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The movement of many countries towards knowledge-based economic development requires the transition to more effective skill formation systems. This paper proposes an institutionalist approach to national skills development systems in the advancement towards knowledge-based economic development. There is currently no accepted general framework to analyze national skills development systems which has resulted in countries adopting reactive approaches to skills development problems. The conceptual framework advanced is an integrated, systemic view of national skills formation systems guided by government intervention in light of rampant failures of neo-liberal skills formation approaches that rely upon market mechanisms. The framework contributes to the skills formation literature by reviewing, synthesizing, and building on the literature from a multidisciplinary perspective that considers the relevant institutions and interests of key stakeholders as highly interrelated in the context of knowledge-based economic development and achievement of accompanying economic, political, and social objectives.

Keywords: skills formation, knowledge economy, competitiveness, skills development policy, economic development

Knowledge-based Economic Development and the Need for More Effective Skills Formation Systems

Knowledge-based economic development is at the nexus of government economic, political, and social objectives and is highly related to 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). Rischard (2009) observes several common development objectives, job creation, economic integration, economic diversification, environmental sustainability, and social development, which have underpinned successful transitions to knowledge-based economies. A vital precursor to knowledge-based development is human capital development that is conducive towards developing a society characterized by skilled, flexible, and innovative individuals nurtured through quality education, employment, and broadly accessible life-long learning opportunities (Planning 2010).

In the 1960s, Becker (1994) underscored the critical link between human capital and economic growth when he 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." More recently, Kuruvilla and Ranganathan (2008) show that, given sufficient skills levels, a development strategy based on the export of low-cost and high-end knowledge-based services is a viable alternative to the more traditional low-cost export-oriented manufacturing strategies for developing countries. The movement of more developed countries towards knowledge economies and the skills formation challenges such a transition presents has also been well documented. Lack of effectiveness of skills formation systems to produce high-level skills serves as a constraint to knowledge-based economic development. Adaptability and congruence of skills formation systems and constituent actors in response to factors such as economic development, skill demands of employers, technological progress and industrial strengthening, and macroeconomic trends is critical to knowledge-based development (Schwalje 2011). Thus, the movement of many countries towards knowledge- based economic development inevitably requires the transition to more effective skills formation systems.

This analysis proceeds by advancing an institutionalist approach to skills formation which might serve as a conceptual model to inform national skills development systems. This paper will advance a conceptual framework for national skills formation which exhibits the flexibility and responsiveness to meet the needs of 21st century labor markets. The literature on skills formation draws from several disciplines. Unfortunately, the literature currently exists in a fragmented and non-integrated form that fails to cut across disciplinary boundaries. There is currently no accepted general framework to analyze national skills development systems which has resulted in countries adopting reactive approaches to skills development problems (Kuruvilla, Erickson et al. 2001).

The conceptual framework advanced is an attempt to review and synthesize the literature on skills formation. This paper proposes an integrated, systemic view of national skills formation systems guided by government intervention in light of rampant failures of neo-liberal skills formation approaches that rely upon market mechanisms. Under neo-liberal approaches to skills formation, formal education and

training systems, industrial development policy, firm-level skills training and workforce development initiatives, and the incentives behind individual investment in skilling have lacked coordination and proceeded as distinct fields of inquiry. It is important to consider the relevant institutions and interests of key stakeholders as highly interrelated in the context of knowledge-based economic development and achievement of economic, political, and social objectives.

National Skills Formation for Knowledge-based Economic Development

Beginning in the 1990s, there was a move away from viewing formal education and training systems as solely suppliers of skills towards an emphasis on the relationship between governments, educational systems, labor markets, and firms to generate demand for skills (Ashton, Sung et al. 2000). Such a demand-driven, integrated approach to skills development recognizes the point Philip Foster made in "The Vocational School Fallacy in Development Planning" that career “Aspirations are determined largely by the individual's perception of opportunities within the exchange sector of the economy, destinations by the actual structure of opportunities in that sector (Foster 1964).” Individuals and firms do not invest in education and training unless they are sufficiently compensated. In such an environment, government supply side expansionary measures such as building more schools or training facilities may be economically suboptimal and ineffective in an environment characterized by low demand for skilled labor (Wood and Ridao-Cano 1996).

Conceptual frameworks of skills formation seldom consider the role of the state and economy which results in static accounts with no clear link between key stakeholders and specific economic outcomes (Ashton, Sung et al. 2000). Hoppers (2007) observes that an integrated conceptual model of skills formation must also include “the totality of other structured arrangements that provide young people and adults with a learning experience that develops competencies for the world of work, whether as pre-employment or as further skills development while working, institution-based or work-based, off-the-job or on-the-job training.” In this evolving perspective of skills formation systems investment in human capital has become a political as well as economic goal in which government intervention is warranted (Brown, Green et al. 2003). This represents a departure from the neo-classical view of the role of government in skills formation based on human capital theory in which human capital formation is pareto optimal without government intervention. Market approaches that underpinned skills formation policy in the past have failed to address persistent skills development problems and do not present a comprehensive strategy to develop the skills of the workforce as a whole (Hall and Lansbury 2006). With the objective of arriving at a conceptual model of a sustainable system of skills formation to facilitate knowledge-based economic development, this analysis proceeds by discussing the role of key stakeholders in a systemic approach to skills formation that aligns skills development within broader economic development, business, and social measures. A graphic depiction is shown in Figure 1.

[Figure 1 about here]

The Role of Governments

The changing demands of knowledge-based economic development, global macroeconomic trends, and social development, create a need for interdependence and collaborative networks consisting of education and training providers, firms, government entities, and other key stakeholders for effective skills formation (Finegold 1999; Powell and Snellman 2004). The literature points to the following government roles in the skills formation system for knowledge-based development.

Coordination

Finegold (1999) compared the interrelationship between the various actors involved in skills formation systems to a complex adaptive system. Since the constituent parts of complex adaptive systems are always changing, the aggregate behavior of the system can be suboptimal and may never arrive at a final optimal state (Holland 1992). In the context of skills formation systems, suboptimal states are manifest in underinvestment in human capital and market failures occurring at all components of the skills formation system: education and training institutions, employers, institutions providing training, and individual investment in attaining higher level skills (Wade 1992; Lall 2000). The economic and political exigency of skills formations systems to constantly respond to evolving skills needs requires an institutional setting similar to a complex adaptive system. In light of this need for adaptability, feedback loops, responsive policymaking, and coordination of education and training actors, institutionalist approaches to national skills formations in which governments play a center role have emerged as a preferred approach to national skills formation. The role of government in an integrated institutional approach to skills formation goes beyond supply side policies for schools, universities, and training organizations and reflects an understanding that the relationship between skills formation and labor markets is more nuanced than applying simplified neo-classical assumptions that labor markets are homogenous and supply and demand will converge upon equilibrium.(Brown, Green et al. 2003; Kupfer 2011). Effective institutions that prevent market failure related underinvestment in skills, provide adequate regulation, and coordinate stakeholders are key elements of effective skills formation systems. In many countries national skills development policies, underpinned by skill inventories, sectoral skill development plans, and competency standards and accreditation frameworks, serve as a governance mechanism for policy guidelines, monitoring the workforce supply and requirements, channeling funds, and ensuring coordination in skill building efforts. Thus, there are four main overarching skills formation coordination objectives required by governments to advance knowledge-based development: linking economic development with the evolution of education and training systems; ensuring qualitative and quantitative supply-demand match between outgoing students and the needs of the labor market; facilitating regular, on-the-job training provision and participation in skills formation by the business community; and addressing policy, informational, or financial sources of individual underinvestment in skills development.

Aligning Macroeconomic Policy With Skills Formation

A completely market based approach to skills formation is not 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. As countries

develop economically and become more competitive with greater reliance on technology, the demand for higher levels of human capital both in terms of basic skills developed through formal education and training and specific technical skills becomes stronger. The skill supply influences the amount and degree of sophistication of technology which can be adopted and efficiently used, while in turn the amount and sophistication of newly introduced technology impacts the demand for skills. The high costs of skill upgrading can bias countries towards less skill intensive, low technology industries (Lall 1999). In such instances, skill shortages might stall the development of strategic new industries. Kurvilla (2008) , for example, finds that skills shortages and the inability of the skills formation system in India to produce higher level skills has stalled the growth of higher-value added, knowledge-based industries such as IT outsourcing. Wages offered for skills related to emergent industries may also not reflect the future social benefits that employment of skilled workers can have on economies (Ziderman 2003). As governments engage in proactively shaping the technological and industry structure of their countries they create a need for skills development that cannot 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.

National FDI-based strategies of technology acquisition and skills development must be met with policy responses to develop local capabilities of suppliers and domestic firms to benefit from spillover and increased competitiveness. Through FDI, multinationals import simple labor-intensive technologies calibrated to host country skills. These firms do not generally invest in more advanced technological capabilities, further expansion, and higher-level skills development without government upgrades to the skills formation system and upskilling of domestic firms across the value chain. Domestic firms face more market failures and higher training costs particularly in technology intensive industries. Effective skills formation policies can also improve the efficacy of FDI promotion efforts by attracting more sophisticated FDI. 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).

Alignment of macroeconomic policy with skills development may involve training subsidies under the rationale that societal benefits will be derived from the emergence of new industries which might fail to take off if sufficient workforce skills did not exist. The cost of such subsidies could be funded through taxation due to the societal benefits generated. While general education subsidies are justified in light of societal externalities, the case for subsidizing more tailored training and skills formation for particular occupations is less justified as societal benefits decline for such investments (Ziderman 2003).

Broad-based, Inclusive Skills Formation

Sufficiently high levels of general education are required by the workforce for knowledge-based economic development. From this perspective, national skills formation systems must support the workforce presently employed in or entering the formal sector as well as individuals who are self-

employed, working in informal sectors, or unemployed. Operating under the assumption that entrepreneurship is a mechanism for job creation, many governments have engaged in efforts to improve the environment for entrepreneurship including providing funding and training, reducing bureaucracy, and establishing business incubators. Government economic policies that stimulate the creation and growth of enterprises are both a mechanism for job creation as well as increase demand for employable skills. Demand–driven active labor market policies targeted at unemployed youth and adults or other disadvantaged groups who have left the education system which include employer involvement and various mixes of job-search assistance, work experience, job training, remedial education, and direct job creation have been shown to be effective at increasing employability skills and reducing unemployment (Quintini, Martin et al. 2007). However, evidence from industrial and developing countries shows that the use of active labor market programs are more effective as short-term measures than as remedies for market failures in the skills formation system or structural problems in labor markets (Angel-Urdinola, Semlali et al. 2010).

High unemployment, underemployment, and poverty where opportunities in the formal economy are scarce have increased the role of the informal economy as a source of employment both in developing and developed countries (Office 2003). Low education levels complicate skills development of individuals employed in the informal economy (Adams 2008). The diversity of activities comprised by the informal sector makes skills formation priorities for the informal sector difficult (Liimatainen 2002). Skills formation to overcome economic vulnerability embraces a much wider set of skills than just conventional technical and managerial competencies including basic literacy and numeracy, social and political awareness , and life skills.(Bennell 1999). However, skills development in the informal sector cannot be separated from other inputs necessary to the informal sector, such as access to credit, infrastructure, and legislative or policy support, which are required for the successful utilization of the acquired skills (Liimatainen 2002).

The Role of Formal Education and Training Systems

While there is no ideal education and training system architecture due to social, historical, cultural, organizational factors, and varying levels of economic development, the literature suggests three objectives for education and training systems to complement knowledge-based economic development.

Ensuring Relevancy and Employability

The effectiveness of formal education and training systems is increasingly measured by production of human capital in the quantity and quality required by the labor market and whether outgoing students meet the expectations of employers (Development 2010). Large macroeconomic trends such as expanding international trade ties, skill-biased technological change, globalization, changing forms of work organization, and knowledge-based economic development necessitate the need for opportunistic as well as responsive education and training systems. These economic trends have led to an increased demand for skilled labor. However, education and training systems are struggling in their response to global macroeconomic forces by not creating the skills needed for development and increasing industrial

sophistication. Particularly in developing countries, population growth and demographic trends have stressed education and training systems and created a need for job creation. Youth bulges have led to high unemployment, underemployment, and low wages as well as urban informal sectors becoming a larger source of employment.

While there is general agreement that education plays an important role in economic growth, the exact role education plays is unresolved (Islam 1995). Microeconomic findings provide a strong rationale for government and private investment in education with the expectation of benefits from educational investments that enable individuals to be equipped with knowledge and skills that improve their employability and productive capacities that would lead to higher earnings in the future. However, the inconclusiveness of macro growth studies suggest a nuanced conclusion (Son 2010). Some studies suggest a mediated impact of education on economic growth based on level of economic development. Otani and Villanueva (1990), for example, provide evidence that higher levels of government expenditures on education as a percentage of gross national product have a small but positive impact on economic growth which is found to be stronger particularly in low and middle income countries. Iyigun and Owen (1996) find evidence that national education and training system needs progressively increase as economies develop and human capital intensive industries emerge. This means countries must ensure alignment between the education and training system and industry needs to enable economic development. Gemmell (1996) finds that primary level education is more conducive to growth in least developed countries; secondary educational levels impact growth more in middle income countries; and tertiary educational levels have a strong impact on growth in developed countries. Endogenous growth theories have also found that education affects growth and competitiveness by, amongst other things, establishing comparative advantage, increasing productivity, influencing the rate of domestic innovation, and speeding the adoption of technology from abroad (Nelson and Phelps 1965; Lucas 1988; Mankiw, Romer et al. 1992; Benhabib and Spiegel 1994). The complementary role of education and training systems to economic development suggests a critical role for differentiation and alignment of educational programs and institutions with specific science and technology needs required by knowledge-based economic development and industrial development policies. The success of universal primary education in developing countries has also necessitated increased capacity to train semi-skilled workers in two-year or shorter vocational programs with skills that match immediate market needs (United Nations Educational 2010).

Development economics models of stages of development are an attempt to integrate empirical macro growth findings to specify national education and training priorities at various stages of development. These models assume that as countries move from resource-based to more competitive, knowledge-based economies they face similar challenges and priorities. In such models countries start as low income, primarily agrarian based economies in which the primary sources of competitive advantage are cheap labor and natural resources. Economic development is a process of "successive upgrading, in which businesses and their supporting environments co-evolve, to foster increasingly sophisticated ways of producing and competing (Porter, Sachs et al. 2002)." Development economics models of skills formation underscore that human capital requirements increase as countries become more developed,

as industry structures become more competitive and knowledge-oriented, and as firms move from smaller patriarchal family structures to larger size firms.

The once predominant liberal view of education for personal enrichment has lost ground to new vocationalism which views occupational preparation as a primary goal of education and articulates the relationship between education and employment outcomes with competency-based thresholds. Competency frameworks formalize the link between educational systems and specific labor market outcomes suggested by macro growth theory and development economics. Economic benefits have become a key driver behind education policy decisions and measuring success (Harris, Hobart et al. 1995). An important outcome of the new vocationalism movement 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 and prescribe the qualifications needed for performance in the workplace. Adopted by countries such as the United States, England, New Zealand, Australia, Mexico, Costa Rica, France, and South Africa, competency based educational approaches were exported farther afield via international organizations despite differences in social context and varying institutional environments (Caillods 1994; Bank 2003; Power and Cohen 2005; Bank 2009). Public-private 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 are increasingly being leveraged to avoid supply-demand informational gaps regarding skills trends and ensure skill alignment with the needs of employers.

Quality Assurance

The institutional environment and governance structures which control the provision of public and private education and training in many countries are increasingly becoming disconnected from market forces. Education and training systems are slow to adapt to changing needs suffering from centralized curriculum design and limited institutional autonomy. Such systems, referred to as supply-driven, find it difficult to respond to changing skills demand required by rapidly developing, competitive economies (Ziderman 2003). In many cases federal ministries are both providers and regulators of education and training systems, a situation where a lack of independent regulatory bodies leads to misalignment between the education and training system and industry needs to enable economic development. Since the cost of providing education and training represents a significant share of public expenditure, shrinking or insufficient public budgets for education and training can lead to access issues in countries with demographic youth bulges, insufficient institutional capital spending, and a focus on system expansion rather than performance. Poor institutional governance and funding challenges can result in outdated instructional methods and curricula, low quality standards, and market lagging public policies to regulate private education and training providers (Schwalje 2008).

Hanushek and Kimko (2000) find that labor force quality, as proxied by performance on international standardized tests, is positively related to school quality. From this perspective, poor quality schools can have an impact on economic development as well as social development since studies show little or no wage premia from additional schooling in poor quality institutions (Pritchett 2001). The negative impacts of school quality have influenced some education and training systems to adopt more performance-oriented, rather than expansion focused, approaches to improving quality, increasing performance, and assuring the marketability of outgoing students. Such initiatives are often achieved through 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. In many education and training systems renewed emphasis on quality has also necessitated 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. Licensing, professional development, and qualification standards for teachers have also accompanied quality assurance efforts (Brule 2008).

Expanding Access

The ongoing global financial crisis has imposed severe fiscal restraint on governments through declining tax bases and enormous public deficits that have reduced public education budgets (Barakat, Holler et al. 2010). A recent report suggests that less wealthy countries could be hit harder by the financial crisis and begin limiting universal education expansion (Abuel-Ealeh, Barratt et al. 2010). Led by the initiatives of international organizations and donors, there is an increasing emphasis on the need to develop skills amongst individuals who are disadvantaged by inadequate skills investment. Failure to develop these skills can lead to long-term, negative externalities on health, earnings, and education that impose large costs on individuals and societies (Banerji, Cunningham et al. 2010).These long term repercussions have highlighted the need for national programs which specifically target the poor, ethnic minorities, and women to facilitate job matching and skilling. However, the expansion of education and training systems to accommodate these groups will further stress already limited public education and training budgets and may require intervention in capital markets to increase the affordability of education for individuals from disadvantaged groups (Ziderman 2003).

The Role of the Business Community

Internal organizational pressures catalyzed by global macroeconomic trends have increased the importance of firms taking a long-term approach to workforce skills formation. Expanding trade, technological diffusion and adoption, and changing forms of work organization have increased the relative demand for skilled workers globally. Globalization increases the importance of skills, rather than resources, as a source of competitiveness (Shankar and Shah 2003). Workers employed in exporting industries tend to be well educated and highly skilled (Autor, Katz et al. 1998). As countries increasingly shift their development policies from import-substitution to export-led growth models, trade-induced flows of workers from importing, traditionally lower skilled, labor-intensive industries, to higher skilled,

export and knowledge-driven industries increases the overall demand for high skilled workers. Trade in high skill, knowledge-based services has become a significant contributor to gross domestic product and a large source of employment in many countries (Bank 2010).

Globalization increases technology imports leading to productivity growth from higher capital intensity and resulting in an increase in the demand for skilled labor (Mayer 2000). A higher level of human capital enables capital investment to be more productive while increasing return on investment (Ashton, Green et al. 1999). Slaughter (2002) provides evidence that foreign direct investment stimulates skill upgrading in developing countries. If capital accumulation favors highly skilled workers and technology is substitutable for lesser skilled workers, an outward shift in the relative labor demand curve for skilled labor can lower demand for unskilled labor and increase demand for skilled labor.

Globalization, trade openness, and technology-driven development have led to new patterns of work organization. Firms are moving towards more flexible and innovative forms of organization and production to increase efficiency, accommodate technological change, respond to evolving consumer behavior, as well as adapt to broad macroeconomic forces (Organization 1998). The tendency of firms to adopt what has been labeled as "high performance enterprise" forms of flexible work organization and practices has a significant impact on the skills required by employees. For employees this means more involvement in continuous improvement and production which requires social and problem solving skills in addition to technical skills. The evolving skills demanded by high performance enterprises require continuous firm-based training. New forms or work organization have been adopted in many industries and services, particularly manufacturing and tradable, business services, by a large number of firms in OECD and developing countries (Organization 1998; Organization 1998). However, adopting new forms of work organization requiring greater skills levels and responsibility are prohibitive to countries with low skills levels.

The trends identified above have led employers to demand both higher numbers of skilled workers as well as greater levels of skills from their existing workforce. In many countries, evidence points to an unmet demand for highly skilled workers, known as a 'skills shortage,' as well as firms expressing concern that they face internal employee skills deficiencies that limit performance, a phenomenon that has been labeled as a 'skills gap'(Campbell, Baldwin et al. 2001; Manufacturers 2005; Unit 2009; Education Analytical Services 2010; Forum 2010). The few skills studies available suggest a deficiency in general skills such as critical thinking, problem solving, listening, communication, and teamwork, and collaboration as well as more technical skills such as languages, technological proficiency, science, technology, engineering, and mathematics (Foundation 2008; Unit 2009; Forum 2010). Skills deficiencies affect both developing and developed countries serving as a significant constraint to economic growth, firm-level competitiveness, and firm entry into highly skilled, knowledge-based industries (Campbell, Baldwin et al. 2001; Manufacturers 2005; Education Analytical Services 2010).

The global macroeconomic trends that have led to higher skills demands and the failure of education and training systems to keep pace with economic growth suggest a long-term approach to workforce

skills formation involving workforce investment and development is needed for knowledge-based development.

Workforce Investment

While firms tend to focus on paying higher wages for highly demanded skills, macroeconomic trends and rampant market failures of education and training systems suggest longer term approaches to skills formation through continuous, regular on the job training and knowledge transfer are needed (Hall and Lansbury 2006). Market failures in human capital formation are rampant as education and training institutions struggle to keep pace with economic growth (Lall 1999). The workforce investment mandate of employers in the 21st century has expanded to include not only training in response to high-performance workplace organization and maintaining skills relevancy in light of competitiveness, but it now also includes the burden of remediating inadequate pre-employment general skills formation due to formal education and training system market failures.

Lall (1999) suggests that basic skills, personal attitudes, and competencies developed through formal education and training must be complemented with specific technology-based experience to develop technical skills. Industrial sophistication and competitiveness are derived not from formal education and training but the "practical experience of mastering, adapting, and improving specific technologies (Lall 2000)." Industrialization and skill accumulation are achieved by expansion of the education system alongside the upgrading of the skill intensity of economic activities. For developing countries, this approach reduces the technology gap with advanced countries while raising the demand for higher levels of human capital and concurrently providing the education and training required for economic development (Mayer 2000). To avoid insufficient individual incentives to engage in skill upgrading, improved performance and productivity gains from skills acquisition are linked with pay when firms exercise wage flexibility (Ashton and Sung 2002).

The willingness and ability of firms to provide enterprise-based training is rooted in a number of factors. The educational attainment of the workforce and firm managers can serve to reduce investments in firm-level training. Low levels of education amongst a firm's workforce can raise doubts surrounding the absorption capacity of training while managers with lower levels of education may not perceive a value in providing training. Managerial calculations of the returns to training may be further complicated by informational gaps surrounding technology, future skill requirements, and benefits of training (Lall 1999). Firms which operate in less competitive, low skill production economies in which short-term strategic planning, little technological upgrading, low rates of capital spending, and an unfavorable economic policy environment for growth are rampant may prevent structured firm-based training. Lack of internal capacity to provide training can obligate firms to rely upon external private training provision. However, in cases where the external training sector is underdeveloped and firm sizes are generally small, the inability to achieve scale to minimize training costs and budgetary constraints can serve to reduce the prevalence of firm-based training (Lall 2000; Ziderman 2003). Employee poaching, the tendency of firms to recruit employees with transferrable skills from other firms, may serve to limit

firm-based training since training firms incur the cost of employee training only to lose the employee and resulting benefits of the training to another firm. In an environment with high levels of poaching, training firms will reduce training or only offer highly, specific training that is not transferrable to other firms (Acemoglu and Pischke 1996).

Due to the variety of causes of inadequate enterprise training policy solutions must be tailored to the root cause. In cases of market failure which deter workforce investment, joint approaches that share the responsibility of skills development between government and business have been effective. Training subsidies allow companies to develop training capacity, but 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. Government subsidies offering training subsidies to firms may also be warranted as a secondary approach (Ziderman 2003).

Workforce Development

Jacobs (2002) identifies workforce development as the cooperation of education and training institutions, the business community, and governments to provide individuals with gainful, rewarding employment as well as firms obtaining the skills in the quantity and quality they require. High youth unemployment rates and market failures of education and training systems to create general skills suggest an expanded role for the business community towards ensuring alignment between the skills imparted in formal education and training systems and those demanded in the workplace. Apprenticeships or work experience, often compensated at below the market wage rate, in which work experience is integrated into the formal educational structure and classroom learning can ease the school-to-work transition and ensure employability of young graduates (Quintini, Martin et al. 2007). Including employers in curricula design, identifying the skill sets needed by graduates, standards setting, and accreditation can ensure education and training systems evolve alongside changing labor market skills needs. Through membership in industrial trade associations, businesses can also serve a governance role in the skills formation system (Ackroyd, Batt et al. 2005). However, in developing countries the oversight role typically played by scholarly, scientific, and professional organizations may be limited due to lack of capacity. Workforce development ensures that the relevance and employability mandate of education and training systems is fulfilled, minimizes information gaps and uncertainty that could prevent individual investment in education and training by articulating future skills needs, and reduces the need for workforce training investment to backfill general skill deficiencies due to market failure in education and training systems.

The Role of Individuals

Much of the literature on individual human capital decisions focuses on the economics of education as a major field of empirical inquiry. Education augments natural abilities with skills that are subsequently sold in the labor market and is a proxy for the willingness of individuals to invest in their own human capital (Sweetland 1996; Bedard 2001; Wolfe and Haveman 2002). Private rates of return are used to explain the motivation of individuals to pursue different levels and types of education. Typical findings on the private rate of return to education from studies in several countries summarized by Psacharopoulos and Patrino (2004) reveal the following trends: declining returns to education with economic development; decreasing returns with increases in supply of education; higher returns for primary and secondary schooling; returns which are generally higher than those on physical capital. Such analyses assume that individuals pursue general skilling as long as the value stream of future earnings is more than foregone earnings, training, and equipment expenses. Because the property rights to general training vest with individuals who derive higher wages from higher levels of training, individuals are willing and incentivized to pay the costs of general skilling (Becker 1994).

In addition to expected wage differentials relative to less educated workers, there is evidence that individual investment in higher levels of skills is influenced by the probability of finding employment that adequately rewards the skills achieved (Mayer 2000). Such findings underscore the importance of alignment between the education and training system and industry needs to enable economic development. Neglecting the delicate balance between skills demand and supply can lead to systemic failures such as low skill equilibria or overskilling. In a low skill equilibrium employers face few skill shortages in a predominantly low skilled workforce, where there is little incentive to participate in education and training and raise qualification levels and aspirations (Finegold 1999). Countries in a low skill equilibria suffer from a lack of institutional alignment resulting in low productivity, low wages, and a low value added production orientation. Over investment in skills can lead to an oversupply of skilled workers that deflates wages or causes brain drain by those who cannot find local employment to match their skills and aspirations(Mavromaras, McGuinness et al. 2007).

Investment Optimization

The assumption that individuals can make rational choices to optimize their education and training decisions has been criticized widely (Ashton and Green 1996). Empirical studies have found that a number of factors drive the evolution of wage differentials. Returns to education are higher when demand for education rises due to disequilibrium created by sectorial shifts requiring higher skill intensity (Schultz 1975). In environments where the expansion of educated labor outpaces expansion in employment, returns to education can decrease (Pritchett 2001). Returns to education are higher where technological progress is rapid and by implication in countries where government policy is more conducive to technological progress and skill intensive development (Rosenzweig 2010).

Information gaps about the future trajectory of industries and emergent skills needs, the returns to investing in particular skills sets, and projecting the future returns of education and training investments

is a main source of market failure. Skilling investments may also be subject to short-termism in which individuals are unwilling to invest in skills with uncertain and longer-term return horizons. Capital market weaknesses in terms of a lack of funding to finance education and training investments may also lead to underinvestment. Externalities and labor market rigidities may also alter the incentives and return to skilling resulting in sub optimal investment in skills formation. Such market failures are mainly unintended outcomes of economic and social policies that serve to alter the returns to training such as artificially compressed wage scales; unions or minimum wage legislation that raise wages above the market level, when pay and status are not linked to the attainment of qualifications (Research 1996; Ziderman 2003). The appropriate government response to such market imperfections is to address the policy, informational, or financial source of the failure. However, such market failures may be immensely difficult to solve politically. In such cases, subsidies typically take the form of training grants to individuals or organizations offering firm based training. The focus of the subsidy would be to raise the private benefits of education and training relative to their cost so the incentives for engaging in increased levels of education and training are sufficiently high (Ziderman 2003).

Lifelong-Learning

Though several definitions exist, lifelong learning emphasizes the continuous learning of knowledge, skills, and values throughout all stages of a person's life for the purposes of community engagement, performance in the workplace, personal development, and physical well-being (See for example: Medel-Añonuevo, Ohsako et al. 2001; Bank 2003; Commission 2011). For example, the Composite Learning Index, Canada's annual measure of progress in lifelong learning, makes use of a conceptual framework of lifelong learning from UNESCO's International Commission on Education for the Twenty-first Century that includes four pillars: Learning to Know involves the development of knowledge and skills such as literacy, numeracy, and critical thinking; Learning to Do involves the acquisition of employment skills such as computer training, managerial training, and apprenticeships; Learning to Live Together involves the development of social skills and values such as respect and concern for others, social and inter-personal skills, and an appreciation of diversity; Learning to Be involves activities that foster personal development, contribute to creativity, and personal discovery.

Lifelong learning requires public spending on education for which social returns exceed private returns (such as basic and secondary education) and increased private spending on investments that yield higher private returns (such as most higher and continuing education) (Bank 2003). Since lifelong learning implies increased private spending on educational investments after formal education, participation would be subject to the individual investment optimization process described above as well as suffer from the same return uncertainties. Palacios (2003) observes "Because lifelong learning encompasses such a wide variety of areas, including learning outside formal education settings, and because of the different circumstances each individual faces in life, it is very difficult for government to try to administer the provision of lifelong training." Evidence from a variety of regions such as the Arab World, Africa, and Latin America, suggest that lack of a lifelong learning culture and operationalization of

its concepts has failed to motivate individuals to engage in continuous learning to ensure continued relevance of skills (Bank 2005; Maruatona 2006; Yousif 2009).

Conclusion

The changing demands of knowledge-based economic development create a need for interdependence and collaborative networks for effective skills formation. Although specific institutions designed to achieve skills formation objectives may vary by country, a systemic approach reflects the adaptability and congruence required by knowledge economies and concurrent achievement of development objectives such as job creation, economic integration, economic diversification, environmental sustainability, and social development. The conceptual framework advanced is an attempt to update and advance current skills formation thinking from a multidisciplinary perspective to guide collective action and inform both policy and practice as countries pursue knowledge-based development. The approach advanced views skills formation as a political and economic goal in which government intervention is warranted to align skills development with broader economic development, business, and social measures.

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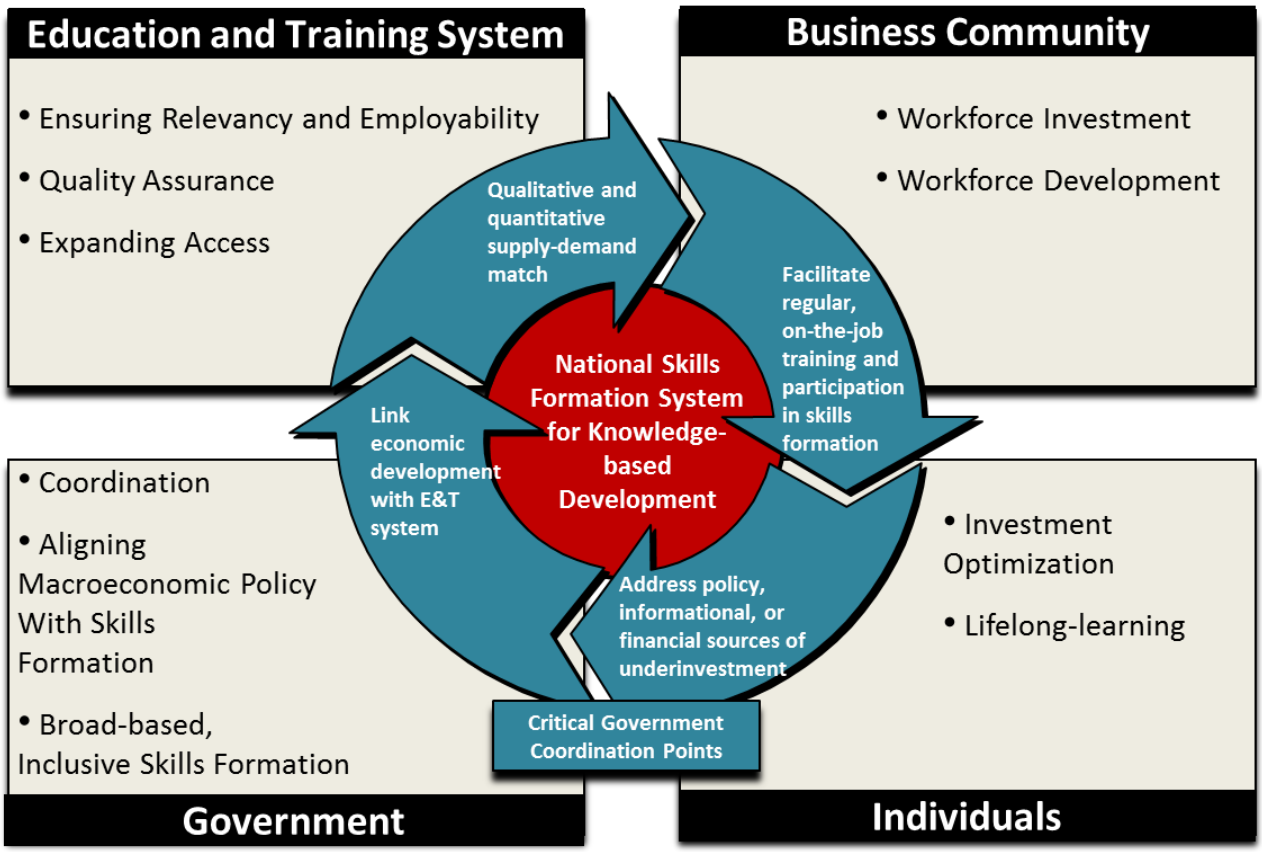

Figure 1: Conceptual Framework of a National Skills Formation System for Knowledge-based Economic Development