills across the world. LAC and Filipino employers prioritize socio-emotional skills. In the Philippines, independent work (15 percent) and team work (13.5 percent) are ranked highest (diGropello 2010).[45] In LAC, 44 percent of manufacturing employers state that socio-emotional skills are most important (Bassi et al. 2012).[46] In contrast, Indonesian manufacturers prioritize cognitive skills; 72 percent identify higher-order cognitive skills as a priority for managers and 42 percent state that basic cognitive skills are the most important skills for workers (diGropello 2011) (Figure 4). These employers give a second place rank to basic cognitive skills for managers (54 percent) and higher-order cognitive skills for workers (42 percent). Notably, socio-emotional skills are ranked the same as basic cognitive skills for Indonesian manufacturing sector managers. Showing yet a different trend, Vietnamese manufacturing employers top rank technical skills (16 percent), followed by punctuality (World Bank 2008).

Service sector employers demonstrate a similar heterogeneity among preferred skills sets. LAC service sector employers prioritize socio-emotional skills (53-58 percent) by a much higher margin than do LAC manufacturing employers (Bassi et al. 2012). Filipino service sector employers prioritize independent work (13 percent) and communications (11 percent) (diGropello 2010). Indonesian employers most value higher-order cognitive skills (72 percent) and basic cognitive skills among managers and workers in the service sector, respectively (Figure 4). Although behavioral skills in managers were also top ranked (72 percent) by Indonesian service sector employers. Conversely, Vietnamese service sector employers most value job-related skills (25 percent), followed by drive, initiative and teamwork (World Bank 2008).

The priority skills within a country are identical across industries; in other words, the preferred skill set in manufacturing is also the preferred skill set in services in all countries in the sample.

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[45] The Philippines study ranks basic skills, higher-order cognitive, and socio-emotional skills on one scale and ranks technical skills on a separate scale.

[46] Although technical skills are ranked last by these employers, it is valued by twice as many employers in the manufacturing sector as compared to the service sector. And, the gap in technical skills is identified by 14 percent of manufacturing sector employers versus 1-4 percent of service sector employers.

Vietnamese employers most prioritize "practical" technical skills in both the manufacturing and non-education service sectors (World Bank 2008). In Indonesia, thinking skills and general skills dominate both industries (diGropello 2011). Filipino employers most value socio-emotional skills, though "technical" was not one of the skills sets measured (diGropello 2010). While in Argentina, Brazil, and Chile, employers in all five industries most valued socio-emotional skills (Bassi et al. 2012).[47]

Although the priority ranking by industry within countries is identical, the weight on each priority ranking reveals the expected patterns: behavioral skills are more important in the service sector than the manufacturing sector. For example, 54 percent of Indonesian manufacturing sector employers rate behavioral skills as very important (for their professional staff), as compared to 72 percent of service firm employers (diGropello 2011) (Figure 4). In the Latin American sample, the manufacturing sector (auto) valued socio-emotional skills at 10 percentage points lower than the service sectors (Bassi el al. 2012). Communications skills are slightly more important in the service sector, as observed in the Philippines (11.5 percent of employers identify as very important, as compared to 10 percent of manufacturing sector employers) (diGropello 2010), Vietnam (prioritized by 10 percent of service sector employers as compared to 8 percent of manufacturing sector employers) (World Bank 2008), and Indonesia (English) (diGropello 2011). In the Philippines, when asking employers to only reflect on "core" skills (basic and higher-order cognitive and socio-emotional skills), service sector employers had a higher demand for basic cognitive skills, as compared to employers in the manufacturing sector, and a lower demand for socio-emotional skills (independent work, problem solving) than manufacturing employers (diGropello 2010).

### 4.5  Exporters v. domestic markets

Exporting firms demand more socio-emotional and higher-order cognitive skills than do firms producing for domestic markets. Latin American exporting firms place a higher value on socio-emotional skills than non-exporters, with 57 percent of exporting employers prioritizing socio-emotional skills, as compared to 53 percent of firms selling domestically and 52 percent of firms selling locally (Bassi et al. 2012). LAC firms producing for domestic and local markets put a greater value on cognitive skills than exporters do (30 compared to 26 percent) (Bassi et al. 2012). Indonesian exporting employers demand more of every skill set than do non-exporting employers. They particularly demand English and thinking skills of their managers and basic cognitive skills, thinking (higher-order cognitive), and behavioral skills of their workers (diGropello 2011). Employers in Filipino exporting firms particularly

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[47] Auto, retail, hotel, financial sector, and food industries

demand more independent work, problem solving, creativity, and leadership skills – all socio-emotional and higher-order cognitive skills – than do non-exporters (DiGropello 2010) (Figure 5).

Although exporters demand more of every skill type than non-exporters, with a particular demand for higher-order cognitive and socio-emotional skills, the priority ranking for skill demands do not differ by export-orientation. In the three-country LAC sample, firms that sell to local markets, national markets, or international markets all value socio-emotional skills as the most important skill set, ranking it 20 percentage points higher than general (cognitive) skills (Bassi et al. 2012). Technical skills were ranked the lowest, prioritized by only 16 percent of firms, regardless of their market. Indonesian and Filipino exporting and non-exporting employers prioritize the same skills sets. In Indonesia, exporters and non-exporters most demand thinking skills among their managers/professionals and basic skills among their skilled workers. Behavioral skills are ranked second most important for all three occupation groups (Di Gropello 2011). Filipino exporting and non-exporting employers prioritize (in order of descending importance) independent work, communications, teamwork, and problem solving, though the problem-solving ranks second for exporting firms (Figure 5).

The Philippines study is the only data point in our sample that examines the gaps identified by exporter and non-exporting companies. The greatest skills gaps identified by exporters are initiative, time management, leadership, and problem-solving. Non-exporters perceive the greatest skills gaps in these, areas, as well, but they add creativity to the list (diGropello 2010).


### 4.6  Innovator v. traditional firms

The Russian and Macedonian[48] studies, only reporting skills gaps perceived by innovator and traditional firms, demonstrate that innovator firms perceive a more severe shortage of higher-order cognitive and technical skills than traditional firms. Russian innovator firms note that managers most lack decision-making skills, followed by leadership while unskilled workers most lack conscientiousness and problem-solving skills, followed by professional skills (Table 7, left column). Traditional Russian firms name the same skills gaps as the innovator firms for both managers and workers (Vasiliev et al. 2013).

Though the top ranked skills gaps do not differ by firm modernity, Russian innovator firms identify larger skills gaps than traditional firms. Innovator firms identify greater gaps across all skills, but the gaps are particularly large in decision-making, and problem-solving (Table 7, right column). Other

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[48] In the Russian sample, modern firms are defined as those that have their own website. In the Macedonian sample, modern firms are those that have recently invested in new technology.

skills gaps that Russian innovator employers lament more than traditional firm employers are leadership, foreign language, openness to new ideas, independent work, and teamwork. Professional skills gaps rank second highest among most lacking skills for employers of specialist and blue collar workers in both innovative and traditional firms (Vasiliev et al 2013).

Though responsibility, literacy, and communication are most demanded among Macedonian firms, there is a particular gap in skills demand between innovative and traditional firms employers in five of the 14 skills explored in the study: foreign language, use of ICT, problem solving, technical/vocation skills, planning/organization, and self-management and initiative (Rutkowski 2010).[49]

### 4.7 Manager v. worker occupations

The most demanded skills by employers of managers are higher-order cognitive and socio-emotional skills, with technical skills playing a much lesser role. Indonesian employers prioritize higher-order cognitive (thinking) skills among their managers (70 percent), followed by behavioral skills (64 percent) (diGropello 2011). Russian employers seek managers who have decision-making, problem-solving, planning, and leadership skills (Vasiliev et al. 2013). Filipino employers rank problem solving and leadership as the most demanded core (socio-emotional) skills for managers and practical skills and degree as the top technical skills (diGropello 2010). In Lebanon, communications skills are most demanded by employers of managers, with teamwork (socio-emotional skill) ranked as a close second (World Bank 2012) (Figure 6).

Among workers, technical and socio-emotional skills are both important. In Russia, job-specific/technical/professional skills are the priority among technical specialists and blue-collar workers (Vasiliev et al. 2013). Socio-emotional skills are ranked first in Lebanon (teamwork) and second in Russia (independent work, teamwork). Latin American employers look for socio-emotional skills (49-57 percent), though the most demanded type of socio-emotional skill differs by occupation (Bassi et al. 2012).[50] For example, employers of Latin American skilled workers most value attention to client (40 percent) while they look for work attitude among those in sales (37 percent). In contrast, Indonesian employers most demand basic cognitive skills among their skilled workers (47 percent), followed by behavioral and thinking skills (32 percent each) (diGropello 2011).

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[49] Responsibility/reliability, literacy, communication, customer care, motivation & commitment, teamwork, problem solving, basic vocation/job-specific, use of ICT, numeracy, planning/organization, advanced vocational/job-specific, foreign language, self-management/entrepreneurship
[50] Occupations = professional, office worker, sales, services, manufacturing, machine operators.

Within country, employers generally demand the same skill sets for managers and workers, though higher-order cognitive skills are more stressed for managers.  In Lebanon, communications and teamwork are the two top-rated skills by employers of managers and workers, though communications is ranked first for Lebanese managers and teamwork for workers.  Similarly, within the top-ranked non-technical skills in the Philippines, problem-solving and leadership emerge for managers while independent work and teamwork are identified for workers.

There is not a global pattern of the greatest skills gaps for managers.  Employers in the UK, Russia, and Philippines, report that socio-emotional and higher-order cognitive skills are the largest skills gap among managers, specifying the shortage of strategic management, problem solving, planning, time management, initiative, leadership and decision-making (UKCES 2012, Vasiliev et al. 2013, diGropello 2010).  Indonesian and Lebanese employers feel that their managers need greater domination of the English language (higher-order cognitive skill) while Botswanan employers name the ability to use technology in the workplace as the most lacking skill (diGropello 2011, World Bank 2012, Vasiliev 2013).

Worker skill gaps are observed in technical, higher-order cognitive, and socio-emotional skills.  Employers in the UK, Indonesia, and Botswana[51] report that job-specific skills are most lacking among their workers (UKCES 2012, diGropello 2011, Vasiliev et al. 2013).  While in Russia and Lebanon, the most lacking skills are higher-order cognitive and socio-emotional:  problem-solving, independent work, and conscientiousness (Vasiliev et al. 2013, World Bank 2012).  Russian employers identify as second the gap in professional skills.  Higher-order cognitive and socio-emotional skills gaps also emerge as very important for UK workers, including planning, organization, problem-solving, and strategic management skills (UKCSE 2012).  Basic cognitive skills gaps (numeracy) are particularly noted by employers in Lebanon (World Bank 2012).

Although employers identified the same preferred skill sets for their workers and managers, the skills gaps differ.  Greater technical skills gaps were identified among workers.  While socio-emotional skills gaps are stressed across the employers' workforces, leadership and management gaps are most named for managers while initiative and independent work are more desired in workers.  Among higher-order cognitive skills gaps, problem-solving gaps consistently emerge for workers (US, Philippines) with fewer employers identifying severe higher-order cognitive skills gaps among their managers.

## 4.8  Less v. more educated  workers

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[51] Elementary occupations, plant/machine operators, craft/trade, skilled agriculture, services and sales, clerical support, technicians, professionals, managers.

More skilled workers are generally expected to excel in socio-emotional skills. The skills that employers most value in their more skilled employees in Peru, India, and LAC, can be classified as socio-emotional skills (World Bank 2011, Blom and Saeki 2011, Bassi et al. 2012). Of the seven skills Peruvian employers were asked to evaluate,[52] they most demand interpersonal skills (17 percent) of their workers with some tertiary education. Indian employers of university educated engineers also classified socio-emotional skills as most important. The set of "core employability" skills are more important, on average, than professional skills (technical) and communication skills, and specific skills within that set – including integrity, reliability, teamwork, willingness to learn, and entrepreneurship – rank highest among the 25 skills measured (Table 8). More than 56 percent of Argentine, Brazilian, and Chilean employers ranked socio-emotional skills as the most important skills set of "high paid" employees. Vietnam may be an exception, where "job-related" skills are most demanded of college graduates, but this category likely includes all four of our skill sets.

Technical skills are more important for employers of low-skilled workers, but employers also highly value socio-emotional skills among less skilled workers. Peruvians who employ people with less than completed secondary education list teamwork (23 percent) and being capable (a mix of all three skills sets) as the top ranked of seven skills explored (World Bank 2011). Vietnamese employers name job-related skills, punctuality (24 percent), and practical skills as most important for technical school graduates (diGropello 2010). In Latin America, socio-emotional skills emerge as the most important skill set for those hiring low-wage workers (Bassi et al. 2012).

Within country comparisons reveal that employers prioritize similar skills among more and less skilled workers. Vietnamese employers give top ranking to the same skills sets for more and less skilled workers, though they demand more of those skills from their less-skilled workers (diGropello 2010). In Peru, the top ranked skills do not differ by skill level of the worker, though there are subtle differences by education levels: employers demand more teamwork of those without a secondary education and more inter-personal skills of more educated workers (World Bank 2011). Cognitive skills top Latin American employer's preference ranking for low- and high-wage workers, though they demand more socio-emotional skills of high-wage employees as compared to lower-wage employees. Basic cognitive skills and technical skills were ranked low for both education levels (Bassi et al. 2012).

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[52] The skills employers were asked to rank were: interpersonal skills, creativity, verbal fluency, capability, proactive, working under pressure, and teamwork.

**V.** **"Readiness", the Skills Development Process and Policy for Developing the Skills Employers Demand**

Employer voices tell us that a broad range of skills are necessary for the labor market, but to draw conclusions that would guide policy to better prepare workers for the labor market, we must first turn to the developmental psychology and education literature to understand the skills development process.

Labor-market relevant skills are taught throughout the life-cycle by age-relevant actors. One reason for the life-cycle approach is that neurological, biological, psychological and social processes dictate that certain skills are not learn-able before certain ages (Guerra and Modecki forthcoming). For example, a toddler is me-centered and is not biologically or socially able to feel genuine empathy that a primary school student displays. It is not for a lack of being taught to be empathetic but instead the toddler is not neurologically or psychologically "ready" and a toddlers' social context – where she is still very much driven by parental guidance – is not conducive to practicing, and thereby developing, this skill. A second reason for the life-cycle approach is that certain skills are the foundation for other skills (Cunha et al. 2005). Basic math – which is developmentally appropriate for primary school – is a foundation for secondary-school introduction to physics just as impulse control is a foundation for the higher-order cognitive skill of problem solving. Heckman (2008) argues that most of the gaps at age 18 that help to explain gaps in adult outcomes are already present at age five, and that disadvantaged children are at a particular risk of falling behind early and not being able to catch-up as the life-cycle process moves on without them.

Table 9 presents a rough representation of the appropriate period of the life-cycle to acquire skills that the employer surveys point to. In the early years, the most basic cognitive skills such as numeracy and literacy can be acquired. Also, some of the most important foundational socio-emotional skills are developed in this period, such as delayed gratification, impulse control, and working with others. During childhood, the learning really takes off with the ability to rapidly acquire basic cognitive skills – with some higher-order cognitive emerging, such as problem solving – and the child is in a context to develop more complex socio-emotional skills related to engaging and negotiating with others. During adolescence, the foundations should already be built, the brain is neurologically and psychologically ready, and the social context is appropriate to go full force on higher-order cognitive development and complex socio-emotional development while still acquiring basic cognitive skills. Once reaching early adulthood (18-26), technical skills can be built on the foundation of the basic cognitive,

higher-order cognitive, and socio-emotional skills learned earlier in life.  Socio-emotional skills are refined and shaped by higher education institutions (Robins et al. 2001) and work environment (Roberts, Caspi, and Moffitt 2003) and experiences in this stage.  Contrary to assumptions, psychologists purport that even greater personality change comes in adulthood once careers have been established that shape personality more profoundly than transitory early adulthood jobs (Roberts 1997) and as life changes, such as marriage, affect personality (Robins, Caspi, and Moffitt 2002). Technical skill development also continues through adulthood through on-the-job training (Villaseñor 2013).

A lot of skill development occurs outside the classroom, indicating that a wide range of age-relevant actors are best positioned to develop the young person's skill sets (Table 9, row 2).  Drawing from the Bronfenbrenner ecological risk framework (1979), we see a young person's actors of influence broaden, and move away from the nuclear family, as she ages.  At an early age, family and early childhood development programs are the age-relevant actors due to biological forces of children being psychologically attached to a core, known family, and to practical issues related to a child's independence.  Thus, these are the actors responsible for developing the age-associated skills.  During childhood, the school gains in importance, as do peers and other mentors, but the family still plays a dominant role.  During adolescence, the family starts to fade as peers, educational institutions, and non-family mentors grow in importance, and finally, in the work age, higher educational institutions and the workplace become the skill-building actors.  In fact, once reaching adulthood, firms are the primary source of new skills acquisition for workers (Villaseñor 2013).

There are a multitude of methods for effectively teaching the appropriate skills by each actor at each life-cycle stage (Table 9).  For parents of young children, good family leave policies that allow parents to provide quality parenting and programs to enhance parental learning and encouragement of early stimulation and nutrition, have shown a greater acquisition of cognitive skills and socio-emotional skills (Gertler et al 2013, Kagitcibasi 1988).  Child-centered ECD that focuses on improving personality traits and managing externalizing behaviors while also acquiring basic cognitive skills have shown positive results in employment, wages, and positive behaviors for more than 30 years after program participation (Schweinhart et al. 2005).  A wide-range of mentoring programs have shown successful and can take different forms, such as after-school clubs, programs that pair model adults with children, or sports programs run by child development specialists; the former two models have shown to increase cognitive and non-cognitive skills of participants relative to control groups ( Tierney and Baldwin 2000, Boys & Girls Clubs of America 2004).  Modern pedagogy used in schools is moving away from the model that schools are responsible for teaching facts and toward a curriculum, teaching methodology, and

monitoring and evaluation system that develops the range of skills to be acquired in this life-stage.  The US *Knowledge is Power Program* (KIPP) does just that with disadvantaged youth, setting expectations, requiring behaviors grounded in good socio-economic skills, and working closely with each child to ensure success (Angrist et al 2010).  Similar programs exist in developing countries, as well (Heckman and Kautz 2012; Alfonso et al 2012).  Finally, once the child reaches working age, two types of programs exist.  The first are programs to ease the school-to-work transition, such as augmented apprenticeship programs, which combine socio-emotional skills development, technical training, and job experience; these have shown to increase employment and wages for youth (especially women) in several Latin American countries (Ibarraran and Rosas 2009).  The second is continuing in educational institutions to ease the transition, such as technical institutions that are closely linked to the productive sector and complement technical training with pedagogical methods conducive to developing higher-order cognitive and socio-emotional skills.  Public efforts to formalize and incentive in-firm training may include a skills certification system that is independent of firms but widely recognized economy-wide,[53] providing incentives to firms to train their workers such as tax breaks as provided by Colombian law (Law 789 of 2002), and providing services and supports to facilitate worker transition out of firms where the worker has exhausted learning opportunities and into firms where new learning can occur, such as job service centers and unemployment insurance.[54]

### VI.     Conclusions

   The review confirms that there is a mismatch between the education sector's perception of skills demand and that of the productive sector.  While the education sector focuses on technical training and believes that it well prepares students for the labor market (Mourshed, Farrell and Barton 2012, IFC 2010), skills demand surveys from around the world show different results.  The skills most demanded by employers – socio-emotional and higher-order cognitive – are often outside of school curriculum or teaching methods.

   There is remarkable consistency across the world of the skills demanded by employers.  Whether a large diversified economy or a small specialized economy, manufacturing or service sectors, developed country or developing, exporters or local market, traditional or modern firms, employers point to the

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[53] While skills certification systems are common in developing countries, there is not, to date, rigorous evaluation evidence that they, indeed, facilitate worker movement across jobs.
[54] See Banerji et al (2010), Section 3, for a brief discussion on social protection programs to protect against income loss while workers transition to utility improving jobs.

same set of skills that they most value.  We do observe variance in the specific skills demanded, but the overall skills set are very similar regardless of how we look at the data.

Socio-emotional and higher-order cognitive skills are the most valued by employers in nearly all studies in the sample.  This emerges in the aggregate analysis of the top five skills demanded by employers and in the non-parametric comparisons between different types of countries (small economy v. large economy), between firms within country (exporters v. domestic producers, innovators v. traditional firms, manufacturing v. service firms), and between workforces with different profiles (managers v. workers, more educated v. less educated workers).  Oral communication – a higher-order cognitive skill - ranks consistently very high, as do a small set of socio-emotional skills, namely ethics, punctuality, and honesty.

Technical skills are ranked as third most important in the aggregate estimate, but they emerge strongly for some groups.  Specifically, Western and Eastern European employers add technical skills to the list of priority skills sets, joining socio-emotional and higher-order cognitive skills.  Employers in all other regions and in the US do not value technical skills as highly.  This variable was difficult to analyze, though, since the classification of "technical skills" may have over-simplified employer responses since "job-related" skills were assigned in this skills set, even though many job related skills are socio-emotional or cognitive by nature.  Technical skills seem to be complements to, not substitutes for, cognitive and socio-emotional skills.

Basic cognitive skills are the least prioritized in all but one sub-set in one study (skilled workers in Indonesia) which may reflect that these skills are not needed or, more likely, that they are in sufficient supply that employers do not notice how important they are.

Socio-emotional skills are most cited among the top five skills gaps but technical skills are the top ranked skill gap.  Employers are more heterogeneous in their identification of the most pressing skills gaps as compared to the most valued skill.  The largest skills gap differs across and within regions and it is difficult to draw conclusions within industry, sector, type of firm, or worker profile.

When we bring employer preferences together with the skills formation process as understood by developmental psychologists, three key conclusions for education/skills development policy emerge.  First, the skills development process necessarily begins at birth (or before) and continues throughout the life cycle.  Certain skills employers demand are formed in the toddler years and other skills can only be developed once the foundational skills are there.  Waiting until school completion to begin developing job-relevant skills is too late.  Second, schools play a relevant, but limited, role in skills development.  Certain skills are better taught by parents, mentors, or the work place.  This points to an

education/skills development strategy and related programs to support the actors that are best suited to provide instruction to children at each age-appropriate stage. Third, the skills most demanded by employers – higher-order cognitive skills and socio-emotional skills – are largely taught and refined in secondary school, which argues for a general education until these skills are formed. Rather than early tracking of youth into technical training (ranked third by employers), skills/education systems need to ensure that the foundational basic and higher-order cognitive and socio-emotional skills are there to allow for effective technical skill acquisition.

Tables and Figures

**Table 1: Key words used in the searching process**

| | | |
|---|---|---|
| Behavior | Forced-choice | Personality |
| Big Five | Future skills needs | Personality traits |
| Cognitive abilities/skills | Heterogeneous ability | Rate of return |
| Competences | Human capital | Situational strength |
| Demand for schooling | Intelligence | Social skills |
| Demand for skills | Labor demand | Soft competencies |
| Emerging competencies | Locus of Control | Soft skills |
| Employability | Management | Test scores |
| Employer survey | Non-cognitive abilities/skills | Training and education |
| Entrepreneurship | Occupational choice | Transferable skills |
| Five-Factor model | Performance | Work performance |

Table 2:  Summary statistics of countries in the sample, 2008

| Country Name | GDP per capita (constant 2005 US$) | GDP (millions of constant 2005 US$) | Population total (millions) | Exports of goods and services (% of GDP) | Research & development expenditure (% of GDP) | Employment in industry (% of total employment) | Labor force with secondary education (% of total) | Labor force with tertiary education (% of total) |
|---|---|---|---|---|---|---|---|---|
| East Asia & Pacific | 4905 | 10,517,444 | 2,144 | 35 | 2.50 | 24 | .. | .. |
| Europe & Central Asia | 19047 | 16,691,987 | 876 | 39 | 1.73 | 27 | 46 | 29 |
| European Union | 28626 | 14,288,628 | 499 | 39 | 1.84 | 27 | 49 | 25 |
| Latin America & Caribbean | 5202 | 2,956,473 | 568 | 27 | 0.63 | 22 | 30 | 16 |
| Middle East & North Africa | 4359 | 1,528,350 | 350 | 52 | .. | 25 | .. | .. |
| Sub-Saharan Africa | 889 | 690,904 | 776 | 35 | .. | .. | .. | .. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Argentina | 5096 | 198,702 | 38 | 25 | 0.49 | 24 | 34 | 30 |
| Botswana | 5687 | 10,782 | 1.8 | 52 | .. | 15 | 26 | 0 |
| Brazil | 4875 | 917,079 | 188 | 14 | 1.01 | 21 | 30 | 9 |
| Cambodia | 514 | 6,970 | 13 | 69 | .. | .. | .. | .. |
| Chile | 7884 | 130,114 | 16 | 43 | .. | 23 | 49 | 25 |
| Egypt, Arab Rep. | 1313 | 95,823 | 72 | 30 | 0.26 | 22 | .. | .. |
| India | 797 | 911,498 | 1,143 | 21 | 0.77 | .. | .. | .. |
| Indonesia | 1324 | 301,594 | 227 | 31 | .. | 19 | 22 | 6 |
| Jordan | 2458 | 13,609 | 5.5 | 54 | .. | 20 | .. | .. |
| Lebanon | 5390 | 21,991 | 4 | 21 | .. | .. | .. | .. |
| Macedonia, FYR | 3003 | 6,286 | 2 | 47 | 0.20 | 33 | 53 | 15 |
| Morocco | 2080 | 64,142 | 30 | 34 | 0.64 | 20 | 10 | 9 |
| Pakistan | 723 | 116,370 | 160 | 15 | .. | 21 | 12 | 24 |
| Peru | 3051 | 85,529 | 28 | 29 | .. | 23 | 53 | 36 |
| Philippines | 1242 | 108,469 | 87 | 47 | .. | 15 | 39 | 28 |
| Romania | 4944 | 106,727 | 21 | 30 | 0.45 | 31 | 62 | 13 |
| Russian Federation | 5799 | 826,293 | 142 | 34 | 1.07 | 29 | 41 | 51 |
| Saudi Arabia | 12831 | 325,545 | 25 | 63 | 0.04 | 20 | .. | .. |
| Solomon Islands | 921 | 442 | 0.48 | 36 | .. | .. | .. | .. |
| South Asia | 746 | 1,135,508 | 1,521 | 21 | 0.75 | .. | .. | .. |
| St. Kitts and Nevis | 11389 | 567 | 0.05 | 37 | .. | .. | .. | .. |
| Tonga | 2564 | 260 | 0.1 | 14 | .. | .. | .. | .. |
| United Kingdom | 38873 | 2,355,546 | 60 | 29 | 1.75 | 22 | 45 | 31 |
| United States | 43228 | 12,898,400 | 298 | 11 | 2.64 | 21 | .. | .. |
| Vietnam | 687 | 57,271 | 83 | 74 | .. | 20 | .. | .. |
| Yemen, Rep. | 837 | 17,284 | 20 | 41 | .. | .. | .. | .. |

The selected indicators are intended to proxy the dimensions by which the sample is analyzed.

… indicates that the data were not available

*Source: World Development Indicators, 2008.*

**Table 3: Sample stratification**

|  | Type of skill demand (level) | Perceived Skill gap |
|---|---|---|
| **All Skills Sets, Country Aggregate** |  |  |
| **By size of economy** | Indonesia<br>Pakistan<br>Russia<br>St. Kitts<br>Solomon Islands<br>Tonga<br>US | Indonesia<br>Russia<br>Solomon Islands<br>Tonga |
| **By firm** |  |  |
| Industry: Manufacturing v. Service | Indonesia<br>LAC<br>Philippines | Philippines |
| Domestic v. export firm | Indonesia<br>LAC<br>Philippines | Philippines |
| Innovator v. traditional firm |  | Russia<br>Macedonia |
| **By occupation** | Indonesia<br>Lebanon<br>Philippines | Botswana<br>Indonesia<br>Lebanon<br>Philippines<br>Russia<br>UK |
| **By skill level (education or wage level)** | India (only engineering graduates)<br>LAC<br>Peru<br>Vietnam | LAC<br>MENA<br>UK |

**Table 4:  Classification of Skills Reported in the Sample**

| Socio-emotional | Higher-order cog | Basic cog | Technical |
|---|---|---|---|
| Adaptability | Analysis Skills | Basic literacy | Advanced IT |
| Collaboration | Critical Thinking | Numeracy | Advanced |
| Commitment | Decision-making | | vocational |
| Control emotions | Entrepreneurship | | Basic vocational |
| Conscientiousness | Foreign language | | Computer Literacy |
| Cooperation | Intellect | | Degree level |
| Creativity | Language | | Degree subject |
| Conflict aversion | Learning Processes | | Experience |
| Cultural diversity | Listening skills | | Grades |
| Customer Awareness | Manage risk | | Hands-on training |
| Customer Handling | Oral communication | | Industry-based |
| Dependability | Organization | | skills |
| Efficiency | Planning | | IT knowledge |
| Emotional Stability | Problem-solving | | Job-specific skills |
| Extraversion | Strategic management | | Office |
| Flexibility | Time management | | administration |
| Hard worker | Thinking skills | | Practical |
| Honesty | Written-communications | | knowledge |
| Initiative | | | Professional skills |
| Independence | | | Score on employer |
| Integrity | | | test |
| Leadership | | | Statistical analysis |
| Modesty | | | STEM |
| Motivation | | | Technical skills |
| Negotiating | | | Theoretical |
| Negotiate conflict | | | training |
| Networking | | | University |
| Open to new ideas | | | attended |
| Personal appearance | | | Work experience |
| Positive attitude | | | |
| Proactive | | | |
| Punctuality | | | |
| Professionalism | | | |
| Responsibility | | | |
| Self-confidence | | | |
| Self-management | | | |
| Social values | | | |
| Stress-management | | | |
| Teamwork | | | |
| Work ethic | | | |

*the skills in the list were condensed from 140 different skills names in the 28 studies reviewed in this paper.  The author's used the definition of each skill category to assign each skill to a category.  One could argue that some skills better fit in another, or multiple, skill categories.  The table is organized such that the skills categories that are most similar are next to each other.

**Table 5: Employer ranking of most important skills, %**

|  | Socio-emotional | Higher-order cognitive | Basic cognitive | Technical | Sample size (n) |
|---|---|---|---|---|---|
| **Most demanded skill** | | | | | |
| 1 | 76.5 | 17.6 | 0.0 | 5.9 | 17 |
| 2 | 52.9 | 23.5 | 11.8 | 11.8 | 17 |
| 3 | 35.3 | 35.3 | 5.9 | 23.5 | 17 |
| 4 | 35.3 | 41.2 | 0.0 | 23.5 | 17 |
| 5 | 57.1 | 28.6 | 0.0 | 14.3 | 16 |
| **TOTAL** | **51.2%** | **29.3%** | **3.7%** | **15.9%** | |
| **Greatest skills gap** | | | | | |
| 1 | 25.0 | 25.0 | 0.0 | 50.0 | 16 |
| 2 | 43.8 | 31.3 | 0.0 | 25.0 | 16 |
| 3 | 56.3 | 31.3 | 6.3 | 6.3 | 16 |
| 4 | 68.8 | 25.0 | 0.0 | 6.3 | 16 |
| 5 | 33.3 | 53.3 | 6.7 | 6.7 | 15 |
| **TOTAL** | **45.6%** | **32.9%** | **2.5%** | **19.0%** | |

*Source: Authors' elaboration based on sample data.*

**Table 6:  Employer Skills Set Preferences**

*An  X indicates an employer identified ranked as first a skill that corresponds to the skill set; a \* indicates the second ranked skill in the corresponding skill set; a blank indicates the skill set was not the first or second priority of the employer.  For those surveys that disaggregate within category, the skill corresponding to that disaggregated category is noted.  More than one X in bold or not bold indicates a tie in the preference ranking of the skills, some of which are within the same skills set. The skills under each X is available from the authors.*

| Geographic area | Basic skills | Higher-order skills | Socio-emotional | Technical Skills | Source |
|---|---|---|---|---|---|
| **Global** | | | | | |
| Level | | | | | |
| Global | | * | **X, X** | | Mourshed, Farell and Barton (2012) |
| Global | | * | **X** | | Andreasson (2009) |
| Gap | | | | | |
| Global | | | * | **X** | Mourshed, Farell and Barton (2012) |
| Global | | | | **X, X** | Manpower (2012) |
| **Regional** | | | | | |
| Level | | | | | |
| US | | **X** | **X** | | Zemsky (1997) |
| Romania | | | * | **X** | Balcar (2012) |
| Russia | | **X, X** | * (managers) *, *,* (non-managers) | **X** | Vasiliev et al. (2013) |
| Poland | | | **X**, * | | Arnhold et al. (2011) |
| Macedonia | * | | **X** | | Rutkowski (2010) |
| LAC | | | **X** | | Beneitone et al. (2007) |
| LAC | | *, * | **X, X** | | Bassi et al. (2012) |
| LAC | | * | **X** | | Ogier (2009) |
| Lebanon | | * | **X** | | World Bank (2012) |
| Egypt | * | | **X, X** | | AED, reported in Blom and Saeki (2011) |
| Indonesia | **X (workers)** | **X (managers)** | * | | diGropello (2011) |
| Vietnam | | | **X, X** | | World Bank (2008) |
| Philippines | | **X (managers)** | * (managers) | | diGropello (2010) |

| | | | | | |
|---|---|---|---|---|---|
| | | | **X, * (workers)** | | |
| Pakistan | | | **X, X** | | Hamid, Imaizumi and Blom (2010) |
| India | | | **X, X** | | Blom and Saeki (2011) |
| GAP | | | | | |
| Western Europe | | | | **X** | Manpower (2012) |
| UK | | * | | **X** | Learning and Skills Council (2008) |
| UK | | *, * | | **X** | UKCES (2012) |
| UK | | * | **X** | | CBI (2012) |
| LAC | | * | **X** | | Bassi et al. (2012) |
| LAC | | **X,** * | | | IFC (2010) |
| MENA | | | **X** | | IFC (2010) |
| Philippines | | | **X,** * | | diGropello (2010) |
| Poland | | | * | **X** | Arnhold et al. (2011) |
| Economy size | | | | | |
| Level | | | | | |
| Tonga | | | **X, X** | | Tonga Chamber of Commerce and Industry (2010) |
| Solomon Islands | | * | **X** | | Close (2012) |
| St. Kitts | | | **X, X** | | cited in Blom and Hobbs (2008) |
| Pakistan | | | **X, X** | | Hamid, Imaizumi and Blom (2010) |
| Indonesia | **X (workers)** | **X (managers),** * (workers) | * | | diGropello (2011) |
| Russia | | **X, X (managers)** | **X (managers)** X, X, X (non-managers) | **X (non-managers)** | Vasiliev et al. (2013) |
| US. | | **X** | **X** | | Zemsky (1997) |
| Gaps | | | | | |
| Tonga | | | **X,** * | | Tonga Chamber of Commerce and Industry (2010) |
| Russia | | **X, X (managers)** | **X (managers)** X, X, X (non-managers) | **X (non-managers)** | Vasiliev et al. (2013) |
| Solomon Islands | | **X,** * | * | | Close (2012) |
| Indonesia | | **X** | | * | diGropello (2011) |
| Manufacturing v. service industry | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Levels** | | | | | | |
| Philippines | Manuf | | | **X, X** | --- | diGropello (2010) |
| | services | | * | **X** | --- | |
| LAC | Manuf | | * | **X** | | Bassi et al. (2012) |
| | services | | * | **X** | | |
| Indonesia | Manuf | **X (workers), (managers)** | **X (managers (workers)** | * (managers) | | diGropello (2011) |
| | services | **X(workers), (managers)** | **X (managers)** | **X (managers), (workers)** | | |
| Vietnam | Manuf | | | * | **X** | World Bank (2008) |
| | services | | | *, * | **X** | |
| **Export v. domestic** | | | | | | |
| **Level** | | | | | | |
| LAC | Export | | * | **X** | | Bassi et al. (2012) |
| | domestic | | * | **X** | | |
| Indonesia | Export | **X (workers)** | **X (managers), (workers)** | * (managers, workers) | | diGropello (2011) |
| | domestic | **X (workers)** | **X (managers), (workers)** | * | | |
| Philippines | Export | | **X** | **X** | | diGropello (2010) |
| | domestic | | * | **X** | | |
| **Gaps** | | | | | | |
| Philippines | Export | | | **X**, * | | |
| | domestic | | | **X**, * | | |
| **Innovators v. traditional** | | | | | | |
| **Gaps** | | | | | | |
| Russia | Innovator | | **X (managers), (unskilled)** | * (managers), **(unskilled)** | * (unskilled) | Vasiliev et al. (2013) |
| | traditional | | *(managers) | **X (managers), (unskilled)** | * (unskilled) | |
| **Manager v. worker** | | | | | | |
| **Level** | | | | | | |
| Indonesia | Managers | | **X** | * | | diGropello (2011) |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Workers | X | * | * | | |
| Philippines | Managers | | X | X | X | diGropello (2010) |
| | workers | | | X, * | X | |
| Lebanon | Managers | | X | * | | World Bank (2012) |
| | workers | | * | X | | |
| **GAPS** | | | | | | |
| Russia | Managers | | X | * | | Vasiliev et al. (2013) |
| | Workers | | X | X | * | |
| Philippines | Managers | | | X, * | X | diGropello (2010) |
| | workers | | X | * | | |
| UK | Managers | | X, * | | | UKCES (2012) |
| | workers | | *, *, * | | X, * | |
| Indonesia | Managers | | X | | * | diGropello (2011) |
| | workers | | | | X | |
| Lebanon | Managers | | X | | * | World Bank (2012) |
| | Workers | * | | X | | |
| Botswana | managers | | | * | X | World Bank (2012b) |
| | workers | | * | | X | |
| **Skill level** | | | | | | |
| Peru | Skilled | | | X, *, * | * | World Bank (2011) |
| | Unskilled | | | X | * | |
| India | Skilled | | | X, X | | Blom and Saeki (2011) |
| LAC | Skilled | | | X | | Bassi et al. (2012) |
| | Unskilled | | | X | | |
| Vietnam | Skilled | | | * | X | World Bank (2008) |
| | Unskilled | | | X | X, * | |
| **GAPS** | | | | | | |
| UK | Skilled | | X | * | | CBI (2012) |
| | Unskilled | | X | * | | |
| MENA | Skilled | | | X | * | IFC (2010) |
| LAC | Skilled | | | X | | Bassi et al. (2012) |
| | Unskilled | | | X | | |

**Table 7: Russian employers in innovative firms assessment of the most lacking skills**

|  | Skills most lacking (in decreasing order of skills gap) | Skills where the perceived gap among innovative firm employers most exceeds the perceived gap among traditional firm owners |
|---|---|---|
| Managers | Decision-making<br>Leadership<br>Foreign language<br>Teamwork<br>Openness to ideas<br>Problem-solving | Decision-making<br>Leadership<br>Foreign language<br><br>Openness to new ideas<br>Problem-solving |
| Specialists | Problem solving<br>Professional skills<br>Independent work<br>Cooperation<br>Decision-making<br>Planning work | Problem solving<br>Professional skills<br>Independent work<br><br><br><br>teamwork |
| Blue-collar | Conscientiousness<br>Professional skills<br>Problem-solving<br>Independent work<br>Conflict aversion | Problem solving |

*Source: Adapted from Vasiliev et al. (2013), pages 38-41.*

**Table 8: Indian employers' most important skills, by factor with mean factor loadings**

| Core employability | Mean | Professional Skills | Mean | Communication Skills | Mean |
|---|---|---|---|---|---|
| Integrity | 4.48 | Use of modern tools | 4.08 | English Communication | 4.26 |
| Reliability | 4.42 | Apply math/science/ engineering knowledge | 4.07 | Written Communication | 4.07 |
| Teamwork | 4.41 | Creativity | 4.07 | Reading | 4.04 |
| Willingness to learn | 4.4 | Problem Solving | 3.93 | Technical skills | 4.02 |
| Entrepreneurship | 4.35 | System design | 3.84 | Experiments/data analysis | 4.01 |
| Self-discipline | 4.26 | Contemporary issues | 3.83 | Verbal communication | 4 |
| Self-motivation | 4.22 | Customer service | 3.51 | Basic computer | 3.95 |
| Flexibility | 4.15 |  |  | Advanced computer | 3.71 |
| Understand/take directions | 4.14 |  |  |  |  |
| Empathy | 3.92 |  |  |  |  |
| **Average** | **4.27** | **Average** | **3.91** | **Average** | **4.1** |

Question asked:  Employers were requested to rate on a scale from 1 (not at all) to 5 (extremely) how important each skill is for an engineering graduate to be an effective employee.  The scores were used as input to a factor analysis, which returns the three factors in the Table.
*Source: Blom and Saeki (2011).*

**Table 9: Skill Formation at Different Points of the Life-cycle**

| Period | Early years (0-5) | Childhood (5-12) | Adolescence (13-16) | Early and Middle Adulthood (18-29) and (30+) |
|---|---|---|---|---|
| **Type of Skills** | Basic cognitive Foundational socio-emotional | Basic Cognitive Socio-emotional | Basic Cognitive Socio-emotional Higher-order cognitive | Socio-emotional Higher-order cognitive Technical |
| **Key Actor** | Family, ECD programs | Family, schools, peers | Schools, peers, mentors, family | Higher education institutions, training institutes, work place |
| **Sample programs to Guide Actors to Build the Skills** (for a list of evidence-based programs, see Guerra and Modecki, forthcoming) | Quality parenting (Nuevo Postnatal, Program on Cognitive Development, Early Enrichment Program) <br><br> Child-focused ECD (Perry Program, Head Start) | Holistic curriculum, teaching methodology, and monitoring and evaluation system (KIPP, EPSIS, Enseña Chile, RCCP) <br><br> After-school/extra-school/out-of-school programs/activities (BBBS, Student Success Teams) | | Apprenticeships (Jóvenes programs) <br><br> Skills certification system, support systems for worker transition to firms where new learning can occur |

*Source: own elaboration based on World Bank (2010) and Guerra and Modecki (forthcoming)*

Figures

**Figure 1:  Employer skill preferences and greatest skill gaps among youth, %**
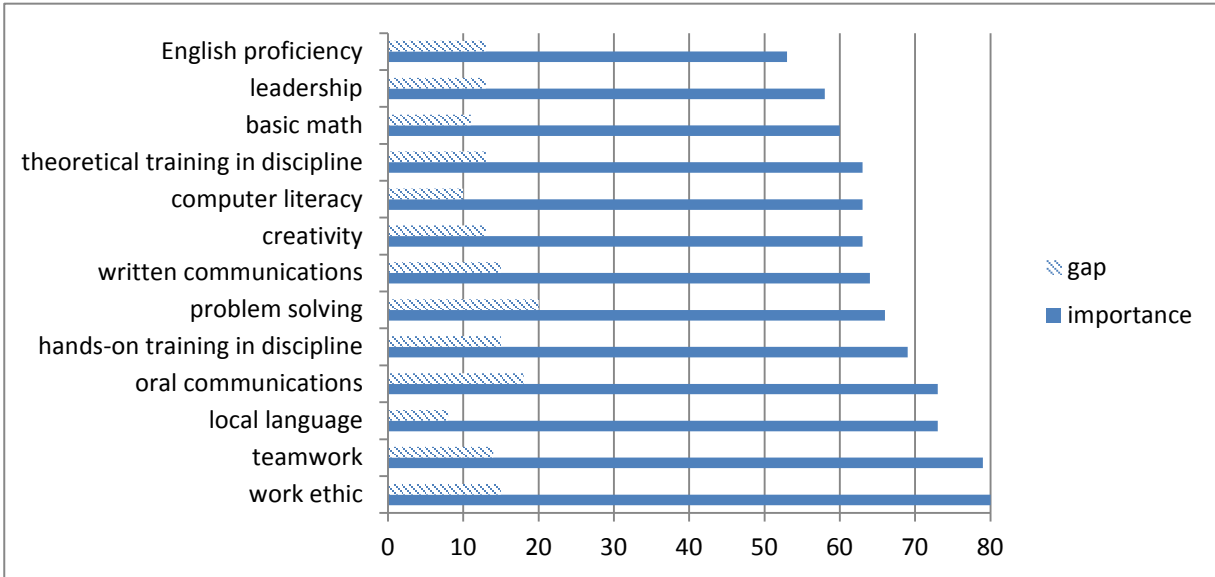


Question: "importance" is defined as the percentage of respondents ranking the skill as 8 or higher out of ten. "gap"is defined as (% of respondents who rank a skills as highly important) – (% of respondents who feel youth are highly competent in that skill). *Source: adapted from Mourshed, Farell and Barton (2012), Exhibit 15, page 12.*

**Figure 2: Employer demand for each skill set, by distribution of 100 points to each set based on degree of importance, %**
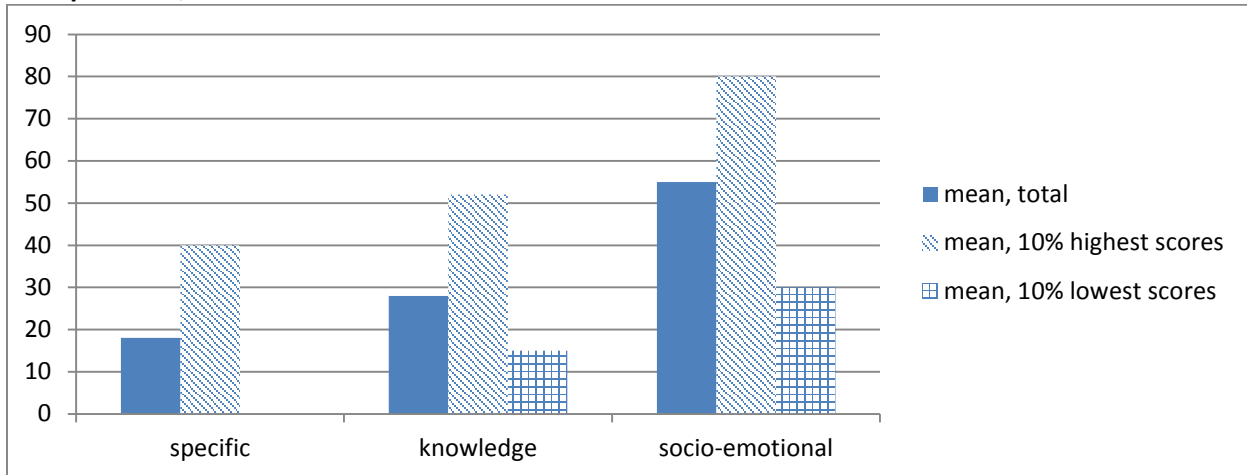


*Source: Derived from Graph 6.7, page 150 in Bassi et al. 2012.*
Question: distribute 100 points among the three skills sets, based on the importance of each in the respondents' firms

**Figure 3: Tonga Employer assessment of the most important and most lacking staff characteristics, %**
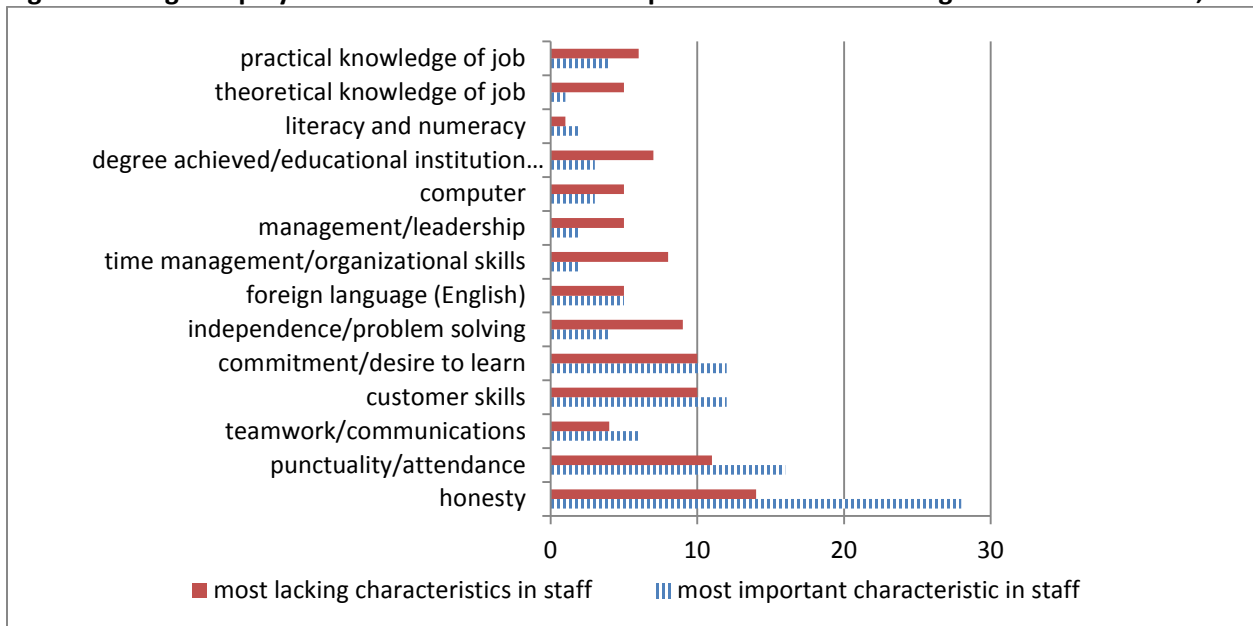


Question: what are the most important characteristics in your staff? Which are the biggest skills gaps?
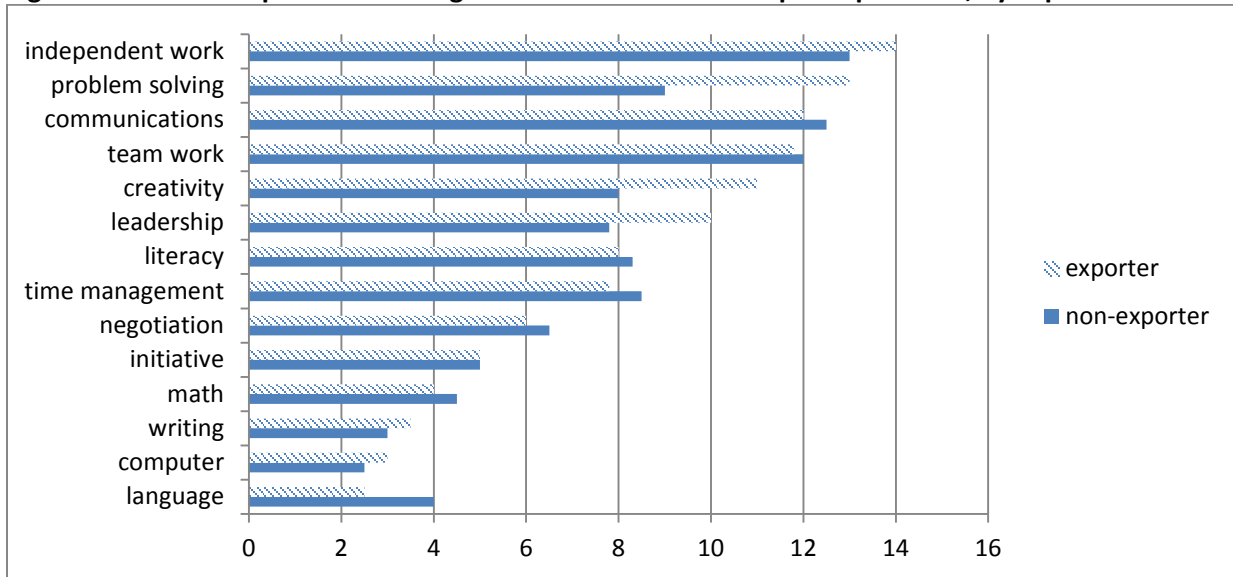*Source: Adapted from Figures 14 and 15, pages 24 and 25, in TCCI 2010.*

**Figure 4: Indonesian firms ranking of "most important" skills, by sector**
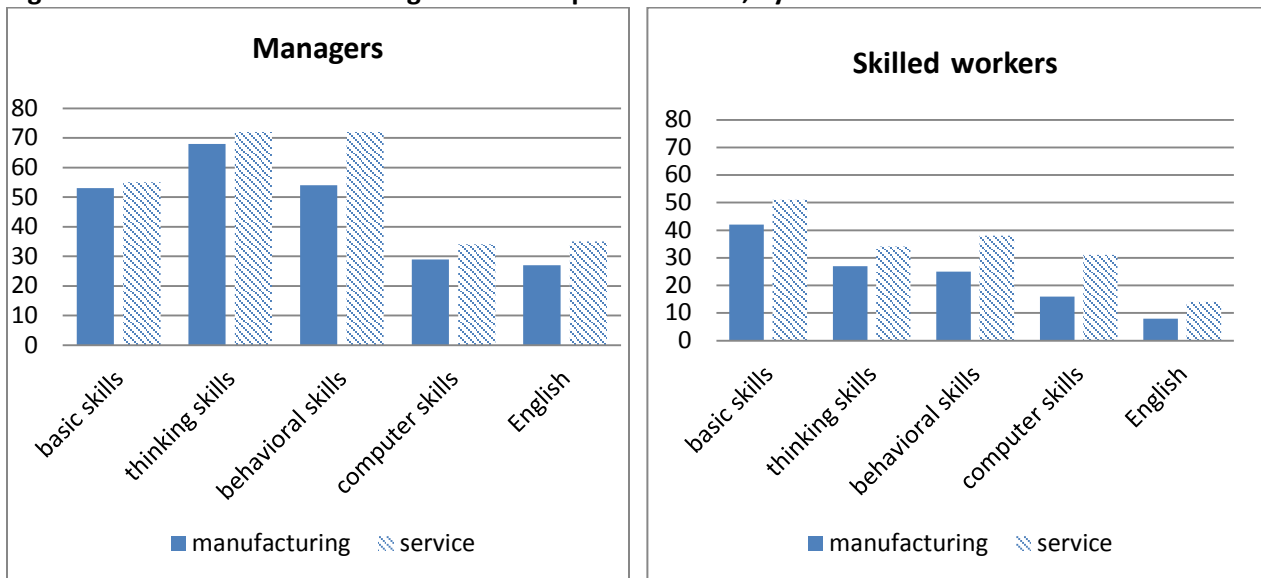


*Question: share of firms rating each skill as "very important*
*Source: diGropello (2011), adapted from Figure 2.22 on page 81.*

**Figure 5: Share of Filipino firms rating each skill as one of the top skill priorities, by export orientation**



Question: rank the five most important generic skills and job-specific Rank the three most important generic skills and job-specific skills for which gaps were most noticeable
*Source: Adapted from Figure 2.5, page 86 in diGropello 2010.*

**Figure 6: Skills Lebanese employers want in their managers and in their employees**
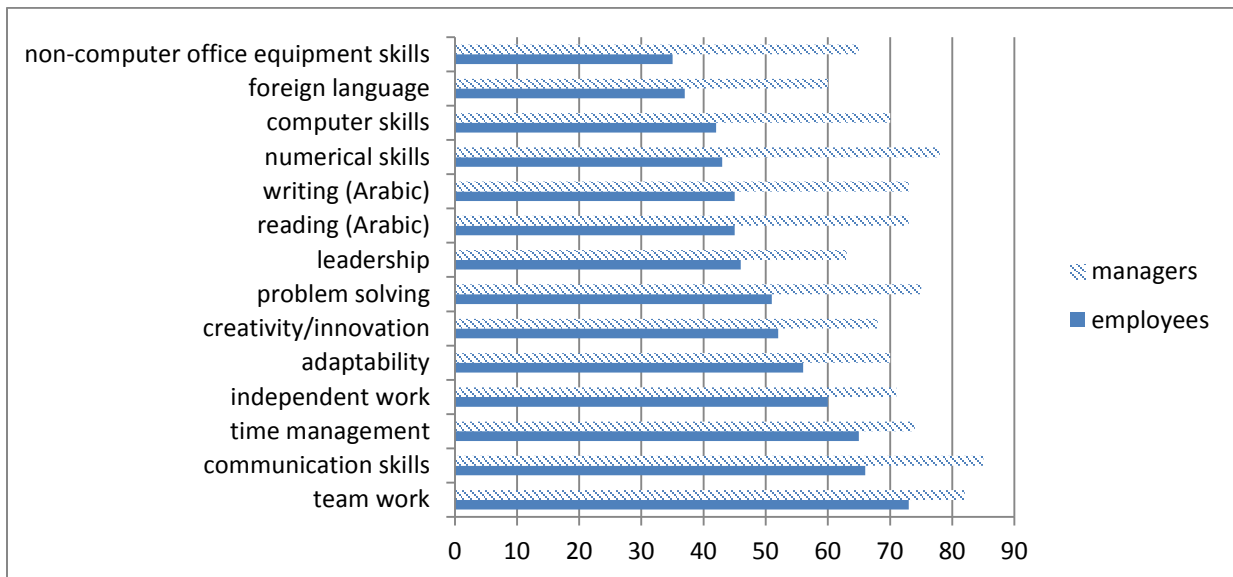


*Source: Adapted from World Bank (2012), page 36 Figure 2.8.*

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* indicates the reference is a data point in this paper

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