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This article traces the evolution of knowledge-based economic development in the Arab World. In pursuing this objective, many countries in the region have made large state-driven human capital investments with the goals of job creation, economic integration, economic diversification, environmental sustainability, and social development. An assessment of the effectiveness of Arab investments in human capital shows marginal progress towards knowledge-based development over the last decade. A disconnect between the skills developed in Arab skills formation systems and those required by private sector employers relegates Arab businesses to contesting lower-skilled, non-knowledge intensive industries which has stalled knowledge-based development in the region.

Keywords: Arab World, Middle East, skills formation, knowledge economy, competitiveness, skills development policy, economic development

Introduction

Economic policy across the Arab World[1] has led to a unique brand of private sector, export-led development impaired to varying degrees depending upon the country by lack of transparency, accountability, political cronyism, youth unemployment, and lagging rural development (Henry and Springborg 2011). Many of these issues are cited as catalysts for the series of protests that began in late 2010 and continued into 2011 that resulted in the heads of state of Tunisia and Egypt being deposed and several other political clashes across the region. It remains a question of intense regional significance whether the new government administrations in Egypt, Tunisia, and other Arab countries can form a political consensus and define an economic trajectory to begin addressing these development challenges. While economists generally view political violence, even if organized, as severely detrimental to economic growth, the sentiment on the frontlines views the recent unrest in the Arab World as a renaissance (See for example the comments of the Secretary General of the Arab League, Amr Mousa, to the Arab Economic Summit 2011 (Arab Soul is Broken 2011). A recent public statement by Mongia Khemiri (2011), Director General of the Foreign Investment Promotion Agency of Tunisia, also reflects this view of recent events as an opportunity:

> What is certain is that the future of Tunisia will be better. Its political system, which was long criticized, is bound to evolve towards more freedom, better governance, greater transparency resulting in a healthier business environment that is favorable to resourceful private initiative, whether local or foreign.

Such positivity towards the future is supported by recent research by the World Bank which shows that political systems emerging after organized unrest involving some degree of competitive political participation and relatively free elections can actually increase economic growth. However, the World Bank's findings provide evidence that economic growth after unrest requires an enabling environment

[1] This analysis defines the Arab World as the 22 countries which form the League of Arab States.

that is free from “parochial or ethnic-based particularist agendas that favor group members to the detriment of common, secular, and cross-cutting agendas (Bodea and Elbadawi 2008).”

The well-known Arab poet Khalil Gibran also prophetically captured this spirit of opportunity when he wrote “Pity the nation divided into fragments, and each fragment deeming itself a nation.” Assuming several countries in the Arab World emerge from their current uncertainty with relatively free elections that embrace political participation as a means of solving pressing development challenges, renewed economic growth at the national level may provide an impetus to forge a new regional economic model rooted in integration and cooperation. The widespread adoption of knowledge-based economic development as the competitive ideal for countries in the region could potentially provide a shared overarching vision to address many of the development challenges in the post- awakening Arab World.

The Origins of Knowledge-based Economic Development in the Arab World

While there is no single accepted definition of the term knowledge-based economy, one of the most widely cited papers on the subject defines knowledge-based economy as “production and services based on knowledge-intensive activities that contribute to an accelerated pace of technological and scientific advance as well as equally rapid obsolescence. The key component of a knowledge economy is a greater reliance on intellectual capabilities than on physical inputs or natural resources (Powell and Snellman 2004).” In the Arab World, knowledge-based economic development has become closely intertwined with national competitiveness and economic policies that support innovation, technology development, entrepreneurship, workforce skills development, adoption of high performance organizational structures, and ICT infrastructure development (Planning 2010).

Based on the development experience of countries such as Finland, Singapore, Korea, United States, and United Kingdom, Rischard (2009) identifies five common economic development justifications (job

creation, economic integration, economic diversification, environmental sustainability, and social development) which underpinned successful transitions to knowledge-based economies. A review of the national economic development plans across the region, detailed in Figure 1, shows that seventeen of the twenty-two countries in the Arab World have the development of a knowledge-based economy specifically stated as a medium to long-term economic policy objective. Applying the economic justifications for pursuit of knowledge-based economic development identified by Rischard to the countries of the Arab World, nearly all of the Arab countries specifically state the determinants shown by international example to be associated with successful transitions to more knowledge based economic development as objectives in their national economic development plans.

Djeflat (2009) observes that the transition to knowledge-based economies emerged as a development goal in many countries in the region in the late Nineties due to the commonality of several factors related to culture, the economic environment, and socio-political developments. Sawhel (2009) cites the historical importance of the quest for learning and knowledge influenced by religious beliefs, the brain drain of prominent Arab academics and scientists, and the perception that the Arab World is lagging behind in development as cultural factors for leading to the embrace of knowledge-based development.

The literature describing the economic factors contributing to the movement towards knowledge-based economic development is substantial. Al-Ali (1991) provides evidence that suggests countries in the region are dependent on foreign technologies while concurrently facing shortages finding qualified employees and not having the capacity to transfer technologies in a way that develops the local workforce. High levels of capital formation have not been accompanied by gains in higher value added industry specialization and increased export capabilities resulting in the prominence of low-grade industries in many countries which can be characterized as ‘bazar economies’ (Djeflat 2009). Though FDI

grew at a compound annual growth rate of 33% from 2000 to 2009, the Arab world attracted only $41 billion, or 4% of worldwide foreign direct investment flows, in 2009 while emerging regions like Latin America and the Caribbean attracted 7% and East Asia and the Pacific attracted 19%(Bank 2010). Low levels of total factor productivity have resulted in reduced overall efficiency from capital investments. For example, between 1975 and 2000 the only countries in the Arab World with positive total factor productivity growth were Egypt, Oman, Syria, and Tunisia (Sala-i-Martin and Artadi 2002). Economic integration, driven by the accession of several Arab countries to the WTO and globalization, necessitated the adoption of economic reforms to improve the enabling environment for business, entrepreneurship, and attraction of foreign direct investment (Program 2002). The importance of reforms concerning the enabling environment for business are underscored by the industrial structure of the region in which small and medium sized businesses represent 90% of companies and employ an estimated 40-65% of the workforce (Hertog 2010). Volatility in oil prices, which led to regional boom and bust cycles, has highlighted the need for more diversified economies (Program 2003). The region is also facing the uncertainty posed by a post-petroleum and post-carbon era which requires preparation now for major water, energy, food, climate change, and other issues (Rischard 2009). R&D spending, a critical input for knowledge-based economic development, in the Arab World has been consistently below average for over four decades, ranging from 0.1 to 1.0% of GDP, and overly reliant on government spending, whereas advanced countries spend over 2.5% of GDP on R&D and have significant levels of private sector spending (United Nations Educational 2010). The low levels of regional R&D led to a renewed awareness in the Nineties of the importance of science and technology for development that precipitated R&D policies to foster innovation systems and educational reform (Djeflat 2009). Many of the Arab countries are making significant progress in developing the ICT infrastructure to support knowledge-based economies which exceeds levels of development in other regions (Foundation and Program 2009).

The youth bulge has featured prominently in socio-political literature on knowledge based economic development in the Arab World. Though estimates vary based on population growth assumptions, there are approximately 66 million Arab youth currently between the ages of 15-24 which is expected to swell to 88 million by 2030. Youth between the ages of 15-24 make up 20% of the total population (Secretariat 2008). The region's youthful demographics, is viewed both as an enabler of economic growth and a potential threat. Dhillion and Yousef (2009) maintain that regional development has bypassed young people due to institutional weakness which has left youth worse off than previous generations that received free education, public sector job guarantees, and strong state support in the form of subsidies and entitlements. For many Arab youths this has meant chronic and persistent unemployment with an estimated 24% of Arab youth currently unemployed. From 1998 to 2008, the number of unemployed youth increased by 25%, a trend that is expected to continue into the future (Organization 2010). The Arab World has achieved notable gains in access to education which has had the unintended effect of a supply shock in which the supply of highly educated youth has outpaced job creation (Program 2010). Due to several Arab countries achieving gender parity, or close to it, in schooling, Female labor market inclusion has become a policy priority in nearly all Arab countries (United Nations Educational 2010). Demographic pressures have strained public sector employment, which is preferred to private sector employment regionally, and education systems which are not well suited to the needs of knowledge-based economic development (Dhillon and Yousef 2009). While the public sector may continue to be a source of employment, increasingly private sector employment is absorbing unemployed and new graduate job seekers (Yousef 2005). In the Gulf countries, a further complication is the presence of a large expatriate labor force employed in the private sector with the native population almost entirely employed in the public sector. Whereas a youthful, growing labor market can be beneficial to economic development if it is accompanied by job creation as it has been in

East and Southeast Asia, this has not been the case in the Arab World with many youths becoming unemployed, discouraged, or entering the informal economy (Organization 2010). The discontent amongst Arab youth is particularly significant in light of recent events since Urdal (2006) finds a relationship between youth bulges experiencing economic hardship and political violence.

International organizations have stressed the catalytic value of political reform in the Arab region to form an enabling environment for knowledge-based economic development arguing that "many of the values and achievements of the knowledge society are inseparable from freedom and the construction of social and institutional contracts in support of a state in which individual rights and the rule of law are preserved (Foundation and Program 2009)." These objectives have proceeded at varying rates across the region with indices generally showing an increase in political rights, civil liberties, and economic freedom (Foundation and Program 2009; House 2011; Miller and Holmes 2011). The work of international organizations such as the World Bank and the United Nations Development Program has paralleled government reform towards knowledge-based economies in the Arab World with funding, technical assistance, and advocacy. For example, from 1990 to 2010 the World Bank lent approximately $3.4 billion dollars, primarily to Egypt, Jordan, and Tunisia, for education projects specifically targeted at knowledge-based economic development(Bank 2011). The World Bank also hosted a conference in 2009 that led to the 'Tunis Declaration on Building Knowledge Economies' which called for the establishment of a convening body under the Islamic Educational, Scientific, and Cultural Organization funded by member states (Institute 2009). Under the direction of Rima Khalaf, the United Nations Development Program published the highly influential Arab Human Development Report series in 2002 and 2003 which advocated a number of reforms and provided a roadmap for Arab governments to advance toward knowledge-based economic development (Lord 2008).

Common Challenges Have Led to Regional Convergence in Human Capital Policies to Support Knowledge-based Economic Development

In the environment of a rapidly developing United States in the 1960s, similar in many ways to the economic transition unfolding now in the Arab World, in which the economy was shifting from small, entrepreneurial, Marshallian firms to larger innovation-based companies, Becker (1994) drew a strong link between human capital and economic growth. Becker observed "Since human capital is embodied knowledge and skills, and economic development depends on advances in technological and scientific knowledge, development presumably depends on the accumulation of human capital." Schultz (1961) attributed human capital investment to the productive superiority of technically advanced countries. However, the most influential outcome of the early empirical work on human capital in the 1960s was that it calibrated current thinking on human capital as an investment, financed variously by the state, individual, and employers, which vests with individuals in the form of knowledge, skills, health, or values (Johnson 1960; Becker 1994).

In the Arab World, a society characterized by skilled, flexible, and innovative individuals nurtured through quality education, employment, and broadly accessible life-long learning opportunities is seen as a vital precursor to knowledge-based economic development (Planning 2010). Because future regional economic success challenges Arab countries to compete internationally in an increasingly knowledge-driven global economy, many countries in the region have responded by establishing advanced educational and health systems as well as increasing effective participation in the labor force (Planning 2008).Thus, the largely similar economic and social policies outlined in Figure 1 that have accompanied the transition to knowledge economies in many countries in the Arab World, namely improving access and quality of education; improving health, safety, and environment; increasing female

and private sector labor participation; and supporting entrepreneurship, can be viewed as large, state-driven investments in human capital.

The convergence of human capital development policies in the region is driven by the shared vision of a knowledge-led future as well as common development trajectories in which the Arab countries to varying degrees are faced with largely similar human capital development challenges:

Low levels of workforce productivity: Across the region, labor productivity is low. Based on GDP per person employed data from 2008, Qatar, the richest Arab nation, is approximately two thirds as productive as OECD countries, even despite the upward trending of oil and gas which forms the majority of Qatar's domestic product receipts (Bank 2010). Labor productivity data from 1991-2008 show a .7% compound annual growth rate for the Arab World while East Asia and the Pacific grew at 3.97%; Latin America grew at a rate of 1.19%; Sub Saharan Africa grew at 1.46%, and the OECD countries grew at 1.54%. This means that worker productivity growth in East Asia and the Pacific was more than 5 times that of the Arab World over the last 18 years(Bank 2010). To attain higher productivity levels and sustain wage increases, Arab countries require more educated workforces, increased business sophistication, and higher levels of innovation (Hanouz and Khatib 2010).

Preference for public sector employment: Long standing social aspects of career specialization have led to a reluctance to pursue certain professions (United Nations Educational 1960). The social aspects of career choice has slowed economic integration, led to the substitution of expatriate labor in certain industries, and decreased productivity in low value added industries for which low skill expatriate labor is imported from abroad to perform (Oman 2010). Social factors and the perception of more favorable conditions of employment offered by the public sector have led to a reluctance to join the private

sector(Assaad 1997). The concurrent shrinking of public sector employment opportunities and the high level of competition for public sector employment has disproportionately affected the career prospects of educated women, who make up a large number of the unemployed due to employment preference shown to men in the public sector (Miles 2002). The social preference for public sector jobs has precipitated a crisis in which regional governments are unable to create suitable employment opportunities to absorb the youthful population entering the labor market. A recent survey of regional youth shows that 88% of young people believe that they will not be able to find a job easily with 68% indicating finding a job is their highest priority (Dunlop 2006).

Increasing female labor market participation: Despite significant gains in educational attainment, female labor market participation is estimated at 22% resulting in high levels of female unemployment(Organization 2010). While more women have entered the labor market, many have found employment in part-time work, microenterprises, and the informal economy (Flynn and Oldham 1999). Rapidly evolving cultural values and changing views on familial obligations continue to be influential in labor market participation and obtaining higher levels of education (Miles 2002).

Poor match between workforce skills and those demanded by public and private sector employers: In surveying the public sector, Al-Yahya (2008) finds evidence of a low match between the skills of public sector employees and the work roles they perform particularly at lower administrative levels. Al-Yahya also finds evidence that formal educational qualifications are frequently not related to current jobs and a high number of public sector employees who believe their current jobs require low levels of their perceived skills and capabilities. Citing deficiencies in soft skills like communication, teamwork, analytical skills, and innovative thinking, a recent survey of the private sector also found that 46% of regional CEOs do not believe that education and training systems in the Arab World prepare students for the

workplace. This finding is indicative of a vast disconnect between current regional human capital levels and the skills demanded by private sector employers. The lack of such generalized skills that would be useful to a variety of employers suggests a market failure in regional education systems and universities to equip graduates with the skills demanded by employers. The mismatch between employer needs and the skills available in the local labor market increases the import of skilled labor while also making it more difficult for Arab youth to make the school to work transition. Though increasing, there remains a lack of partnerships, such as internship programs, joint advisory boards composed of education institutions and industry leaders, project-based research sponsored by companies, and R&D centers built with active involvement from the business community, between the private sector and education institutions conducive to bridging this disconnect (Dunlop 2006).

Education and training system misalignment with the needs of knowledge-based economies: Many Arab countries are unable to meet the needs of all students who want to pursue education because of dramatic increases in student enrollment and insufficient resources (Program 2002). Though there is a continued long-term trend toward increased budgets for education in the region, meeting the combined demands of increased access, assuring relevance, and improving quality in the face of finite resources is challenging (United Nations Educational 2010). Despite positive gains to promote educational opportunity and increased national spending on education, poor educational quality continues to hamper regional human capital development and the ability of Arab countries to compete in the global economy. Countries with the largest student numbers are falling behind on quality and availability. Female enrollment in higher education in the Arab World is quite high, but social and familial obligations still limit equal access in many countries. Although educational levels have increased significantly across the region, unemployment rates have been higher among educated, women in particular, than low skill workers (Bank 2007). Lack of a lifelong learning culture also fails to motivate individuals to engage in continuous learning to ensure continued relevance of skills (Yousif 2009).

At the higher education level, the region's education systems are failing to produce the right quality and mix of human capital needed for knowledge-based development. Arts graduates are disproportionately higher than graduates in science and technology fields and business (Program 2003). Vocational training has a negative reputation regionally as a second tier educational track for poor students which does not impact employability (Bank 2008). Lack of regional postgraduate programs force students to study abroad which perpetuates the brain drain of talented students. Particularly at the primary and secondary levels educators lack the skills and training to engage students which leads to curricula and institutions that lag international standards in most quality measures (Statistics 2006; Maroun, Samman et al. 2008). At the higher education level, low levels of professorial titles and lack of tenure systems fail to incentivize professors to engage in academia full time (Choueiri 2008). Additionally, the use of Arabic, English, and French in education and training systems has consequences at several levels including cultural identity; research productivity and locally produced knowledge; and in terms of facilitating ambitious scholars to seek higher qualifications outside the region.

Improving educational quality in the Arab World is a significant challenge since several countries in the region lack education authorities to ensure standards and performance improvement. There are few systems of institutional accreditation or mechanisms to measure system performance or to judge quality relative to other institutions. The oversight role typically played by scholarly, scientific, and professional organizations is limited due to lack of capacity. Educational systems in the Arab World have a presumed vocationalist objective without a clear link to the needs of labor markets. Internationally an important outcome of new vocationalism is that "Traditional models and methods of expressing qualifications structures are giving way to systems based on explicit reference points using learning outcomes and competencies, levels and level indicators, subject benchmarks, and qualification descriptors (Adam 2003)." Competence based education and training standards are employer-led in that they prescribe the qualifications needed for performance in the workplace, yet the Arab World is only now adopting such

measures (Opertti 2010). Given the many challenges Arab education systems face, however, Schwalje (2008) finds a number of positive reform efforts regionally designed to increase the alignment of education and training systems with emergent skills formation needs of knowledge-based economies including: a movement towards performance-oriented, rather than expansion focused, education and training systems with an emphasis on improving quality, increasing performance, and assuring marketability of outgoing students. This includes adoption of accreditation systems, performance standards to assess system performance, and the capacity for data collection that facilitates system monitoring and evaluation and policy analysis; increased levels of public-private partnerships focused on producing graduates with new, adaptable leadership qualities, interpersonal, and organizational skills, and who possess the ability to continuously upgrade their skills; differentiation and alignment of programs and institutions with specific science and technology needs required by knowledge-based economies; an increased capacity to train semi-skilled workers in two-year or shorter programs with skills that match immediate market needs while also emphasizing lifelong education to ensure continued relevance of skills; a move from lecture-based methods of instruction to interactive and experiential instructional methods accomplished by training teachers in more engaging teaching methods and use of technology in the classroom; and expansion of education and training systems with the objective of universal education to meet the needs of disadvantaged groups to increase livelihoods and employability.

Barriers to entrepreneurship: Operating under the assumption that entrepreneurship is a mechanism for job creation, many Arab governments have engaged in efforts to improve the environment for entrepreneurship including providing funding and training, reducing bureaucracy, and establishing business incubators. A recent survey showed that 15% of young Arabs say they wish to start their own business in the next 12 months, a rate significantly higher than the 4% of young people in North America or Europe who responded similarly (Silatech 2010). While some gains have been made in facilitating

entrepreneurship in the region as evidenced by increasing numbers of new business registrations, the procedures, time, costs, and minimum capital required to start a business remain much higher than OECD countries(Bank 2010; Klapper 2010). Though some Arab countries provide venture funding for entrepreneurial endeavors, startup and early-stage financing from banks, venture capitalists, and angel investors is very limited in the Arab World due to low liquidity conditions on exit markets. In terms of nurturing businesses, the Arab World has approximately 100 business incubators as compared to 1,600 in the United States to serve roughly similar populations (Association 2011).

Weak innovation systems: R&D spending is significantly lower than in the developed world with very little private sector funding (United Nations Educational 2010). Regulatory frameworks do not protect intellectual property leading to low level of patents and stifling private R&D expenditure. There is weak government policy making in research and innovation in spite of various studies which have shown that critical components necessary for innovation systems, research, market-oriented R&D, and entrepreneurship need to be concurrently fostered and linked in knowledge-based economies (Cooke 2001; Pietrobelli 2009). These components include educational systems; institutions conducting basic, applied, and interdisciplinary research; business incubators; funding institutions; and professional societies. Several of the institutions critical to the innovation system are weak in the Arab World (Foundation and Program 2009). Arab scholarly, scientific, and professional organizations generally operate at a low level of activity due to lack of funding. Venture capital, research foundations, and technology transfer funds that promote research are emerging, yet few multinationals or regional companies have R&D centers in the Arab World. Incentives to promote private sector R&D, innovative research, and recognition of research achievements are limited.

R&D and education, especially graduate education, are strongly coupled. However, the research function has gradually been marginalized in Arab universities. University research centers are few and do not have access to critical resources (United Nations Educational 2003). Research commercialization

is depressed due to the lack of business incubators and disconnects between industry and academia (Djeflat 2002). While availability of scientists and researchers is higher than other developing regions, the number is significantly less than OECD countries and other R&D leaders (United Nations Educational 2010). Research is a global activity which relies on national, regional, and international cooperation. Few Arab national or regional organizations or governments provide funding to promote international or inter-Arab research cooperation. Absence of travel grants to attend academic meetings has worked against the formation of professional societies, dissemination of research, and international citation (Program 2003). Individual Arab researchers who lack financial support instead increase their level of international collaboration while neglecting regional cooperation or co-authorship with other Arab researchers, or in extreme cases choose to brain drain. The brain drain costs the Arab World a huge amount of talent that could be utilized in teaching, research, and innovation (Zahlan 2007).

Managing Growth Sustainably: Underpinned by high fertility rates and increased life expectancy, the population of the Arab World nearly tripled to 359 million growing at an average annual rate of over 2% from 1970 to 2010 (Mirkin 2010). This growth has increased demand for basic services such as health, education, housing, water, and sewerage systems which has outpaced the growth rate of national income and government revenues (Rischard 2009). The Arab World is experiencing rapid urbanization which has resulted in increased poverty, inadequate solid waste collection and disposal, toxic and hazardous waste problems, poor or non-existent sanitation facilities, and degradation of urban environment and coastal areas (Asia 2009). Demographic trends are also having a number of societal implications related to marriage and the family; the status of women; and the care of older persons (Mirkin 2010).

Assessing the Effectiveness of a Decade of Arab Human Capital Investment: Are Human Capital Investments Creating the Skills Needed by the Private Sector?

Zahlan (2007) observes that Arab governments have pursued human capital investments with the expectation of a return in the form of contributions to the national economy through productive employment of their citizens. Therefore, the challenge for Arab governments is strategically investing in endowing citizens with human capital that meets the demand of the market in a such a way that the economy as a whole can benefit while avoiding the liability of misplaced investments that are not market oriented (Foundation 2008). From this perspective, Arab government investments in human capital can be viewed as economic policies to improve the business climate with the instrumental goals of job creation, economic integration, economic diversification, environmental sustainability, and social development (Development 2010).

The success of Arab human capital investment relies upon effectiveness at three sequential, interdependent levels: the production of human capital in the quantity and quality required by the market via the formal education and training system; how human capital is utilized in terms of whether it meets the expectations of employers; and how human capital is maintained (Development 2010). Given Arab government initiatives over the last decade to improve human capital as a part of knowledge-based economic development and in light of the declining role the public sector can play in regional employment, one increasingly critical measure of the success of Arab human capital investments is the effectiveness of investments in terms of creating the skills, capabilities, and values needed by private sector employers. Development economists have observed that human capital requirements increase as countries become more developed, as industry structures become more diversified and competitiveness oriented, and as firms move from smaller patriarchal family structures to larger size firms (Lall 1999; Lall 2000; Porter, Sachs et al. 2002). Lall (1999) finds that market failures in

human capital formation are rampant in rapidly developing regions as education and training institutions struggle to keep pace with economic growth.

In tracing the history of knowledge-based economic development in the Arab World and in discussing the developmental context of human capital investments over the last decade, this analysis suggests that Arab human capital investments have likely fallen short in meeting private sector market needs. There have been very few employer surveys to date that have empirically examined the effectiveness of Arab human capital investments in meeting the needs of private sector employers in the transition to knowledge-based economies. In many countries in the Arab World, firms have anecdotally expressed a serious concern that they face internal employee skills deficiencies that limit performance, a phenomenon that has been labeled as a "skills gap[2]." Given the regional human capital challenges described thus far, it would be reasonable to hypothesize that skills gaps are likely widespread in many countries in the Arab region in the private sector. This analysis will proceed by assessing the effectiveness of Arab human capital investments in meeting the needs of private sector employers by determining the extent of national skills gaps; the prevalence of skills gaps by firm size; and the industries facing the most severe skills gaps.

For reasons of practicality and data coverage two data sets are used to shed light on the presence of private sector skills gaps in the Arab World. Administered globally since 2002 with a standardized international survey questionnaire in local languages, the World Bank Enterprise Survey dataset covers over 100,000 private companies with more than five employees in the manufacturing and services sectors in 124 countries. For the purposes of this analysis, a proxy for the extent to which businesses perceive skills gaps as a hindrance to their operations was calculated as a ratio of the number of firms

[2] This analysis defines a skills gap as a situation in which an employer feels their existing workforce has inadequate skills to meet their business objectives or where new entrants to the labor market are apparently trained and qualified for occupations but still lack a variety of the skills required.

who answered Major Obstacle or Very Severe Obstacle to the World Bank Enterprise Survey question "Is an inadequately educated workforce No Obstacle, a Minor Obstacle, a Moderate Obstacle, a Major Obstacle, or a Very Severe Obstacle to the current operations of this establishment?" to the total number of firms surveyed in a country. The World Bank dataset includes full data for 116 countries 7 of which are located in the Arab World. This analysis also makes use of data from a regional survey of 587 Arab CEOs in 12 Arab countries carried out in late 2007(Foundation 2008). The survey asked "Does the education system provide people with adequate skills and in sufficient quantities to the economy?" Skills gaps are proxied by the percentage of respondents who answered that the education system does not provide people with adequate skills. While there are limitations, many labor force surveys utilize educational attainment as a proxy for a worker's skill level. Gonzaga et al. (2006) provide evidence that educational attainment is particularly useful as a proxy for skills. International organizations such as the OECD have also found schooling to be a useful proxy measure for human capital in the Arab region due to a lack of regional data (Development 2010). A critical assumption of these proxies is that responding firms rely upon local labor markets for their hiring needs which would convert low levels of external workforce human capital into internal firm-level skills gaps. As discussed previously, the generalizability of this assumption on a country-by-country basis may apply to varying degrees given potential sorting effects surrounding the preference for public sector employment in the Arab region and the level to which expatriate labor might be used to meet critical skills deficiencies.

Results and Implications

Twenty-four percent of firms in the Arab World report that they face a skills gap according to data from the World Bank Enterprise Survey as compared to 20% in Latin America and the Caribbean, 20% in Europe and Central Asia, 18% in Africa, 17% in East Asia and the Pacific, and 15% in South Asia. Figure 2 reconciles the skills gaps estimates from the two data sources. Both surveys reveal significant levels of unmet skills needs amongst private sector employers, although the large disparity between the proxy

estimates across the two surveys suggest there may be some trouble with cross comparability of the estimates. Nevertheless, Figure 3 merges the two data sets in attempt to build a global ranking of skills gaps prevalence. The data from the Arab CEO survey suggests that Arab countries, particularly the Gulf countries, are amongst the top of the ranking in terms of facing the highest prevalence of skills gaps globally. However, the World Bank Enterprise data suggests a slightly more moderate interpretation in which the majority of the Arab countries are clustered around the middle of the ranking. The story across the two datasets is consistent, however. Both surveys indicate a gap between the human capital requirements of private sector firms in the Arab World and the skills levels of their current employees.

In small firms (less than 20 employees), 20% of respondents report facing skills gaps that affect the operation and growth of their firms while 23% of medium sized (20-99 employees) and 26% of large (100 or more employees) firms responded this way. Such a finding is particularly troublesome in the Arab World since the economy is comprised of a high number of SMEs that employ a significant percentage of the workforce. Firm level skills gaps thus appear to be a binding constraint on the competitiveness of Arab SMEs. In terms of industries affected, Figure 4 shows that both manufacturing as well as service industries suffer from skills gaps. Firms operating in skill intensive industries such as chemicals and pharmaceuticals as well as less skilled industries such as textiles report skills gaps. Many of the industries that have the potential to contribute strongly to a more diversified regional economy suffer from significant levels of skills gaps which suggests regional economic diversification is hampered by low levels of human capital.

Based on this analysis it appears that Arab human capital investments have been marginally successful at creating the skills demanded by private sector employers in a number of industries. These findings also cast doubt on whether the other larger macroeconomic objectives of the regional emphasis on transitioning to knowledge-based economies have been achieved. In the Arab World the gross value

added of knowledge-based industries[3] is the lowest in the world making up 39% of regional gross domestic product as compared to 74% in OECD countries, 64% in East Asia and the Pacific and Latin America and the Caribbean, and 57% in Sub Saharan Africa. The contribution of value added to regional gross domestic product from knowledge-based industries has remained virtually constant over the last decade. From 2000 to 2009, the percentage share of employees in knowledge-based industries has increased by a compound annual growth rate of .8% in OECD countries with knowledge-based industries employing 77% of workers. Based on sparse data from 2000 to 2009 from 14 countries in the Arab World representing 70% of the region's population, 61% of the population is employed in knowledge-based industries. Employment in knowledge-based industries has increased only negligibly over the last decade despite Arab government human capital investments. Arab World economies remain heavily reliant on the industrial sector[4] which accounts for 53% of regional domestic product while in OECD countries the industrial sector accounts for only 25%. Gross value added from manufacturing[5] makes up 10% of regional gross domestic product in the Arab World as compared to 16% in OECD countries and 22% in Latin America and in East Asia and the Pacific. The lack of growth in gross value added and employment levels in knowledge-based industries suggests that Arab human capital investments have not led to job creation or meaningful economic diversification in knowledge-based industries (Bank 2010).

While job creation and economic diversification efforts have not been successful, the Arab World has increased its level of economic integration. From 2000 to 2008 trade as a percentage of regional gross domestic product increased at a compound annual growth rate of 2.87%, with imports and exports

[3] Knowledge based industries correspond to International Standard Industrial Classifications 50-99 including value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services.

[4] The industrial sector corresponds to International Standard Industrial Classifications 10-45 and includes manufacturing (ISIC divisions 15-37). It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas.

[5] Manufacturing refers to industries belonging to International Standard Industrial Classifications 15-37.

increasing from 72% of regional gross domestic product in 2000 to 90% in 2008. Trade in knowledge-based services as a percentage of regional gross domestic product also increased from 2000 to 2009 at a compound annual growth rate of 2.76% which was roughly the same as the OECD countries. Exports of knowledge-based services during this period increased at a compound annual growth rate of 12.40% which was less than South Asia at 24% and East Asia and the Pacific at 13.41% but comparable to OECD countries at 11.23%. However, export sophistication is declining. Royalty and license fees decreased at a compound annual growth rate of -2.3% from 2000 to 2009. Just 1% of the Arab World's manufactured exports are classified as high-technology, R&D intensive exports, and the region's portion of high technology exports as a percentage of manufactured exports actually declined at a compound annual growth rate of -4.83% from 2000 to 2009(Bank 2010).

Based on observing Silicon Valley, Finegold (1999) articulates two economic development outcomes which relate workforce skills to economic orientation and industry specialization that can be applied at the country level. A low skill equilibrium occurs when an economy adopts a low quality, lower value added production orientation when faced with a low supply of workforce skills. In economies with low skills equilibria, workers acquire little training because few high-quality goods are produced and investment in education and training is not sufficiently rewarded. Feingold describes knowledge-based economies as high skills equilibria in which skills formulation institutions and the enabling environment work in tandem to produce high-level skills suited to knowledge-based industries that thrive on competitive advantage, high wages, and innovation capacity. Wilson and Hogarth (2003) also provide evidence that skill requirements increase as firms move from low value-added industries to operating in high value, knowledge-intensive industries. Bonser, Daniel et al. (2006) find that firms make choices to contest particular industries based on the skills of the workforce at their immediate disposal. In this respect, workforce skills serve as a signaling mechanism whereby employers form beliefs about the

productive capabilities of the national workforce and make choices to contest particular industries which are well suited to national workforce skills. Applied to the Arab World, the perception of Arab employers that regional skills formation systems are not producing the skills they require may serve as a deterrent to entry into knowledge-based industries which are perceived to require skills unavailable in the national workforce or which would be too costly to build internally.

To examine the relationship between the sufficiency of internal firm skills levels and knowledge-based economic development in the Arab World, Figure 5 layers the findings of the skills gap rankings presented in the previous section over the World Bank's Knowledge Economy Index (Bank 2011). Assuming that knowledge-based economies exhibit much of the interconnectivity required by a high skills equilibrium, countries with developed knowledge-based economies would be expected to be more effective at producing the skills required by businesses. While the lack of institutional cohesion to produce high-level skills combined with less skill intensive industrial structures of economies at low skills equilibrium states would be expected to generate low demand for skills and few skills gaps. Figure 5 confirms these propositions as high income, developed countries with knowledge-based economies (contained in the green oval) exhibit less skills gaps consistent with a high skills equilibrium state while low income countries (contained in the red oval) exhibit low demand for skills with few skills gaps corresponding to a low skills equilibrium state. However, the large cluster of countries (contained in the amber oval), which includes the majority of countries in the Arab World, seemingly fall in an alternative equilibrium state which might be described as an "intermediate skills equilibrium."

Nations which fall in intermediate skills equilibria can neither be classified as specializing in knowledge-based industries or lower skilled, goods producing or commodity industries. Thus, the lack of effectiveness of Arab skills formation systems to produce high-level skills serves as a constraint to regional knowledge-based economic development and entry into high value, knowledge-based industries. The signal that employers receive regarding workforce skills from the labor market and

internal to their firms essentially leads to partial pooling equilibrium characterized by under investment in knowledge-based industries that require high-level skills. Given the level of skills available at their disposal, businesses in the Arab World are seemingly influenced to contest lower-skilled, non-knowledge intensive industries at the detriment to regional competitiveness and knowledge-based economic development.

Conclusion

This analysis has shown that Arab human capital investments meant to support knowledge-based development over the last decade have been marginally successful. In light of the decreasing role the public sector can play in generating employment opportunities for the region's youth, the extent to which Arab skills formation systems produce the skills required by private sector firms is a critical measure of human capital investments that accompany regional knowledge-based development. It was shown that Arab private sector employers report a large disconnect between the skills required for the growth and operation of their businesses and the skills of their employees. Given the current level of skills available at their disposal in national labor markets and internally within their firms, businesses in the Arab World seem relegated to contesting lower-skilled, non-knowledge intensive industries. The gap found between employer needs and the skills produced by Arab skills formation systems casts further doubt on whether the other larger macroeconomic objectives, namely job creation, economic integration, and economic diversification, have been achieved through human capital investments that have accompanied knowledge-based economic development policies in the Arab World over the last decade. Human capital investments do not seem to have led to significant increases in job creation in knowledge-based industries or meaningful diversification of regional economies into knowledge-intensive industries. However, notable gains have been made in terms of integration of Arab economies into the world economy, but exports of knowledge-based services increased less than other comparator developing regions and there was a persistent decline in exports of R&D intensive goods.

The burden of making up for inadequate pre-employment skills formation shifts attention from the formal education system as provider of knowledge and skills towards the role of firm training in eliminating skills gaps. Based on sparse statistics from the Arab region, the number of employers providing formal training to permanent employees is comparatively low: Algeria (29%), Egypt (12%), Jordan (24%), Lebanon (68%), Mauritania (24%), Morocco (20%), Oman (20%), Syria (21%), and Palestine (27%). Training rates in the Arab World are generally lower as compared to developed knowledge economies with more effective skills formation systems. For example, in Ireland 73% of employers and 35% of employers in Germany provide on the job training to permanent employees. Training rates in the Arab World are also lower than in other developing economies such as Brazil (67%), China (93%), and Russia (55%) (Bank 2010). Data from the World Economic Forum suggest training rates may be higher particularly in Tunisia, UAE, Qatar, Saudi Arabia, and Bahrain, but the underlying theme that on the job training rates in the Arab World are significantly lower than high income, knowledge-based economies and other developing economies is consistent (Hanouz and Khatib 2010).

With the exception of Algeria in which 65% of firms have employee training plans in place more than a year in advance, a small sample of countries which include Morocco, Oman, and Syria shows that firms exhibit extremely short term planning horizons of under 10 months when developing training programs for employees(Bank 2010). Based on sparse data, training in the Arab World is focused on permanent, skilled employees with firms in Egypt training 17% of permanent skilled workers annually, Lebanon 40%, Mauritania 13%, Morocco 7%, Oman 51%, and Syria 48%. A small portion of unskilled, permanent employees receive training in Egypt (9%) and Morocco (4%), while Oman trains 43% of permanent unskilled employees. In Ireland 58% of skilled and 57% of unskilled employees receive training annually while in China 48% of skilled and 25% of unskilled employees receive training annually. In Egypt

permanent skilled employees receive an average of 262 hours of training annually while in Oman the average is 267. In Egypt unskilled employees receive 309 hours of training as compared to 270 hours in Oman. If these rates are generalizable across the region, it seems that Arab firms, when they do provide training, are offering significantly more hours of training than other developing economies. For example, firms in Brazil offer on average 50 hours of training annually for skilled workers and 49 hours for unskilled; Chinese firms offer on average 104 hours annually for skilled and 108 hours for unskilled; and Indian firms offer on average 58 hours for skilled and 51 hours for unskilled employees (Bank 2010). It appears that the Arab companies which do train are providing adequate levels of training to permanent, skilled employees, but, relative to a comparator developing countries like China, for example, training rates for unskilled workers is lagging.

The focus of Arab firms on training permanent, skilled employees suggests that the emphasis of training currently provided by Arab firms is on building firm-specific skills rather than general skills, which have been suggested are a key source of skills gaps in the Arab World (Foundation 2008). These data points, which in no way represent a valid sample, provide some evidence that Arab firms are willing to invest in building firm-specific human capital. However, a key challenge for Arab governments is incentivizing firms to backfill current and previous market failures in building general skills to eliminate skills gaps amongst less skilled employees with firm based job training. In a recent survey in Bahrain 40% of companies surveyed indicated that structured training programs would be effective or somewhat effective in improving the skills and productivity of the national workforce. The survey also found that 74% of companies surveyed indicated that on the job training was the best way to provide practical job relevant training. However, the employers surveyed indicated that they were only willing to provide such training at a wage level significantly below the market rate (Bahrain 2008). This finding suggests a key role Arab governments can play is in compensating companies for lost productivity and the costs of

generalized training to bring workers with skills deficiencies up to speed. In fact, the UAE government announced such a fund in February 2011 which serves as a temporary measure to circumvent skills formation systems market failures (News 2011). The fund provides financial privileges to UAE citizens who accept a private sector position to reduce the pay gap between the public and private sectors. The fund also compensates employers to help them cover the pay of UAE national employees in the first year of employment, provides partial funding for training new UAE national employees in the first year of employment, and contributes towards long-term training to maintain skills relevancy. Underlying such a program is the assumption that firms need to be compensated for lost productivity to provide general skilling that was not received via formal education and training systems.

Public-private partnership that involve direct monetary transfers to firms to provide general training are unsustainable over the long term and cost prohibitive for less wealthy Arab nations. While training subsidies allow companies to develop training capacity, more sustainable, longer-term approaches such as government provided training advisory and technical assistance funded through national training funds and levy-grant schemes are preferred. Where the private training sector is weak, the government may fulfill a transitional role to build the capacity of private training providers complemented with public sector provided training. Payroll levy-grant schemes which do not require government financing are effective in limiting poaching. Under such schemes, firms which provide training receive subsidies to fund training initiatives while firms that do not train do not have access to funds since they are more likely to poach employees (Ziderman 2003).

Arab governments serve as the regulator, providers, and funders of education and training systems. Arab governments also play a stronger role in defining industrial economic development policy than in other regions. Regional governments are in a unique position of coordinating education and training

outputs with economic development needs. A completely market based approach to skills formation may not be effective during a period of significant industrial upgrading in which there is entry into technology-intensive new industries requiring substantial and uncertain skills development costs with a long-term payback horizon. The high costs of skill upgrading can bias countries towards less skill intensive, low technology industries (Lall 1999), as it seems to have in the Arab World. In such instances, skills deficiencies might stall knowledge-based development. As Arab governments engage in proactively shaping the technological and industry structure of their countries they create a need for skills development that is not able to be predicted by free market mechanisms. Thus, educational and industrial policy interventions must be set in place so that education and training systems coevolve with industry development. The institutional environment and governance structures of Arab formal education and training which control the provision of public and private education and training must align with market forces to create the skills needed by the region's employers. Attracting higher levels of FDI is premised upon a sufficient level of education and skills, without policies and systems in place to ensure increasing levels of skills formation investors choose other destinations or bring low levels of technology which is not upgraded over time and fails to increase demand for higher skilled labor(Lall 2000).

In order to get the highest return on human capital investments, it seems clear that the input of private sector firms to define the skills required by knowledge-based development is essential. Structural transformation of Arab economies to a specialization in knowledge-based industries requires alliances between existing firms and Arab governments. In a post awakening Arab World, governments must increasingly view the national skills formation systems as an ecosystem that includes education and training providers, firms, government entities, and individuals to address supply and demand side skills formation challenges with the objectives of improving business performance and bettering the position

of individual employees. The intermediate skills equilibrium in which the majority of Arab countries find themselves in currently is a significant deterrent to further knowledge-based development. An ecosystem approach to skills formation acknowledges that reducing skills gaps is not solely limited to supply side interventions but increasingly requires a systemic approach that aligns skills development within broader business, economic, and social development measures.

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Figure 1. Assessment of Reasons for Pursuing Knowledge-based Development and Supporting Human Capital Objectives in the Arab World

Country	Justification for Knowledge-based Economy as a Goal in National Development Plan					Specific Human Capital Objectives Identified in National Development Plan			
	Job Creation	Economic Integration	Economic Diversification	Environmental Sustainability	Social Development	Improving Access and Quality of Education	Improving Health, Safety, and Environment	Increasing Female or Private Sector Labor Participation	Increasing Entrepreneurship
Algeria	●	●	●	●	●	●	●	●	●
Bahrain	●	●	●	●	●	●	●	●	●
Egypt	●	●	●	●	●	●	●	●	●
Iraq	●	●	●	●	●	●	●	●	✘
Jordan	●	●	●	●	●	●	●	●	●
Kuwait	●	●	●	●	●	●	●	●	●
Lebanon	●	●	●	●	●	●	●	●	●
Libya	●	●	●	●	●	●	●	●	●
Morocco	●	●	●	●	●	●	●	●	●
Oman	●	●	●	●	●	●	●	●	●
Palestine	●	●	●	●	●	●	●	●	●
Qatar	●	●	●	●	●	●	●	●	●
Saudi Arabia	●	●	●	●	●	●	●	●	●
Sudan	●	●	✘	●	●	●	●	●	✘
Syria	●	●	●	●	●	●	●	✘	✘
Tunisia	●	●	●	●	●	●	●	●	●
UAE	●	●	●	●	●	●	●	●	●

● Explicitly stated as a justification for knowledge-based economic development goals or as a supporting human capital objective

✘ Not stated as a justification for knowledge-based economic development goals or as a supporting human capital objective

The Comoros Islands, Djibouti, Somalia, Mauritania, and Yemen have poverty alleviation focused development plans in place that stress more basic developmental needs rather than knowledge-based economic development. The analysis does not reflect the emphasis placed on each area by the country. Lehman and Crano (2002) provide evidence that vested interests are an important factor in determining behavior and attitudes regarding public policy. Thus, vested interests could potentially lead to a situation in which the officially communicated policy objectives differ from those actually pursued. For example, Palestine cites economic integration and diversification in its national development plan, but its immediate emphasis is on its national economy, political progress, and stability with knowledge-based development seen as a long-term objective.

Sources: (Egypt 2001; Communities 2005; Jordan 2006; Triki 2006; Dimashkiyyah, Zaza et al. 2007; National Council for Strategic Planning 2007; Authority 2008; Board 2008; Planning 2008; Al-Jazzaf and Al-Mutairi 2009; Babes 2009; Emirates 2009; Iraq 2010; Ministry of Trade 2010; Oman 2010)

Figure 2. Skills Gaps Proxy Estimates from the Arab CEO and the World Bank Enterprise Surveys

	% of Firms Which Face a Skill Gap	
	Arab CEO Survey	**World Bank Enterprise Survey**
Algeria	45%	26% (2002)
Bahrain	40%	NA
Egypt	66%	30% (2004)
Jordan	37%	NA
Kuwait	68%	NA
Lebanon	18%	38% (2006)
Mauritania	NA	22% (2006)
Morocco	47%	21% (2004)
Oman	33%	35% (2003)
Qatar	35%	NA
Saudi Arabia	53%	NA
Syria	NA	36% (2003)
Tunisia	30%	NA
UAE	51%	NA
Yemen	NA	29% (2010)

Sources: (Foundation 2008; Bank 2010)

Figure 3. Global Skills Gaps Ranking Formed by Merging the Data Sets From the Arab CEO and World Bank Enterprise Surveys

Rank	Country and Survey Year	% of Firms Which Face a Skills Gap	Rank	Country and Survey Year	% of Firms Which Face a Skills Gap
1	Brazil 2009	73.03%	69	Czech Republic 2009	25.20%
2	Kuwait 2007 CEO	68.00%	70	Laos 2009	25.00%
3	Egypt 2007 CEO	66.00%	71	Malaysia 2002	25.00%
4	Chad 2009	57.33%	72	Armenia 2009	24.06%
5	Belarus 2008	55.31%	73	Namibia 2006	23.71%
6	Cape Verde 2009	53.85%	74	Uruguay 2006	23.51%
7	Saudi Arabia 2007 CEO	53.00%	75	Botswana 2006	22.22%
8	UAE 2007 CEO	51%	76	Mauritania 2006 WB	22.03%
9	Kazakhstan 2009	50.18%	77	Croatia 2007	21.64%
10	Russia 2009	48.90%	78	Sri Lanka 2004	21.33%
11	Argentina 2006	48.35%	79	Morocco 2004 WB	21.06%
12	Morocco 2007 CEO	47.00%	80	Mali 2003	20.78%
13	Romania 2009	46.21%	81	Bosnia 2009	20.50%
14	Algeria 2007 CEO	45.00%	82	Bulgaria 2009	20.14%
15	Mauritius 2009	44.97%	83	Angola 2006	20.00%
16	Micronesia 2009	44.12%	84	Bangladesh 2002	19.83%
17	Ukraine 2008	43.48%	85	Tanzania 2006	18.38%
18	Lithuania 2009	43.12%	86	Lebanon 2007 CEO	18.00%
19	Moldova 2009	42.98%	87	Timor Leste 2009	18.00%
20	Tonga 2009	42.67%	88	Mongolia 2009	17.96%
21	Latvia 2009	41.70%	89	Mozambique 2007	17.95%
22	Jamaica 2005	41.57%	90	Afghanistan 2008	17.94%
23	Gabon 2009	41.34%	91	Ethiopia 2002	17.90%
24	Congo 2009	40.40%	92	Serbia 2009	17.78%
25	Guyana 2004	40.37%	93	Togo 2009	17.42%
26	Bahrain 2007 CEO	40.00%	94	Sierra Leone 2009	17.33%
27	Niger 2009	38.67%	95	Lesotho 2009	17.22%
28	Lebanon 2006 WB	37.96%	96	Bhutan 2009	17.20%
29	Jordan 2007 CEO	37.00%	97	Ireland 2005	15.63%
30	Syria 2003 WB	36.33%	98	Fiji 2009	15.24%
31	Paraguay 2006	36.22%	99	Mexico 2006	15.14%
32	Burkina Faso 2009	35.79%	100	Dem. Rep. of Congo 2006	14.71%
33	Zambia 2002	35.75%	101	Madagascar 2009	14.61%
34	Cameroon 2009	35.26%	102	India 2006	14.47%
35	Qatar 2007 CEO	35.00%	103	Kosovo 2009	14.44%
36	Tajikistan 2008	35.00%	104	Nicaragua 2006	14.44%
37	Oman 2003 WB	34.63%	105	Panama 2006	14.24%
38	Poland 2009	34.51%	106	Macedonia 2009	14.21%
39	Albania 2007	33.88%	107	Burundi 2006	14.07%
40	Ecuador 2006	33.13%	108	Spain 2005	13.81%
41	Ivory Coast 2009	32.32%	109	Costa Rica 2005	13.41%
42	Oman 2007 CEO	33.00%	110	Swaziland 2006	13.36%
43	Chile 2006	32.06%	111	Liberia 2009	13.33%
44	Uzbekistan 2008	31.97%	112	Guinea Bissau 2006	13.21%
45	Peru 2006	31.33%	113	Slovenia 2009	13.04%
46	China 2002	30.73%	114	Pakistan 2002	12.76%
47	Dominican Republic 2005	30.67%	115	Guinea 2006	12.56%
48	Estonia 2009	30.40%	116	Peru 2002	12.48%
49	Tunisia 2007 CEO	30.00%	117	Portugal 2005	12.39%
50	Malawi 2009	30.00%	118	Azerbaijan 2009	12.37%
51	Thailand 2004	29.96%	119	Gambia 2006	11.49%
52	Egypt 2004 WB	29.80%	120	Montenegro 2009	11.21%
53	Kyrgyz Republic 2009	29.36%	121	Albania 2005	10.45%
54	Guatemala 2006	29.31%	122	Rwanda 2006	10.38%
55	Vanuatu 2009	28.91%	123	Uganda 2006	9.24%
56	Yemen 2010 WB	28.72%	124	South Africa 2007	8.96%
57	Kenya 2003	27.64%	125	Senegal 2007	8.70%
58	Slovak Republic 2009	27.64%	126	Greece 2005	8.60%
59	Samoa 2009	27.52%	127	Vietnam 2009	8.26%
60	Venezuela 2006	27.40%	128	Nepal 2009	7.34%
61	El Salvador 2006	27.27%	129	Hungary 2009	7.22%
62	Georgia 2008	27.08%	130	Germany 2005	6.95%
63	Turkey 2008	26.82%	131	South Korea 2005	6.84%
64	Bolivia 2006	26.26%	132	Cambodia 2003	6.57%
65	Algeria 2002 WB	25.47%	133	Indonesia 2009	5.82%
66	Honduras 2006	25.46%	134	Philippines 2009	5.73%
67	Colombia 2006	25.40%	135	Ghana 2007	4.86%
68	Benin 2009	25.33%	136	Eritrea 2009	1.68%

Yellow highlighting indicates the skills gaps proxy is taken from the World Bank Enterprise Survey. Orange highlighting indicates the skills gaps proxy is taken from the Arab CEO survey.

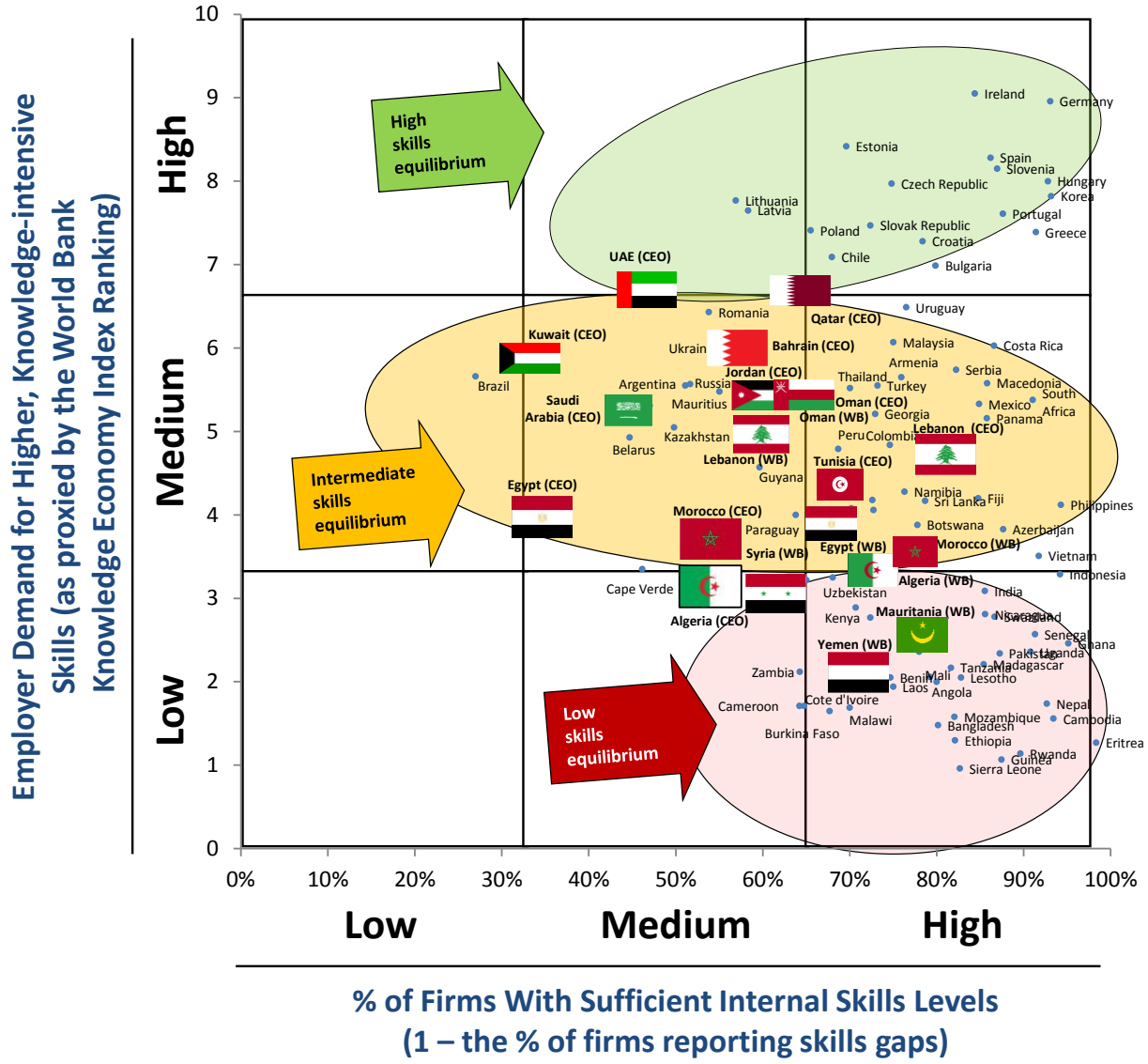
Sources: (Foundation 2008; Bank 2010)

Figure 4. Skills Gaps Prevalence by Industry

Industry	% of Firms Which Face a Skills Gap
Paper	41%
Wood and furniture	34%
Transport	30%
Garments	30%
Textiles	28%
Metals and machinery	27%
Retail and wholesale trade	26%
Food	26%
Construction	26%
Non-metallic and plastic materials	26%
Leather	22%
Chemicals and pharmaceutics	21%
Hotels and restaurants	21%
Agroindustry	19%
Other services	15%
Other manufacturing	13%
Beverages	13%
Electronics	9%
IT services	4%

Source: (Bank 2010)

Figure 5. The Relationship Between Knowledge-based Economy and Internal Skills Sufficiency



Sources: (Bank 2010; Bank 2011)