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Skills Needs, Availability and Competitiveness: A Case for Kenya

Eldah Onsomu
Moses Ngware
Damiano K. Manda

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Bishops Garden Towers, Bishops Road
PO Box 56445, Nairobi, Kenya
tel: +254 20 2719933/4; fax: +254 20 2719951
email: **admin@kippra.or.ke**
website: http://www.kippra.org
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Abstract

Kenya has put a lot of emphasis on human capital development as a way of facilitating economic growth. The link between human capital (skills) and growth is through high productivity and improved competitiveness. This study is motivated by the fact that in Kenya, there seems to be a mismatch between the available skills and the skills requirements of firms. The study examines the relationship between skills and competitiveness and the implications of the association both at macro and firm level. The key findings of the study are: (i) there exists a mismatch between firms' skills needs and the skills available in the labour market; (ii) there is limited linkage between industries and training institutions; (iii) there exists institutionalized on-the-job training programmes in various firms that provide company-specific and general skills to employees. Other findings are that skills availability, foreign direct investment, improvement in macroeconomic performance, investment in secondary and tertiary education (especially in technical courses such as engineering) significantly contribute to a country's competitiveness. Various initiatives targeted at improving the availability of skills at firm level, including increasing collaboration between tertiary institutions and industry, should be initiated and encouraged. Such initiatives should include diversification of skills to meet the existing demand, and increased investment in secondary and tertiary institutions that offer science and technical subjects.

Abbreviations and Acronyms

DIT	Directorate of Industrial Training
FDI	Foreign Direct Investment
HDR	Human Development Report
HMI	Harbinson Myres Index
ICT	Information and Communication Technology
ILO	International Labour Organization
ISCO	International Classification of Occupations
ITs	Institutes of Technology
GDP	Gross Domestic Product
GoK	Government of Kenya
KASNEB	Kenya Accountancy and Secretarial National Examinations Board
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KNEC	Kenya National Examinations Council
KNOCS	Kenya National Occupation Classification
NSE	Nairobi Stock Exchange
NSSF	National Social Security Fund
RBA	Retirement Benefits Authority
SACCO	Savings and Credit Cooperatives
TIVET	Technical, Industrial, Vocational and Entrepreneurship Training
TTIs	Technical Training Institutes

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1. Introduction

Skills development is an important element in a country's human capital development, improved competitiveness, and sustainable economic growth and development (World Bank, 2004).[1] Availability, acquisition and application of appropriate knowledge and skills to specific firm activities enhances competitiveness of enterprises, industries, workforce and economy at large through their effects on labour productivity (Tilak, 2002; Lall, 1999). Availability of relevant skills, in particular, contributes to production of quality, high technology and cheap outputs while giving the firm a competitive edge both nationally and internationally. In general, factors that affect a firm's productivity and competitiveness potential include business environment, management structures, access to physical infrastructure, social and economic sustainability, capacity utilization, and labour markets and their cost implications, among others (World Bank, 2004).

Skills-related features include levels of knowledge, skills and innovation on the employees, mechanisms for skill updating, information technologies, quality of human capital, and level of investment in education and training in the country. Thus, the pace at which education and training systems transmit knowledge into required quality of skills directly affects the firm's competitiveness and, by extension, the overall development of the economy. Consequently, systems that influence training should include degree of mastery of critical skills, including linguistic, mathematical and communication skills; reasoning, problem solving and innovation; and knowledge and appreciation of the inter-relationships between science, technology and socio-economic factors (Government of Kenya, 1998). Development of skills and techniques relevant to the industry/firm's needs would save the production units from the devastating effects of social exclusion.

[1] Competitiveness is multidimensional but basically means success (of countries and companies) in markets, which translates into general improvement in welfare. It involves the ability of an economy to grow in an open market, with advantages that yield rising wages, sustained employment creation and improved working conditions (Lall, 1999). The World Economic Forum (WEF) broadly defines competitiveness as 'the ability of a country to achieve sustained high rates of growth in GDP per capita'. The International Institute for Management Development (IMD) defines competitiveness as the ability of a country/firm to create added value on products, ability to produce high technology products, and thus increase national wealth by managing assets and processes, attractiveness and aggressiveness, globality and proximity, and by integrating these relationships into an economic and social model. National competitiveness refers to a country's ability to create, produce, distribute and/or service products in international trade while earning rising returns on its resources (Kuhn, 2005). According to Porter *et al* (2005), competitiveness is determined by productivity of an economy/firm brought about by the ability of firms and subsidiaries based in a country to get a lot of output per dollar of capital per unit of labour. Thus, a firm is competitive if it is productive, since it is firms that compete and not countries (Krugman, 1994). This study adopts the IMD definition.

Further, development of education, knowledge, skills and abilities of people help the economy to grow through production and provision of marketable goods and services while attracting more (local and foreign) investments for the country's sustainable development (Lall, 1999; 2000). In turn, this helps create the surpluses needed to raise living standards through increased employment opportunities, infrastructure improvement, and better social benefits (education, healthcare, housing, social security, among others). Consequently, education and training systems in any country should contribute to development of a workforce with cognitive skills, and produce knowledgeable employees for the brainpower jobs. However, this process depends on the dynamism of professions and supply of, and demand for specialists and skills, and other internal changes within professions brought about, for instance, by changes in technologies, globalization, etc.

In Asian countries, for instance, interest of the high technology products and key industries in microelectronics, biotechnology, production of new firm products, science industries, civil education, telecommunication, robotics and machine tools, computer hardware and software led to heavy public and private investments in relevant fields of education and skills training (Lall, 1999). On the contrary, though much of this is known even in other developing countries, skills levels are under-developed and the private sector (particularly production enterprises) play a limited role in influencing the education and training policy environment (Mburugu, 2003). Employers have limited influence on appropriate education policies and systems to promote the acquisition of relevant knowledge and skills geared to business needs and the ability to use them. For most developing economies, strong linkages are lacking between the private sector and secondary and tertiary education institutions on and between education and training with the labour market/ industry (Dar, 2000; Fluitman and Alberts, 2000; Lall, 1999).

Kenya's skills and training mechanisms, for instance, have not been adaptive enough to meet the challenges of social, economic and technological changes in the private and public sector (Mburugu, 2003; Government of Kenya, 2001; 2004a). There is a mismatch of skills taught and skills demanded by industry. Dynamic, flexible and market-driven curriculum structures and content necessary for high levels of employment are also weak. In 2003, there were approximately 2 million unemployed youth with no skills in the country(Government of Kenya, 2003a) . Unemployment has to a large extent been associated with low labour productivity as a result of low levels of skills acquisition from both education and training programmes in the country (Government of Kenya, 2001). Training staff upon employment may be costly to organizations, and it is important and more cost-effective for employees to enter organizations having already acquired knowledge and experience in

the respective fields through collaboration between academia and industry, and through pre-service training programmes.

According to a training survey by the Ministry of Labour and Human Resource Development, Kenya risks attracting foreign investment, on the one hand, but also importing workers with the requisite skills at the same time (Government of Kenya, 2004a). Firm level surveys conducted in Kenya in 2004 also established that close to 20 percent of firms rated inadequate skills and education of workers as a major obstacle to growth and labour productivity (World Bank, 2004). It is, therefore, important to assess the effects of skills on competitiveness.

The mismatch between the end products of the education and training system (skills supply) and skill demand by industry has been associated to the fact that the education policy framework has more focus on academic disciplines compared to technical subjects (Blattman, *et al.*, 2004 and Mburugu, 2003). Technical, vocational, education and training institutions are inadequately resourced, poorly managed and under-utilized (Mburugu, 2003). Other concerns revolve around skills availability, demand for specific skills, quality of skills, relevance of skills, cost of training borne by a firm and changing skill needs and technology, among others. Despite significant public and private spending on education and training, some skill specialties are still inadequate to meet the labour market demand.

In some cases, the quality of training is inadequate, calling for more investment by firms to cover training costs. The private sector also plays a minimal role in policy and curriculum development for skills and technical education programmes and capacity enhancement (Government of Kenya, 2005a). Weak linkage between formal education and training institutions with industry and labour market has worsened the problem of labour productivity and in turn profitability and competitiveness for most firms (Mburugu, 2003). This is manifested through limited support from industry for apprenticeship and attachment training, curriculum development and sponsorship.

Further, skills needs tend to change rapidly due to globalization and technological dynamics, among other factors.[2] Since quality and relevance

[2] Skills availability concerns skills that exist in a particular industry/firm, sector and/or country. This includes competencies attained through formal education and training, on the job training and experience. It is these skills that comprise overall human capital and has effects on firm outputs and competitiveness. Skills can be categorised into two groups: technical and generic skills. Technical skills, attained through long term education and/or training are specific and concern knowledge depth. Generic skills, on the other hand, concern people's skills, character, personal qualities and interpersonal relations and can be obtained through either experience and/or short-term training. Communication skills, problem solving, critical thinking, leadership, and information skills are examples of generic skills.

of skills availability has direct impact on firms' and the economy's competitiveness, the workforce has to embrace innovativeness to ensure skills attained are adaptable to the changing work environment and are able to boost competitiveness. However, there is limited empirical work that has been done on Kenya to establish the status of skills needs, availability and their implications on competitiveness.

The purpose of this study, therefore, is to: (i) examine the contribution and association of skills to competitiveness and the implications such contribution and association may have on Kenya's competitiveness both at macro and firm level; and (ii) assess the cost implication of the mismatch between skills needs and skills availability with a view to establishing ways of increasing firm's competitiveness. Specific objectives are: (i) to analyze the contribution of skills to a country's competitiveness; (ii) establish the relationship between skills and competitiveness; (iii) identify skills needs at firm level in Kenya; (iv) assess the levels of skills availability in Kenyan firms; (v) establish the levels of skills formation from education and training institutions in Kenya; (vi) assess the cost implication of the mismatch between skills needs and availability; (vii) explore mechanisms for linking education and training with industry and labour market needs; and (viii)) draw policy recommendations.

2. Overview of Skills Training in Kenya

2.1 Legal and Policy Framework

The Ministries of Education, Science and Technology; and Labour and Human Resource Development carry out vocational and technical training programmes for the country, while universities, both private and public, undertake higher education training. In 2006/7, there were a total of 18 universities (7 public and 11 accredited private universities) with 112,229 students. About 54 percent of students enrolled in art-oriented courses (Table 1).

Vocational and technical education and training is offered in a variety of trades and professions at four post-school level (Government of Kenya, 1998): artisan, craft, technician and technologist levels. Artisan level is offered in Youth Polytechnics and on-the-job training both by formal sector and *Jua kali* apprenticeships and certified by the Kenya National Examinations Council (KNEC) and Directorate of Industrial Training (DIT), respectively. Crafts courses are offered in Technical Training Institutes (TTIs) and Institutes of Technology (ITs) with certification from KNEC. Technician courses are offered in national polytechnics, some Technical Training Institutes (TTIs) and Institutes of Technology (ITs) with certification of Diplomas by KNEC. National polytechnics offer technology courses with an award of diploma by KNEC. Universities offer professional training programmes and some technology degree courses. Most of the on-the-job trainees who undertake DIT tests obtain a maximum of designated Trade Test Grade 1. Government ministries and departments offer specialized training in public sector while private sector employers and private institutions provide in-house training for their employees.

To a large extent, most of the training takes the form of general training for the open labour market, compared with training for specialized skills (Government of Kenya, 1998). There is limited coordination between the training programmes offered by mainstream training institutions and in-house training undertaken by firms, government ministries and departments. Kenya, thus, possibly lies within the category of most other developing economies that are not adequately investing in the education and training structure that provides the basic skills on which competitiveness rests (Lall, 1999).

In the absence of a coherent national training policy framework and specific legislation for technical education in Kenya, skills development is governed through various legislations, key among them being the Education Act Cap 211 and the Industrial Training Act Cap 237. The Education Act gives guidelines for establishment and development of learning institutions,

their management, administration, curriculum development and teacher education. It governs the TIVET functions of the Ministries of Education; and Science and Technology under the Directorate of Technical Training, which is charged with the overall responsibility for the administration, supervision and regulation of the provision of vocational education and training, including curriculum development, testing and certification and regulation of private training providers.

The Industrial Training Act contains provision for the training and certification of artisans under the Directorate of Industrial Training. The KASNEB Act empowers the Board to conduct examinations and certification in some business fields, while the KNEC Act provides for the administration of examinations and certification in schools and institutions outside the university (Government of Kenya, 1998). Other features of the Industrial Training Act include appointment of a Director of Industrial Training and a number of Deputy Directors and Assistant Directors of Industrial Training in a Directorate of Industrial Training under the Ministry of Labour and Human Resource Development (World Bank, 2004). Training in universities is provided for under the Universities' Acts.

However, this legal infrastructure has various challenges and complexities. The Education Act, for instance, emphasizes on issues related to primary and secondary education, giving limited focus on skills training (Government of Kenya, 1998). This framework has undermined the need for development of clear norms to allocation of adequate resources to vocational and technical training (Government of Kenya, 1998), leading to under-developed middle level training institutions and lack of autonomy, which is critical particularly in attracting and producing highly skilled and qualified personnel. There are also other legislations on sector aspects of technical education in various ministries and government departments, leading to considerable duplication of functions and activities in technical education and training.

The policy framework for education and training in Kenya is contained in Sessional Paper No. 1 of 2005. Specific policy provisions related to skills development include: ensuring relevant training in all professional courses to address the current skills mismatch; and reviewing the current training delivery mechanisms to include mandatory on-job training to enhance quality and relevance of training as part of the academic programme (Government of Kenya, 2005). However, although the government recognizes the need for development of a National Training Strategy (Government of Kenya, 1998; 2000; 2003a; 2005a; 2005b) the process is yet to begin, and this has undermined skills development in Kenya.

A survey of Kenya firms drawn from the productive sectors in 2004 shows that provision of hands-on training on operating machines and the lead-time

for training entry-level staff would be shorter if the labourforce had some basic training on requisite skills. The skills in the firms are deficient and there is weak linkage with the skills training institutions (World Bank, 2004). In the garments industry, for instance, the typical programmes identified were specific task performance skills, training in integrated quality management, maintenance and basic managerial skills (World Bank, 2004 and Government of Kenya, 2004a).

Specific skills needs for the garment industry and proposed programmes include: *Machine operators* (basic sewing operations, garment assembly with specific task performance and quality targets); *Quality management* (training in integrated quality management systems for various operations such as sewing, washing, drying, packaging, etc); *Mechanics and technicians* (maintenance and repair of production equipment and machinery); *Middle managers, supervisors and line leaders* (basic business concepts; grievance and disciplinary procedures; leadership and motivation; team building; communication skills; training of trainers; production planning; financial management), etc.

2.2 Skills Formation in Kenya, 1998/99-2006/7

Education and training are the two main mechanisms through which any economy nurtures its labourforce. Training, in particular, is expected to nurture creativity, critical thinking, produce innovative and adaptive human resources with appropriate skills, improve attitude and values for wealth creation, employment and prosperity. Education contributes to development of technical skills that can only be attained through long-term formal education and training, especially through tertiary education. Thus, real skills training takes place in the tertiary education level, including Technical, Industrial ,Vocational and Entrepreneurship Training (TIVET) institutions, middle level colleges and universities.

The public sector plays a greater role in both training and education functions. Table 1 shows the proportion of students enrolled in public universities by programme in 1998-2007. The data shows that although there has been a considerable increase in the number of students enrolled, most students are enrolled in education, general humanities and other studies, and general sciences; academic pursuits that are generally not aligned with the skills demanded. As a result, firms have to retrain new staff, a process that is not cost-effective both in terms of costs and time allocation.

Table 1: Proportions (%) of public universities enrolment by programme in 1998/99-2004/05

	1998/99	1999/00	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7
Agriculture	7	7	5	5	5	5	5	5	6
Medical disciplines	3	3	4	5	3	3	3	3	3
Engineering	5	5	5	5	5	5	5	5	5
Technology/Applied Sciences	3	3	3	3	3	3	3	4	3
General Sciences	13	13	13	12	12	12	13	13	13
Law	3	3	4	4	3	3	5	4	4
Commerce and Business Management	5	5	6	5	5	5	6	6	6
Economists	0.2	0.3	0.4	0.5	0.4	0.4	0.4	0.4	0.4
General Humanities & Other Studies	16	14	14	14	12	12	14	13	13
Civil Engineering, Architecture, Design, Building	2	2	1	2	1	1	3	3	2
Education (Arts)	30	26	24	24	25	28	24	24	21
Education (Sciences)	4	5	4	3	3	3	2	2	3
Postgraduate	7	7	7	7	14	10	10	11	10
Diplomas & Certificate Courses	2	7	10	10	10	10	8	7	8

Source: Statistical Abstract (various) and authors' computations

3. Review of Related Literature

3.1 Theoretical Framework

This study uses the human capital theory to explain the importance and linkages between skills and competitiveness. The underlying proposition of the theory is that education and training are investments that produce returns in the future (Quiggin, 1999). Skills have strong effects on economic growth and other productivity attributes that make both countries and production units (firms) in which the labourforce is working more productive and competitive. Thus, like education, training empowers human capital with quality skills that can produce benefits in terms of future earnings accruing to workforce. The model attempts to show strong linkages between education and training, labour markets and economic growth. Any policy measures aimed at reducing education and training spending at whichever level limits skills training and/or leads to deficiencies in skills development while reducing future national income, productivity and competitiveness (Quiggin, 1999; World Bank, 2004).

In other versions of the human capital models, knowledge, information and skills are critical through their contribution to increased productivity and hence, *ceteris paribus*, to higher earnings and productivity (Quiggin, 1999). Thus, for a country to attain higher levels of economic growth and competitiveness, it must expand investment in education and training up to a point where the rate of return to additional spending is equal to general rate of return on capital. Education and skills training are also associated with other private and social benefits such as better health status of the population, transmission of cultural values, more intelligent political participation such as in voting, and reduced criminal behaviour. Investment in education and employable skills training yields greater returns as compared to physical investment. All these factors contribute to a country's overall competitiveness (UNDP, 2005).

Within the standard labour supply and demand theory (Quiggin, 1999), a country with a large number of educated population is expected to have a lower skill premium. However, in most developing economies, Kenya included, despite the increasing number of educated labourforce, the labour premiums are considerably high yielding low competitiveness leverage (World Bank, 2004). Further, on distributional effects, the model holds that where technological progress tends to increase demand for skilled labour and reduce demand for unskilled labour, a rise in average education levels is necessary to keep the returns to education stable (Quiggin, 1999), and therefore reduce the emergence of higher income inequalities and lower competitive edge.

3.2 Skills and Competitiveness

Skills formation is critical for countries to effectively compete in manufacturing and services exports (Gemmell, 1996; Lall, 1999; 2000), and in order to move into higher growth paths (Kimenyi, Manda, and Mwabu, 2002). Major factors that determine a country's competitiveness include Foreign Direct Investment (FDI) inflows, technological activity, skills formation and technological effort. Ability to effectively compete in liberalized markets largely depends on the extent to which countries incorporate new skills into the production processes within the fast changing technological advancements. Technological progress and globalization, characterized by rapid and flexible shifts in the productive and innovative activities, all call for high level skills and improvement of workforce skills at all levels (Lall, 1999), supported with comparative advantage and strong systems of industrial organization and management. It is apparent that the proposition of comparative advantage in developing economies has lately changed from the traditional base of primary resources and cheap labour (Lall, 2000) to manufactured products and services that incorporate higher skills and technological inputs. Indeed, even in activities where developing countries still have comparative advantage in terms of low wages, globalization and technological change patterns impose demand for skilled labourforce.

Key features of skills formation for enhanced competitiveness (Linda, 1998) include communication skills; broader skills characterized with teamwork and frequent rotation, problem solving skills; quality improvement, health and safety; and capabilities in linking human resource policies with remuneration systems (peoples' skills). These skills are acquired through organized training, on-the-job experience and/or problem solving through experience.

The World Bank (2004) identifies five integrated blocks for improved competitiveness at industry level: physical infrastructure, business environment, trade and investment facilitation, human capital and financial services. These factors combined lead to sustainable job creation and increased exports and value added produced domestically.

Within this framework, human capital consists of the labourforce, which provides countries with services ranging from healthcare, education, administration and security (Cohen, 2002). With technological and various other advancements, the demand for skilled workers has been growing and continues to grow. For example, in Kenya's manufacturing sector (World Bank, 2004), which is largely a reflection of other major sectors, there has been a shift towards employing highly skilled manpower and technology with the increasing demand for high quality products.

3.3 Skills Needs

New skills needs created by globalization, the quest for enhanced competitiveness, and changes in information technologies imply requirement for high level skills (greater technological, organizational, and managerial skills) regardless of development level of the country (Lall, 1999). This should also be supported with an enabling environment and supportive policy since firms develop competitive capabilities by responding to market signals that are determined by factor markets and institutions. Other complementary skills needed include developing different attitudes towards work, peoples' skills, new work relations and new management skills. There is also increasing demand for not only advanced and/or high skills but also multi-skilling. For instance, there is apparent increasing demand for professionals and technicians in both developed and developing countries due to their analytical, cognitive and behavioural skills that enable them to adapt to sophisticated technology with ease (Lall, 2000). Firm employees with multi-skills, such as specialized professional expertise combined with business and management skills and capable of producing higher quality products, are more preferred in production jobs than a workforce with fewer skills. Consequently, the education system for developing countries should continually put systems in place to allow flexible and regular skills development.

The desire for competitiveness deepening requires that countries shift from simple operational skills to advanced innovative skills (Lall, 1999). Skill deepening is necessary for any country/firm to achieve meaningful competitive edge, although new skills needs differ with levels of development. Figure 1 highlights patterns of skills needs by level of development. It shows that for a country to achieve improvement in level of development, it must address the need for new and advanced skills, relevant to the production functions. For instance, low developed economies are characterized by simple technologies and there is over-emphasis on improving literacy rates. On the other hand, industrialized countries with deep industrial structures are characteristic of excellent quality schooling, industrial training, high levels of university-trained managers, engineers and scientists.

To address the challenge of skills needs and competitiveness, Singapore for instance, increased the share of professionals in manufacturing employment from 3 percent in 1983 to 7 percent in 1996 and that of technical and engineering workforce from 5 percent to 16 percent during the same period (Lall, 1999). The proportion of professionals and technical workers as a percentage of total employment increased from 15.7 percent in 1990 to 23.1 percent in 1995 while allowing for importation of a limited number of skills expatriates for shortage skills. In Kenya, the proportion of technologists to technicians to craftsmen was 1:3:12 in 2003 compared to an optimal ratio of

Figure 1: Human capital and industrial development patterns

Level/Pattern of Industrial Development	Human Capital Profile	
	Skills	Technological Capabilities
Low levels, mainly simple assembly and processing activity for domestic market	Literacy, simple technical and managerial training. Practically no in-firm training except informal on-job learning	Ability to master assembly technologies, copy simple designs, repairs machines. Many activities operate well below world best practice levels for technical efficiency
Intermediate level, with export-oriented activities in light industry, some local linkages in low-technology products	Good secondary and technical schooling and management financial training. Low base of engineering and scientific skills, in-house training mainly by export-oriented enterprises. SMEs have low skills levels	World-class assembly, layout, process engineering and maintenance in export oriented industries. In others, capability to undertake minor adaptations to processes and products. Little or no design-development capabilities. Technology institutes weak
Deep industrial structure but mainly inward-oriented technological lags in many activities	Broad but often low quality schooling, vocational and industrial training. Broad engineering base, in-house training lagging. Training institutes declined from industry. Management and marketing skills weak. SMEs have some modern skills	Process mastery of capital and skill intensive technologies but with inefficiencies. Considerable backward linkages, significant adaptation of imported technologies, little innovation, low linkages with universities and technological institutes
Advanced and deep industrial structure, with many world-class activities, own design and technology base	Excellent quality schooling and industrial training. High levels of university trained managers, engineers and scientists. Training institutes responsive to industrial needs. Large investments in formal and informal in-firm training. SMEs have high skill levels and competence	Ability to monitor, import and adapt state of art advanced technologies. Good design and development capabilities in sophisticated technologies. Deep local linkages with suppliers, buyers, consultants, universities and technological institutes

Source: Lall, 1999

1:5:30 (Government of Kenya, 2003b). There is no information to show that this situation has changed. Such an imbalance of professionals in the labourforce impacts negatively on research and development, which are crucial elements of firm productivity.

3.4 Forms of Skills Formation

Skill formation arises from formal education, vocational training, in-firm (enterprise) training, outside the firm training and on-the-job learning (Lall, 2000). While basic schooling and literacy may be necessary to absorb simple industrial technologies, advanced schooling and tertiary education are potentially critical for knowledge acquisition and modern skills advancement. On-the-job training, a distinct form of skills formation, is perceived to be more effective and economical since employers are more informed about skills needed at firm level and expertise and resources required to train in emerging skills needs. On-the-job training is also an important complement of new investment in technology, plant equipment and organization methods. Singapore, which is widely regarded as one of the most competitive countries in the world, has a large number of skilled labourforce supported with all-inclusive training strategy.[3] Skills provision is integrated within its industrial policy, and enterprises play a pivotal role in determining the nature and content of training in various sectors. However, many firms particularly in most developing economies do not provide on-the-job training, perhaps due to cost implications (Lall, 2000).

There are three types of vocational training systems relevant to development of technical skills (Lall, 1999; 2000). These include cooperative system, enterprise-based-system and state-driven system (Table 2). Under the cooperative system, skills development is a tripartite task undertaken by employers, employees and government. For instance, in Germany, employers offer apprenticeship in all sectors, with active involvement of Chambers of Industry and Commerce in registering apprenticeships and setting qualification standards. Employers cover half of the cost of training in public vocational schools while apprentices contribute by taking lesser wages compared to market rates.

Enterprise-based training, commonly practiced in Japan, involves massive on-the-firm skills training to long-term employees. The state-driven skills formation system involves government providing the fast-changing skills

[3] Singapore ranked 7th with Growth Competitiveness Index of 5.56 out of a maximum of 7 in 2004 (World Economic Forum, 2004). Kenya's competitiveness index was 3.45, ranking 78 out of the 104 countries during the same period.

Table 2: Main types of training systems

System	Example	Main Feature
Cooperative	Austria, Germany, Switzerland, many Latin American countries	Pressure on training from Cooperation between employers' organisations, governments and trade unions
Enterprise-based		
a) Low labour turnover	Japan	Low labour mobility, lifetime employment, absence of stock-market pressures
b) Voluntarist	UK, USA	Few institutional pressures to train
State-driven		
a) Demand-led	Hong Kong, Korea, Singapore, Taiwan	State plays leading role in coordinating demand for and supply of skills, in an open competitive environment
b) Supply-led	Economies in transition, many developing countries in Asia and Africa	Government takes prime responsibility for training in institutions. Little pressure for employers to train

Source: Lall, 1999

needed in both public and private sectors, for instance in Korea. Any training strategy a country takes is a function of social, economic and institutional settings, and the rate at which a country is readily able to adjust to globalization and liberalization forces.

Asian countries, for instance, have recently recorded high levels of productivity and competitiveness, and have also prioritized skills development in their long-term development agenda. Apart from infrastructure development, stable socio-political conditions and overall macroeconomic efficiency, Singapore's increasing competitiveness has been associated with educated and skilled labourforce (Linda, 1998). High-level training and skills upgrading and retraining strategies are well-developed while the universities and polytechnics are committed to higher levels of tertiary education and skills development. The country has a deliberate policy through a foreign workers levy and quarter system to restrain the importation of unskilled and low skilled labour, while encouraging repatriation of highly skilled citizens studying abroad.

However, relatively few developing countries are investing in education structures that provide basic prerequisite skills for competitiveness (Lall, 1999), despite the fact that almost all countries have opened their economies

to global competition and are striving to gain a competitive edge in trade and in attracting foreign direct investments.

3.5 Comparative Analysis of Skills, Availability and Competitiveness

As discussed above, skills availability is central to economic competitiveness and growth potential for any country. Recent studies on Kenyan firms indicate that skills levels and capital productivity have not improved when compared to the mid 1990s (World Bank, 2004). Skills deficiencies and labour costs have been rising over the last two decades and are seen to contribute to the declining competitiveness of Kenyan firms, especially in the manufacturing sector. Between 1990 and 2001, the unit labour cost for the manufacturing and transport and communication sectors in Kenya rose by 20 percent and 45 percent, respectively. This was 12 percent and 33 percent higher compared with firms in India and China. These low levels of labour productivity can be attributed to the effects of preference, quality of skills development, and technical training despite the fact that the country has higher literacy levels compared to the sub-Saharan Africa counterparts. Data on comparative analysis of human capital indexes across countries (UNDP, 2005) indicate that over the last two decades, Kenya has experienced considerable under-investment in human capital development, especially technical and other tertiary levels, which impacts negatively on the growth potential of productive sectors. Other indicators include low transition rates between levels, low and declining tertiary education enrolments especially in technical subjects, and declining quality of industrial training.

According to data in Table 3, in 2001-2004 Kenya achieved a GCI of 3.3 compared to Malaysia (4.8) and Japan (5.3), for instance. On the same note, Kenya's technology exports constitute a low of 5.1 percent while Malaysia's exports are mainly high technology outputs (58.0 percent). Thus, as the country evaluates her strategies for sustainable growth and improved competitiveness, skills development is equally critical, among other factors.

Table 3: Selected competitiveness indicators (average %)

Indicator	*High technology exports as % of merchandise*	*Secondary gross enrolment rate*	*Global Competitiveness Index*	*GDP growth rate*	*FDI as % of gross capital formation*
Country/Years	*1998-2003*	*1999-2003*	*2001-2004*	*2000-2005*	*1999-2003*
Kenya	5.1	31.0	3.3	2.5	2.0
Malaysia	58.0	69.0	4.8	5.2	14.0
South Africa	6.6	87.0	4.7	3.4	8.0
United States of America	32.7	93.0	5.9	2.7	7.0
United Kingdom	30.1	164.0	5.3	2.7	7.0
Korea	31.1	93.0	5.0	5.4	2.0
Japan	25.9	102.0	5.3	1.3	1.0
India	4.7	49.0	4.0	5.7	2.0
Tanzania	2.5	5.8	3.4	6.4	15.0

Sources: Global Competitiveness Report and World Development Indicators (various)

3.6 Empirical Literature

The human capital theory provides the theoretical underpinning on the linkages between education and training, skills needs, availability and firm's productivity and competitiveness.[4] Competitiveness depends on the level of knowledge emergence and application to production. To this end, creativity is essential for moving into and being competitive in the knowledge-based production limits for increased productivity. This requires innovativeness of the right environment for the emergence of such workers and ensuring that education and skills training systems produce a creative workforce.

Human capital is important for economic growth through its contribution to labour productivity (Temple, 2001), and is one of the underlying factors for high and sustainable economic growth and competitiveness levels currently experienced by Asian countries. For instance, education is a key input to the research sector, generating new products and ideas that underlie technical progress. Thus, better quality of education is likely to facilitate rapid growth and a higher competitive edge.

Empirical studies (World Bank, 1993; Barkham *et al.*, 1996) show that there is a strong positive relationship between high primary, secondary and tertiary enrolment rates and rapid economic growth. High standards of education and training is a key element in attracting inward investments while at firm level, enterprises owned and managed by well educated entrepreneurs tend to grow faster than their counterparts. Education and training contribute to improved labour productivity and effectiveness, thereby improving the country's overall economic performance (improved national gross product), productivity and competitiveness. The opposite holds true. Lack of an educated and well trained workforce leads to low firm profitability and competitiveness.

Lall (1999) estimated a regression function on effects of skills as captured through HMI measure and foreign direct investments on competitiveness, captured through levels of high technology exports. He established that skills and inward FDI has a positive and significant impact on the per capita value of high technology exports. Thus, export success in high technology exports, which to a large extent is a measure of a country's level of competitiveness,

[4] Competitiveness is closely linked with levels of human resource development, which involves a wide range of aspects, including healthcare, nutrition, population control, education and training. It comprises a process of increasing the knowledge, skills and capacities of all the people in society (Quiggin, 1999). In economic perspective, human resource development involves accumulation of human capital and its effective investment in the development of the economy. Politically, human resource development contributes to development of informed people who are ready to effectively participate in political processes. Under social perspective, human resource development helps people to lead fuller and richer lives that is less bound to tradition. This leads to higher productivity.

requires skills and benefits from inward FDI. Other important factors contributing to competitiveness include technological upgrading and investment in research and development. However, the study does not capture fixed (country-specific) and time effects.

4. Methodology

4.1 Sources of Data

The study utilizes both secondary and primary data sources. Cross-national data on skills availability and competitiveness are obtained from available international datasets, including the Human Development Report (2005), UNESCO, Global Competitiveness Reports and World Indicators datasets. Data on supply of skills and skills formation (training) was obtained from the Ministry of Labour and Human Resource Development, Ministry of Education, tertiary education institutions and other relevant government sources.

Firm level data (both quantitative and qualitative) was collected from 128 private firms in 2005 within the Sources of Growth in Kenya Social Accounting Matrix project implemented by KIPPRA in collaboration with the World Bank. About 304 firms were targeted from various sectors: transport (10%), tourism and travel (8%), insurance (5%), manufacturing (20%), ICTs (10%), hotels and restaurants (28%) and financial institutions (20%). Table 4 presents data on expected firm sample size and levels of firm responses achieved.

The sample for financial institutions was drawn from all financial institutions depending on their share of total deposits as at the year 2003. A survey sample of 60 financial institutions was drawn from commercial banks (25%), insurance companies (25%), SACCOs (17%), micro-finance institutions (18%), development finance institutions (7%) and other institutions including the Nairobi Stock Exchange, National Social Security Fund, and the Retirement Benefits Authority (8%). The commercial banks sub-sample consisted of five firms from top performing category, five from the middle performing and five from the low performing categories. Within each category, if any firm was not able to respond, the next firm in the list was selected. Under the insurance sub-sector, the 15 firms selected were drawn from both

Table 4: Target and achieved sample size

Sector	Target firms	%	Achieved	Response rate (%)
Manufacturing	60	20	37	62
Finance services	60	20	28	47
Insurance	15	5	3	20
ICT	30	10	18	60
Hotels	86	28	18	21
Tourism and travel	23	8	14	61
Transport	30	10	10	33
Total	304	100	128	42

life and non-life insurance providers. The response rate was low at 20 percent. Like commercial banks, SACCOs based in Nairobi were ranked according to their share contributions. Four firms were drawn from the first category, three from middle category and another three from low performing category. A total of eleven micro-finance institutions and five development institutions were randomly selected. The category of other financial institutions (8%) included Capital Markets Authority, Nairobi Stock Exchange, Retirement Benefits Authority and the National Social Security Fund.

The tourism sector stratified sample had 92 firms comprising of hotels and lodges (59%), restaurants (20%), and tour operators and travel agencies (21%). The official hotel classification outlined in the 2003 Kenya Gazette, Kenya Association of Tours Operators membership list, and Kenya Association of Travel Agencies ordinary membership list were used. In designing the hotels sample size, every 25th hotel was sampled while every 5th travel agency was selected from the membership list. However, in instances where a selected firm was not available, the next firm in the respective list was surveyed.

The 30 firms drawn from the ICT sector in Nairobi consisted of Internet Service Providers (ISPs), postal service providers, broadcasting, and information technology and telephone (both landline and mobile) firms. On the other hand, the transport sector sample consisted of public passenger, cargo and private companies offering transport services.

The overall response rate was 42 percent, with manufacturing recording a high of 62 percent, followed by tourism sector at 61 percent, ICT (60%), financial services (47%), transport (33%), hotels (21%) and, lastly, insurance (20%). Owing to the low response rate, secondary data sources, including data obtained from the relevant government agencies were utilized. These included Ministry of Education trend data on tertiary education and skills training in Kenya, and Ministry of Labour and Human Resource Development labour and skills training surveys. Further, where secondary data was available, the other key sectors such as agriculture and other issues on skills development were analysed.

4.2 Data Limitations and Constraints

The primary data collection did not cover all sectors of the economy. For instance, agricultural sector was not covered. Thus, the qualitative analysis on availability of generic skills is restricted to only seven sectors—manufacturing, financial institutions, ICT, tourism and travel, insurance, transport and hotels. Other sectors were not covered for various reasons, including the firms missing from sources of growth sample.

Most firms were not ready to disclose information particularly on financial-related variables, resulting to major data gaps particularly on labour premiums and levels of firm production. There was also a major challenge of low response rate among the target sample. For instance, out of the 15 insurance firms targeted, only 20 percent of the sample size was achieved.

The survey was mainly conducted in Nairobi and Coast provinces for the tourism sector. However, over 60 percent of the country's production firms are concentrated in Nairobi (World Bank, 2004) making the sample representative and can give an indication of skills availability in the country.

4.3 Model Specification

This study analyses the contribution of skills development to a country's competitiveness using cross sectional data for a sample of 84 countries for the period 1999-2003. Education and training are taken as the main avenues for skill acquisition and skill stock in any given country. This study borrows from the framework for analysis used by Lall (1999), which estimates the effects of skills levels on competitiveness across various countries. Skills level in a country is measured using Harbison Myers Index (HMI). The estimated model is specified as:

HighTech = f(HMI, GDPppp, FDI1,TsciIndex, EngIndex) 1

Where:

HighTech = High Technology Exports as a percentage of manufactured merchandise

HMI = Harbison Myers Index

GDPppp = Gross Domestic Product at purchasing power parity

FDI1 = Net Foreign Direct Investments

TsciIndex = Tertiary Science Enrolment Index

EngIndex = Tertiary Engineering Enrolment Index

Assuming a vector of the explanatory variables is χ_{it} and the dependent variable is γ_{it} we can express equation 1 as follows:

$$\gamma_{it} = \alpha + \beta' \chi_{it} + \varepsilon i \quad \text{.....2}$$

Where γ_{it} = dependent variable; α = constant term; β' = coefficients; χ_{it} = vector of the explanatory variables for individual country *i* at period *t*, ε_i is the error *term*, i = 1,2,3,...N; t=1,2,3,....T. Given that we are using panel data, we can decompose the error term into the following components.

$$\varepsilon_{it} = \alpha_i + a_t + \upsilon_{it} \quad \text{.....3}$$

Where α_i are the country-specific effects and α_t are the time specific effects, while ν_t is idiosyncratic shocks. Whether the error term is to be decomposed into the three terms or two (that is taking into account only country-specific effects) can be tested.

Substituting equation 3 into equation 2 gives the following form of the model:

$$\gamma_{it} = \alpha + \alpha_i + \alpha_t + \beta' \chi_{it} + \nu_{it} \quad \text{.....4}$$

To establish the appropriate stochastic assumptions of the explanatory variables on the error term, we undertake the Hausman test. The null hypothesis h_o is that the fixed effects model estimators and the Error Correction Model (ECM) estimators do not differ substantially; that is the test has asymptotic Chi² distribution. If the h_o is rejected, then the ECM is not appropriate, hence the use of fixed effects model in which case statistical inferences will be conditional of the a_i in the sample. Thus, if the explanatory variables are correlated with the country-specific effects and not with the time series effects, the Least Squares Dummy Variable (LSDV) model or within group estimators model is ideal for estimation. Consequently, a fixed effect model is estimated where differences between units are viewed as parametric shifts of the regression model. This model can be specified as follows:

$$\gamma_{it} = \alpha_i + \alpha_t + \beta' \chi_{it} + \nu_{it} \quad \text{.....5}$$

If the explanatory variables are not correlated with the country-specific effects and the idiosyncratic shock, then the random effects model or standard variance component of Generalized Least Squares (GLS) estimator is appropriate. This implies that the country-specific terms are randomly distributed across the countries and that the individual countries are drawn from a large sample, making the LSDV inconsistent. The random effects model is specified as follows:

$$\gamma_{it} = \alpha + \beta' \chi_{it} + \alpha_i + \alpha_t + \nu_{it} \quad \text{.....6}$$

In the random effects model, the country and time-specific effects are treated as error terms. Model 6 would therefore have three error terms.

4.4 The Panel Data Technique

In the model, each coefficient shows the relationship between changes over time in high technology exports (dependent variable) and changes over time

in the independent variables. This way, country-specific effects are captured other than those common to all sample countries.

Since the data contains many countries (84) and fewer observations (5), the Durbin-Watson (DW) test is used to test for the within residuals within countries. The DW test (2) reveals that there is no significant positive or negative first-order serial correlation in the regression.

The OLS is then applied to the data (after applying cross-sectional weights) to obtain the within estimates of coefficients. The data was transformed by subtracting individual country means to eliminate the country-specific effects. OLS is applied to the data to obtain the "within" estimates of the coefficients. This fixed effects approach was identified to be appropriate after undertaking the Redundant and Hausman tests. Under the Redundant effects test, the null hypothesis h_o is that the country-specific effects are insignificant while the h_1 hypothesis is that the fixed effects are useful. On the other hand, the Hausman test h_o is specified that the country-specific effects are randomly distributed across countries and that the effects are not correlated to the regressors. In both (Redundant and Hausman) tests, the h_o is rejected at one percent level of significance, implying that the country-specific effects are not redundant and that they are correlated with regressors. Thus, the appropriate procedure adopted is the fixed effects estimation procedure (Equation 5) and not the random effects procedure. The preferred panel data estimation technique was the two-way error component model. Since the data is only for a five-year time period, the study only estimates a one-way error component model.

4.5 Definition of Variables

High technology exports (HighTech)

The level of high technology exports as a percentage of manufactured merchandise is used to measure individual country's level of competitiveness (Lall, 1999). The ability to compete in free markets depends on the ability to incorporate new technologies into manufacturing services for sustained growth.

Skills index

Skills level is captured through the Harbison Myers Index (HMI), which is the sum of secondary enrolment and tertiary enrolment (times five), both enrolments as a percentage of age group (Lall, 1999). The computed HMI is

weighted by a factor of a fifth to reduce the observed deviations. HMI is expected to have a positive impact on competitiveness.

Indices for engineering and science enrolment in tertiary education

Science enrolment index is tertiary total enrolment (times 1000) plus tertiary enrolment in technical/science subjects (times 5000), both as a percentage of population (Lall, 1999). Engineering skills index is the same as the previous index, with tertiary enrolments in engineering courses instead of enrolment in technical subjects (Lall, 1999). They both measure the levels of technical, science and engineering skills availability in the respective countries, giving a positive impact on the country's level of competitiveness.

Gross Domestic Product per capita at Purchasing Power Parity (GDPppp)

This is the measure of the countries' overall economic performance, and capability to finance education and skills development. It is also intended to capture the various ways in which different countries are able to offer their inhabitants learning opportunities (Wood and Ridao-Cano, *undated*). High GDP per capita is closely associated with high level of exports, especially middle-level and high technology exports (Lall, 1999). Thus, inter-country differences affect learning and skills development opportunities through household and public expenditure effects on education and training.

Net Foreign Direct investments

Foreign Direct Investments (FDI1) can both contribute to a country's overall productivity if it contributes to capital formation and/or if associated with high technology transfers. In some countries, FDI stocks have been associated with high competitiveness and economy's production of high technology exports.

5. Study Results

Study results are presented in five sub-sections:

5.1 Assessment of Skills Needs and Availability at Firm Level[5]

New skills needs are brought about by various factors, including employers' new demand on employees, globalization, technological change and changes in organizational structures at the workplace. For instance, at professional level, there is demand for multi-skilled professionals with both specialist and technical skills while at the firm level, continuous changes in the organizational structures call for change from traditional production/ operational systems to modern methods of production.

For the manufacturing and services firms surveyed, skills development has been identified as a major obstacle to firm productivity and competitiveness and hence the need for skills upgrading for enhanced productivity and competitiveness.

Findings on skills demanded, their shortages and interventions required and presented in Table 5. Annex Table 1 shows the results of responses from about 128 firms on skills they required and those available in the market. Except the firms in the transport industry, all other types of firms indicated that there are certain sector-specific skills that are not available in the market.

The survey investigated the skill needs of sampled firms in various industries with a view to assessing whether training meets such market needs. Table 6, 7 and Annex Table 3 show the main skills demanded, skills available and those lacking in the sample firms.

What explains the scarcity of skills?

Respondents were asked to give reasons that could explain the scarcity of skills required by the firm. Various reasons were given including:

- Training institutions do not train staff in certain areas (from manufacturing)

[5] Skills availability concerns skills that exist in a particular industry/firm, sector and/or country. This includes competencies attained through formal education and training, on the job training and experience. It is these skills that comprise overall human capital and has effects on firm outputs and competitiveness. Skills can be categorized into two groups: technical and generic skills. Technical skills, attained through long term education and/or training are specific and concern knowledge depth. Generic skills, on the other hand, concern people's skills, character, personal qualities and interpersonal relations and can be obtained through either experience and/or short-term training. Communication skills, problem solving, critical thinking, leadership, and information skills are examples of generic skills.

Table 5: New employees demonstrating the required skills

Industry (n= 116)	*Strongly disagree*	*Disagree*	*Undecided*	*Agree*	*Strongly agree*
Manufacturing (25)	1(4%)	6(24%)	5(20%)	12(48%)	1(4%)
Financial institutions (28)	1(4%)	1(4%)	0	24(86%)	2(7%)
Insurance (3)	0	0	0	2(67%)	1(33%)
ICT (18)	0	0	1(6%)	14(78%)	3(17%)
Hotels (19)	1(5%)	4(21%)	1(5%)	10(53%)	3(16%)
Transport (10)	0	0	0	8(80%)	2(20%)
Travel (13)	1(8%)	1(8%)	0	9(70%)	2(15%)
All firms	4	12	7	79	14

Source: Field data

Table 6: Skills that cannot be sourced from local market

Industry	**Yes**	**Skills unable to source**
Manufacturing	10(38%)	Engineering skills with experience (1) Modern manufacturing system/business (1) Enterprise resource planning (1) Technical planning (1) Plastic technology (1) Technical skills and experienced managerial skills
ICT	4(23.5%)	Broadcasting technical skills (1) Managerial skills (1) ICT skills (1) Technical skills (1)
Hotels	1(4.8%)	Preparing Indian Cuisine
Transport	3(30%)	Reach truck operators Advanced mechanical technology
Travel	2(14.3%)	Specialist skills (not specified) Chinese language

Source: Field data; No responses from financial institutions and insurance firms on variable in question

- Migration of skilled workers from Kenya (from manufacturing)
- Scarcity of relevant educational opportunities in Kenya (from manufacturing)
- Inadequate exposure during technical training in Kenya (from manufacturing)
- Indian cuisine is a foreign meal that is hardly taught by training markets (Tourism)
- Technological changes and inadequate relevant training
- Inadequate local training and examining body in specialist skills; for instance, Express Travel Group provides specialist services that can only be acquired through inhouse training

Assessment of the extent to which a firm requires certain skills and the employees' demonstration of the same

Tables 7 and Annex Table 3 show the opinion of key firm-based respondents regarding the extent to which the firm requires certain skills and the level at which the employees demonstrate the required skill. From the table, more than two-thirds (69%) of the firms highly/very highly require company-specific skills compared to 46 percent of the firms who indicated that employees strongly/very strongly demonstrated the required skills. A similar pattern was observed for technical skills and knowledge with 75 percent of

Table 7: Responses on the extent of skill requirement and demonstration

Firm type	Extent of skill requirement		Extent of skill demonstration	
	Company specific (%)	*Technical skills and knowledge (%)*	*Company-specific (%)*	*Technical skills and knowledge (%)*
Manufacturing, n=37	68	68	21	59
Finance, n=28	82	78	36	32
Insurance, n=3	100	100	33	33
ICT, n=18	61	72	61	78
Hotels, n=18	67	72	72	72
Tourism & travel, n=14	54	79	43	57
Transport, n=10	50	56	50	75
All firms, N=128	69	75	46	58

Source: Field data

the firms indicating a high/very high requirement of such skills but only about 58 percent of the firms thought that employees strongly/very strongly demonstrated theses skills.

A further look at the skills-requirement and level of employee demonstration of required skills by firm type reveal that for company-specific skills, on the job-training and or internship programmes are more relevant. In other types of firms such as ICT, hotels and transport, the disparity between company-specific skills requirement and demonstration of the same by employees was negligible or non-existence. This could be an indication that training institutions are able to supply manpower with the relevant skills. Alternatively, new employees are able to quickly adapt to the skill requirements of such firms.

The findings indicate a training market failure to equip the trainees with non-company specific skills that are best imparted in training institutions. The observations partly confirm the widely held perception of the mismatch between skills need and skills supplied (Table 7).

5.2 Skills Training at Firm Level

Economies that allocate sufficient resources towards their educational systems, skills development and relevant education and training concerns are likely to be more competitive and experience higher economic growth rate and improved living standards. In the absence of adequate formal education and training on skills development, most firms in Kenya resort to on-firm training as a strategy for developing missing skills–at some cost. This indicates that education and training systems are not adequately equipping graduates with the most prerequisite skills and competencies necessary for higher labour productivity. Very few firms undertake regular training needs assessment exercises to inform government on major skills gaps.

5.3 Assessment of Cost Implications of Mismatch Between Skills Needs and Availability

During the survey, firms were asked to indicate whether they retrained their employees and the cost of such training.

Hotels: Results show that 20 managers of 21 respondent firms were trained in 2004 at a cost of Ksh 25,750 in customer service, marketing, foreign languages, management, first aid and energy management skills. At the level of skilled production/service workers, 150 workers were trained at a cost of Ksh 50,000, mainly in foreign languages, first aid and energy management.

ICT services: Eight (8) managers were trained with firms spending between Ksh 10,000 and Ksh 1,500,000 in 2004, mainly in production/ service technology, general computer skills and quality assurance. In addition, three professionals were trained by one firm at a cost of Ksh 2 million in quality assurance. Another one firm trained four unskilled production/ workers in service technology. Twenty other employees were trained by two other firms at a cost of between Ksh 50,000 and 700,000 in production/ service technology, management and leadership-related skills and quality assurance.

Transport services: Firms spent between Ksh 58,000 to Ksh 3,700,000 to train different cadres in general computer skills and marketing to managers (2 trained), professionals (10 trained) and skilled production/service workers (220 trained). In travel services, one firm trained three skill production/ service workers at a cost of Ksh 30,000 in information technology.

5.4 Linkages Between Education and Training, and Industry and Labour Market

Education and industry linkages are important particularly in communicating information on skills needs from industry to formal learning institutions. This is particularly important given the new skills needs occasioned by such factors as globalization, technological and production changes. However, many firms in the study sectors have no system in place to enable education and training institutions know the varied skills needs at firm level. Figure 2 shows the percentage of firms with or without communication systems.

For instance, in the hotels sector, 93 percent of the survey firms did not have a communication strategy of skills needs to the education and training institutions. The proportion of firms without a system of communicating their training needs to other sectors is equally high: Manufacturing (79%); finance services (63%); information and communication technology (76%); Tourism and hotels (58%); insurance (67%). The high level of existence of communication systems in the tourism and hotels sector is attributed to the role played by the Kenya Utalii College, under the Ministry of Tourism, which offers specialized training for the hotels sector and other tourism-related courses.

Participating firms were asked whether they have any system of informing training institutions about their skill requirements (Table 8).

Manufacturing: Out of the 24 firms that responded, only 5 (21%) indicated they have such a system. Systems included performance appraisal of employees, industrial training, liasing with Directorate of Industrial Training,

Kenya Association of Manufacturers and Federation of Kenya Employers to communicate on their behalf and, finally, contacting the training institutions and universities directly (1 firm)

Financing services firms: About 37% (10) of the firms indicated that they communicate their training requirements to training institutions by:

- Conducting training needs analysis and making the results known through labour market systems
- Participating in surveys conducted by Kenya Institute of Bankers.
- Membership to Kenya Bankers Association, which is charged with the responsibility of communicating training requirements
- Giving an internship report to the training institution
- Job advertisements spelling out the required skills (through the labour market)
- Training projections to identify the type of skills and quantity required in future

Hotels: About 42 percent (8) of the firms indicated that they communicate their training requirements to the training institutions through:

- Contact colleges and universities (5 hotels)
- Placement for refresher courses at Utalii College

ICT services: About 24 percent (4) of the firms indicated that they communicate their training requirements to the training institutions. They did this through:

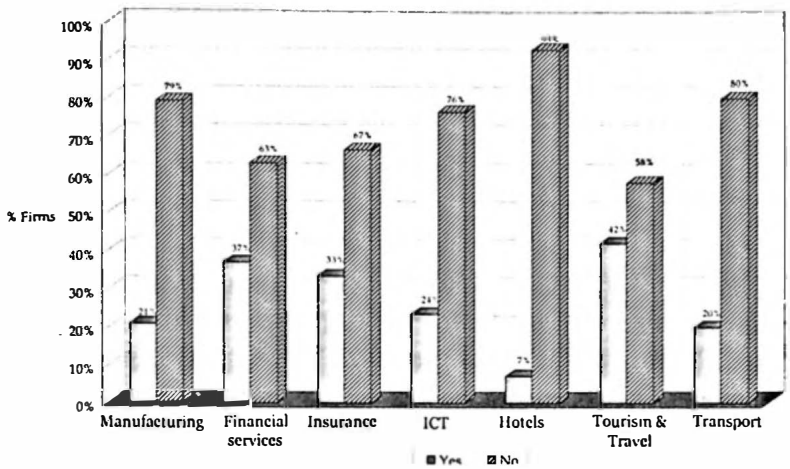
- Performance management and appraisal
- Setting-up a training facility at Mbagathi (TelKom)
- Information leaflets/brochures

Insurance firms: One insurance firm (out of 3 responding) indicated that it communicates its training requirements to the training institutions by providing attachment programme to students, employment of students when on vacation and career education.

Transport service: Two of the ten firms used in the sample indicated that they communicate their training requirements to training institutions through:

- Training manuals to be used as a resource in curriculum development
- Information posted on the website

Figure 2: Percentage of firms with communication strategy on skills needs with industry



Source: Field data

Table 8: Proportion of firms communicating their training requirements to training institutions

Firm type	Observations	Proportion (%)
Manufacturing	24	21
Financial services	10	37
Hotels	8	42
ICT	4	24
Insurance	3	33
Transport services	10	20
Travel Services	14	7
All firms	73	26

Source: Field data

Travel firms: One travel firm (out of 14 responding) indicated that it communicates its training requirements to training institutions by sending its employees for training at Kenya Utalii College.

5.5 Empirical Results on Contribution of Skills to a Country's Competitiveness

Regression results consist of the within fixed effects using the pooled panel data on the EGLS specification of equation 5. The equation is estimated using pooled data for 84 countries. Summary statistics are given in Table 9. The mean (log) values for high technology exports as percentage of total merchandise, foreign direct investments as percentage of gross capital formation, GDP at purchasing power parity, HMI and engineering index were 0.74, 0.35, 3.86, 0.87, and 0.45, respectively. Table 10 and Annex Table 4 present empirical results on factors that contribute to a country's competitiveness and relationship between skills and competitiveness.

The factors include levels of foreign direct investments, skills levels and associated participation in secondary and tertiary education, and a country's macroeconomic stability. The discussion of these factors follows.

Table 9: Summary statistics

	LN_HIGHTECH?	*LN_FDI1?*	*LN_GDPPPP?*	*LN_HMI2?*	*LN_ENGINDEX?*
Mean	0.748533	0.355120	3.865834	0.875007	0.458420
Median	0.878676	0.435988	3.920098	0.979500	0.579784
Maximum	1.874814	1.573431	4.576776	1.627900	1.356094
Minimum	-1.742237	-1.400744	2.691279	-0.492000	-1.371115
Std. Dev.	0.673104	0.478927	0.479169	0.401429	0.571925
Skewness	-0.998576	-0.642498	-0.509522	-1.071357	-1.017045
Kurtosis	3.891504	3.649620	2.465918	3.921791	3.446268
Jarque-Bera	83.51006	36.19501	23.10951	94.98944	75.71118
Probability	0.000000	0.000000	0.000010	0.000000	0.000000
Sum	313.6355	148.7955	1619.785	366.6279	192.0782
Sum Sq. Dev.	189.3828	95.87704	95.97397	67.35860	136.7268
Observations	419	419	419	419	419
Cross sections	84	84	84	84	84

*Standard errors appear in parenthesis; *** Significant at 1 percent and ** significant at 5 percent.*

Table 10: Pooled EGLS (cross-sectional weights) results (linear estimation after one-step weighted matrix)

Variable	All countries EQN1
Foreign Direct Investments	0.020**
	(0.009)
Gross Domestic Product at Purchasing Power Parity	0.335***
	(0.119)
Harbison Myers Index	0.252***
	(0.078)
Engineering Index	0.019***
	(0.039)
Constant	-1.297***
	(0.369)
Fixed Effects (Cross) for selected countries	
Kenya	0.519
Malaysia	0.974
South Africa	0.022
United States of America	0.386
United Kingdom	0.320
Korea	0.460
Japan	0.370
India	0.201
Tanzania	0.452
R^2	0.99
Adjusted R^2	0.99
Sample Adjusted	1999-2003
Total included observations after adjustments	5
Cross sections included	84
Total pool (unbalanced observations)	420

Level of skills development (HMI)

Skills are essential for a country's competitiveness, especially in the production of high technology outputs. The impact of skills on competitiveness was captured through the Harbison Myers Index. According to the results, skills availability has a positive and significant impact on high technology exports. Any improvement in high technology exports requires a skilled labourforce, with secondary and tertiary education.

Production of high technology, and or knowledge-intensive outputs, requires highest levels of competence, with relevant skills on creative design, innovation and efficient production technology. The base for most of these skills is mainly secondary-school education.

Secondary education gross and net participation rates for most less developed countries are relatively low. The developed economies consistently record high competitiveness index (Table 4).

Gross Domestic Product at purchasing power parity (GDPppp)

Gross Domestic Product at purchasing power parity provides a general macroeconomic measure in the estimation. It enabled controlling for macroeconomic factors that are expected to have substantial implication on production of high technology outputs and hence competitiveness. The results show positive and significant relationship between GDPppp and competitiveness measure. Thus, for a country to remain competitive, it should have most of the fundamentals right, including high and stable GDPppp levels.

Foreign Direct Investments (FDI) and competitiveness

Foreign Direct Investment as a share of any country's overall investment can either have a positive or negative effect on competitiveness depending on how best the resources are utilized for improved production. The levels of FDI are higher for technologically-advanced economies that, to a large extent, produce high technology and differentiated outputs, compared to the less developed economies. In the recent past, most developing economies have benefited significantly from FDI. For instance, in 1997, FDI to the leading 10 developing economies[6] was estimated at 75.9 percent (Lall, 1999).

According to the empirical results, FDI has a positive and significant impact on competitiveness. Most developing countries receive low foreign direct investments, especially those in the sub-Saharan Africa, Kenya included, which contributes to low competitiveness leverage.

Engineering index (ENGINDEX)

The level of human capital development, especially critical skills development and its impact on competitiveness can also be observed through the number of skilled manpower, e.g. engineers and scientists, who have acquired high level technical skills necessary in production of high technology products. In this study, we capture the impact of engineering by computing an index that represents the proportion of students enrolled in engineering courses in tertiary institutions. The index has a positive effect on the levels of high technology exports produced in the countries.

[6]These are China, Brazil, Mexico, Singapore, Argentina, Chile, Indonesia, Venezuela, Malaysia and Thailand.

6. Conclusions, Emerging Issues and Policy Recommendations

6.1 Conclusions

This study has shown the status of skill needs and availability in Kenya with findings pointing to the following conclusions:

(i) There is a mismatch between firms' skills needs and what is available in the labour market.

(ii) There are no formal industry-training institutional linkages to enhance skills development at both on- and off-campus.

(iii) Skills availability is a significant contributor to a country's competitiveness in a rapidly changing and demanding world.

(iv) Secondary education and training in technical courses such as engineering is important for a country's competitiveness.

(v) Kenya has a shortage of skilled manpower especially in technical areas such as engineering.

(vi) There exits institutionalized on-the-job training programmes in various firms that provide company-specific and general skills to new employees. This increases labour costs in such firms, and especially when such internally-trained workers leave the firms to work elsewhere.

In all, the new technological paradigm imposes demands on the existing narrow base of skills and knowledge. Kenya will have to develop its skills and knowledge base to deal with this demand in a way that leads to sustainable growth and technological advancement.

6.2 Emerging Issues and Policy Recommendations

Emerging issues include:

(a) Establishing a skills training policy and strategy

The proposed National Training Strategy should, among other issues, incorporate best practices from other countries, including supporting private sector participation in TIVET provision and financing, and establishing a

TIVET system that produces skills relevant to the private sector and public sector as well.

(b) Review the legislative and institutional framework of technical education and skills development

Skills development and training system in Kenya is governed by a wide range of legislative frameworks under different public agencies that provide guidelines on provision of training activities, leading to poor coordination, duplication of activities and inefficient utilization of available scarce resources. It is hoped that the ongoing review of the education and training legal framework will address this challenge.

c) Develop feasible skills development strategy involving public-private sector partnerships

The study confirms the need for the government commitment to develop a National Training Strategy. Only a small proportion of firms are able to communicate their training needs to learning and training institutions. This impacts negatively on the development of relevant skills, which are a prerequisite for enhanced competitiveness. There is need to involve professionals from the private sector in the process. The strategy should comprehensively address issues on TVET provision, development of skills for sustainable growth and competitiveness, regulation of training quality through qualification standards, certification, financing and management.

d) Address issues of producing qualified technical graduates in various fields

Kenya lacks technical skills in the respective sectors. In information and communication technology, for instance, there is need for broadcasting technical skills, managerial and ICT skills. In the manufacturing sector, skills required but unavailable in the local market include engineering, modern manufacturing systems, and enterprise resource planning. These new skills needs are associated with technological change, need for skills upgrading in order to cope with market requirements, challenges related to competitiveness, and changing customer needs and business expansion. Since employers are looking for employees with multi-skills, future training strategy should endeavour to promote education and training programmes that enable inculcation of multi-skills to trainees. This may also require that trainers/ lecturers in tertiary institutions also undergo regular on-the-job pedagogical training to upgrade their skills for quality service delivery.

e) Enhance effectiveness of technical and vocational education and training system, including skills development

Technical institutions in the country suffer from various constraints, including inadequate funding, obsolete equipment, curriculum, instructional capacity, and limited relevance of the curriculum to the market skills needs as may be required by industry. There is need for a comprehensive review of the technical education sector with particular focus on addressing the mismatch between skills supply and demand in both formal and informal sectors.

f) Promote the role of private sector in development of TIVET and skills development

Most firms offer training at firm level and there is limited interaction with the education and training institutions on their training needs. This imposes additional cost on the respective firm, whose reimbursement may not be claimed from the training levy managed by the DIT. This situation is made worse by lack of clear skills training policy and the limited inter- and intra-firm training initiatives and capacity development. Based on the lessons learnt from other countries, particularly the Asian countries that have earned considerable competitive edge in their production sectors, Kenya needs to enhance private sector participation in skills development in the formal institutions and technical and vocational education and training.

Further, policies for promoting employment, education and skills development for sustainable economic development should be geared towards qualitative dimensions in terms of higher skills and productivity, compared to qualitative dimensions. Reforms in education system should focus on expansion and improving the quality of post-primary education, especially in science, technical and engineering courses in technical training institutions, universities, polytechnics and schools. Other initiatives include development of science parks and increased resource mobilization in innovation programmes, research and development.

Finally, it is critical that the country undertakes a skills inventory for the country. This should also be based on such standards as International Standard Classification of Occupations (ISCO) and Kenya National Occupations Standards (KNOCS), giving cognizance to implications of technological developments and globalization on labour markets.

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Annexes

Annex Table 1: Skills demand and shortages in surveyed firms

Sector	Skills required by firm(s)	Skills available in abundance	Skills not available (scarce) in abundance
Manufacturing, n=37	• Quality assurance skills • Sales and marketing • Customer care • Team working • Information technology (IT) • Mechanics • Baking skills • Rubber technology and related skills • Communication skills • Action planning • Welding • Analytical problem skills	• Production skills • Quality assurance skills • Customer care • Team working • Baking skills • Communication skills	• Sales and marketing • Information technology (IT) • Mechanics • Rubber technology and related skills • Action planning • Welding • Analytical problem skills • Production skills
Financial institutions, n=28	• IT/ICT, computer literacy • Accounting • Customer care • Quality assurance • Human resource management • Cooperative principles • Action planning • Analytical problem-solving • Supervisory • Clerical skills	• IT/ICT, computer literacy • Accounting • Customer care • Action planning • Clerical skills	• Quality assurance • Human resource management • Cooperative principles • Analytical problem-solving • Supervisory
Insurance, n=3	• Insurance • IT/ ICT/ Computer literacy • Secretarial, front office • Operations • Customer care • Accounting • Underwriting • Financial management • Credit control • Accounting	• Customer care	• Insurance • IT/ ICT/ Computer literacy • Secretarial, front office • Operations • Accounting • Underwriting • Financial management • Credit control • Accounting

Sector	Skills required by firm(s)	Skills available in abundance	Skills not available (scarce) in abundance
ICT, n=18	• Customer care • IT/ICT, computer literacy • Quality assurance • Supervisory • Phone servicing • System development	• Customer care • IT/ICT, computer literacy	• Quality assurance • Supervisory • Phone servicing • System development
Hotels, n=18	• Customer care • IT/ICT, computer literacy • Catering • Supervisory • Action planning • House keeping	• Customer care • IT/ICT, computer literacy • Action planning • House keeping	• Supervisory
Tourism and travel, n=14	• Customer care • Action planning • Team working • IT/ICT, computer literacy • Quality assurance • Analytical problem-solving • Foreign languages • Accounting • Travel consultancy • Driving • Travel consultancy • Driving	• Customer care • Action planning • IT/ICT, computer literacy • Quality assurance • Marketing • Travel consultancy • Driving	• Team working • Analytical problem-solving • Foreign Languages • Accounting
Transport, n=10	• Technical skills/ Knowledge (not specified) • Driving • Engineering • Customer care • Accounting	• Technical skills/ Knowledge (not specified) • Driving • Engineering • Customer care • Accounting	• None

Annex Table 2: List of definition of skillss

S. No. **Skill**

People Skills

1 ***Customer orientation:*** The ability to establish a confident and flexible relationship with people important to the employer/company. Welcoming, friendly, caring, approachable, constructive, accommodating, tactful, diplomatic, and tolerant.

2 ***Leadership:*** The ability to take control of a situation and to lead by empowering others to follow. Having the vision and innovation to move forward. Dynamic, motivator, team-builder, confidence booster, energetic, capable, outward-looking, accountable, visionary.

3 ***Presentations Skills:*** Ability to organize information and communicate through public presentations using a variety of media, including overheads and PowerPoint presentations.
Oral/written communication: Ability to listen, speak and write, in order to transmit or receive information clearly.

4 ***Team working:*** The ability to work effectively in teams, often more than one team at once, and to be able to re-adjust roles from one project situation to another in an ever-shifting work situation. Supportive, facilitator, organised, co-ordinator, deliverer, imaginative, delegator, open-minded.

Self-reliance Skills

5 ***Action planning and self regulation:*** Self discipline, time-keeping, the ability to deal with stress, to plan and prioritise your workload and to "juggle" several tasks at once. Decision-maker, planner, organised, negotiator, responsive, evaluator, forward thinker, target-driven, able to prioritise.

6 ***Networking:*** For successful personal development, it is vital to build contacts throughout your working life. The process of finding people who are ready, willing and able to help you is the basis of this skill. Initiator, trustful, personable, relationship-builder, persistent developer, resourceful, respected.

7 ***Self-awareness/confidence:*** Self-confidence, self awareness, self belief, self sufficiency, self direction and self promotion. Purposeful, focused, reflective, perceptive, honest, self-belief, objective, realistic, balanced.

Generalist Skills

8 ***Flexibility and adaptability:*** The ability to respond to change, to pre-empt change and ultimately to lead change. Understanding of work-based culture. Multi-disciplinary, flexible, versatile, multi-skilled, willing, obliging, adaptable.

9 ***IT/ICT/computer literacy:*** The ability to accept, learn and adapt to new technology and make the most of the opportunities it presents. IT skills, software packages, common sense, task-oriented, progressive, specific, office skills, keyboard skills, electronic communication, e.g. internet, email, fax.

10 ***Analytical problem solving/intellectual:*** The ability to analyse, critique and synthesise information in order to solve problems. Achiever, successful, results-orientated, project management, creative, practical, logical, astute, agile mind.

11 ***Supervisory skills***: Ability to assign and coordinate projects, and ensure that the work is done on time and to quality standards. These skills are especially valuable when combined with experience doing the work of those being supervised.

12 ***Quality assurance skills:*** Ability to apply statistical formulae to assess production performance, set standards for output, and establish inspection programmes. Knowledge of international standards such as ISO 9000. Ability to use Co-ordinated Measuring Machines (CMM).

Specialist Skills

13 ***Company-specific:*** Meeting the skill requirements of the company either on recruitment or on-the-job, being prepared to adapt and learn new skills to meet future "commercial" needs: specialist knowledge, e.g. product or market knowledge; specialist skills, e.g. IT packages; unique language skills, e.g. Chinese; specialist interpersonal skills.

14. ***Technical skills/knowledge:*** An understanding of basic principles rather than large stocks of specialist knowledge. Professional, sector-based or functional skills, e.g. journalism, research, aerospace engineering, tax accounting, counselling, creative design, economist, personnel, sales, marketing.

Annex Table 3: Comparisons between generic skills requirements and availability (%)

Sector/Type of skill and rating	Weak		Average		Strong	
	Available	*Required*	*Available*	*Required*	*Available*	*Required*
Information Communication Technology						
People's skills	8	17	31	18	61	65
Self-reliance	9	19	37	17	53	65
Generalist skills	12	19	33	14	55	67
Specialist skills	3	16	30	14	68	69
Financial						
People's skills	2	13	33	9	66	78
Self-reliance	5	10	38	10	57	81
Generalist skills	5	13	31	19	64	68
Specialist skills	0	27	18	19	82	54
Manufacturing						
People's skills	18	21	32	19	50	60
Self-reliance	13	20	41	27	46	53
Generalist skills	14	15	43	24	42	62
Specialist skills	22	11	38	20	40	68
Hotels & Restaurants						
People's skills	14	21	25	19	61	60
Self-reliance	14	20	35	27	51	53
Generalist skills	18	15	28	24	54	62
Specialist skills	17	11	14	20	69	68
Insurance						
People's skills	0	21	8	19	92	60
Self-reliance	0	20	22	27	78	53
Generalist skills	0	15	40	24	60	62
Specialist skills	0	11	0	20	100	68
Transport						
People's skills	8	26	28	23	65	51
Self-reliance	3	20	33	27	63	53
Generalist skills	9	16	38	25	53	59
Specialist skills	11	11	37	20	53	70
Travel						
People's skills	7	13	9	9	84	78
Self-reliance	7	10	22	10	71	81
Generalist skills	7	13	21	19	72	68
Specialist skills	4	27	30	19	66	54

Annex Table 4: Pooled EGLS and fixed effects model results

Dependent Variable: LN_HIGHTECH?
Method: Pooled EGLS (Cross-section weights)
Date: 02/21/07 Time: 09:43
Sample (adjusted): 1999 2003
Included observations: 5 after adjustments
Cross-sections included: 84
Total pool (balanced) observations: 420
Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic
C	-1.297121	0.369213	-3.513202
LN_FDI1?	0.020138	0.008937	2.253388
LN_GDPPPP?	0.335320	0.119541	2.805056
LN_ENGINDEX?	0.018871	0.039438	0.478500
LN_HMIINDEX5?	0.252350	0.078577	3.211489
Fixed Effects (Cross)			
Austria	0.049739		
Belgium	-0.188145		
Bulgaria	-0.370893		
Croatia	0.085721		
Czech Republic	0.025166		
Denmark	0.153402		
Estonia	0.246852		
Finland	0.224388		
France	0.273072		
Germany	0.164505		
Greece	0.018539		
Hungary	0.422395		
Iceland	-0.117961		
Ireland	0.534110		
Italy	-0.111037		
Latvia	-0.322323		
Lithuania	-0.363780		
Netherlands	0.367899		
Norway	0.092076		
Poland	-0.478562		
Portugal	-0.255307		
Romania	-0.232035		
Russian Federation	0.240892		

Slovak Republic	-0.310562
Slovenia	-0.364881
Spain	-0.211046
Sweden	0.119013
Switzerland	0.209832
Turkey	-0.214920
Ukraine	-0.138054
United Kingdom	0.319897
Egypt, Arab Rep.	-1.016975
Israel	0.312088
Jordan	-0.060396
Morocco	0.532870
Tunisia	-0.272455
Botswana	-1.121851
Ethiopia	-0.768888
Gambia, The	0.431113
Ghana	-0.144037
Kenya	0.519082
Madagascar	0.432891
Malawi	-0.135205
Mauritius	-0.660633
Nigeria	-0.468142
South Africa	0.021739
Tanzania	0.452328
Uganda	1.018272
Zambia	0.231394
Zimbabwe	-0.185417
Canada	0.094187
United States	0.385849
Argentina	-0.063394
Bolivia	0.735321
Brazil	0.346866
Chile	-0.332781
Colombia	0.155906
Costa Rica	0.930686
El Salvador	0.208063
Guatemala	0.415775
Honduras	-0.636042
Jamaica	-1.861849
Mexico	0.538734
Nicaragua	0.085667
Panama	-1.292366
Paraguay	-0.101758
Peru	-0.268609
Trinidad and Tobago	-0.536254
Uruguay	-0.502407
Venezuela, RB	-0.253233
Australia	-0.036887
China	0.659562

Hong Kong, China	0.334544
Indonesia	0.566923
Japan	0.370760
Korea, Rep.	0.460316
Malaysia	0.974625
New Zealand	-0.030671
Philippines	1.159128
Thailand	0.713005
Vietnam	-0.380837
Bangladesh	-1.328722
India	0.201592
Pakistan	-0.697467

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.998377	Mean dependent var	3.56
Adjusted R-squared	0.997952	S.D. dependent var	4.24
S.E. of regression	0.191925	Sum squared resid	12.2
F-statistic	2347.243	Durbin-Watson stat	1.70
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.927643	Mean dependent var	0.74
Sum squared resid	13.70776	Durbin-Watson stat	1.78

Related KIPPRA Publications

Manda, D. K. (2004). *Globalisation and the labour market in Kenya*. KIPPRA Discussion Paper No. 31, Nairobi: Kenya Institute for Public Policy Research and Analysis.

Manda, D. K., Kosimbei G. K. and Wanjala, B. (2007). *Impact of minimum wages on formal employment in Kenya*. KIPPRA Discussion Paper No. 67, Nairobi: Kenya Institute for Public Policy Research and Analysis.