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Tertiary Education and Industrial Development in Ghana

Simon Bawakyillenuo
Isaac Osei Akoto
Clement Ahiadeke
Ellen Bortei-Doku Aryeetey
Edem Kweku Agbe

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TERTIARY EDUCATION AND INDUSTRIAL DEVELOPMENT IN GHANA

PREPARED BY

Simon Bawakyillenuo
Isaac Osei Akoto
Clement Ahiadeke
Ellen Bortei-Doku Aryeetey
Edem Kweku Agbe

Institute of Statistical, Social and Economic Research (ISSER), University of Ghana, Legon

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ABSTRACT

Accelerated industrial growth is one of the priorities of Ghana in order to boost the welfare of her citizenry as well as economic development. This therefore, requires that tertiary education provides graduates with job-relevant skills to meet the demands of industry and the economy as a whole. Based on this overarching development objective, the Ministry of Finance and Economic Planning (MOFEP); The Association of Ghana Industries (AGI); the National Council for Tertiary Education (NCTE); and the Ministry of Trade and Industry (MOTI) have in various national documents called for the need to build effective and strong linkages between tertiary education and industry. On the backdrop of these expressed needs of policy makers coupled with the imperativeness of the subject matter, this study was initiated, with its main thrust being the unravelling of the elements of mismatch between tertiary education and the needs of industry in Ghana and the factors underpinning the mismatches.

Using an eclectic mix of methodological approaches – quantitative and qualitative methods, the study was conducted in tertiary institutions and firms within the Greater Accra Region, Association of Ghana Industries (AGI), government agencies mandated to govern tertiary education delivery in Ghana and among graduates of tertiary institutions. Fundamentally, the mismatches uncovered included the insufficiency of certain skills in the labour market that are highly needed by firms: the ability of graduates to analyse data/situations and propose solutions, leadership and innovation, technical skills, and graduates' ability to take responsibility of own actions and inactions; and the lack of employment opportunities in the labour market. The foundations of these mismatches were unearthed to include the following eight (8) subcomponents: inadequate tertiary education provisions vis-à-vis provisions in Ghana's industrial policy; ineffectiveness of institutions charged with oversight responsibility for ensuring quality in tertiary education; poor integration of relevant stakeholders; absence of a national development plan linked to tertiary education; inadequate funding; inadequate personnel/ infrastructure at tertiary institutions; the shift in focus of some tertiary institutions; and industrial Challenges. The study further unraveled that the mismatches between tertiary education and skills need of firms have three major effects on the Ghanaian economy: labour market effect, productivity effect, and development effect.

Based on these findings, the study recommended the need to develop a long-term national development plan and a comprehensive tertiary education policy situated within the long-term developmental objectives of the country; revamp the tertiary education governing bodies; enhance both vertical and horizontal integrations among stakeholders in the tertiary education sector; boost up funding for tertiary education; mainstream entrepreneurship course into all departments' programmes; promulgate a legal instrument to compel industries to open up for research; create a greater enabling environment for the private sector and industry to thrive; and create an integrated platform for dialogue on national provisions for tertiary education and the needs of the Ghanaian economy.

1. INTRODUCTION

Accelerated industrial growth is one of the priorities of Ghana in order to boost the welfare of her citizenry as well as economic development. To achieve these goals several factors including, building competent human resource base are required. This therefore, requires that tertiary education provides graduates with job-relevant skills to meet the demands of firms and the economy as a whole. As a result many state agencies, ministries and the private sector in Ghana are expressing interests on the need to make tertiary institutions more relevant to the holistic development of the country. For instance, in the Medium-Term National Development Policy Framework: Ghana Shared Growth and Development Agenda (GSGDA), 2010-2013 (2010), the Ministry of Finance and Economic Planning (MOFEP) prioritizes enhancing the relevance of tertiary education for socio-economic development. MOFEP recognises the indispensability of establishing linkages between the content of tertiary education and the needs of the labour market in order to achieve this socio-economic development. In addition, MOFEP identifies the necessity of adopting policy strategies to promote science and technical education at all levels in order to achieve the Millennium Development Goals (MDGs) and to promote accelerated industrial growth.

Similarly, the National Council for Tertiary Education (NCTE) has expressed an interest in enhancing the relevance of tertiary education in the country, as it planned to rank tertiary institutions based on the relevance of their programmes to national development and income generation. In its strategic plan for 2010 – 2014 the NCTE further seeks to formulate broad policy framework on applied research in priority areas for national development in tertiary education institutions. Also, the Association of Ghana Industries (AGI) clamours for suitably qualified graduates to increase industrial productivity. In the 2010 Ghana Industrial Policy, the Ministry of Trade and Industry (MOTI) did acknowledge the problem of inadequate skills-relevant human resource base confronting all the sectors of industrial development in Ghana. MOTI therefore recommended the urgent need to support tertiary institutions to train the nation's labour force in skills needed to promote sustainable industrial productivity and growth.

Even though the mismatch phenomenon between the skills possessed by graduates and those needed by firms has been widely acknowledged and reported in Ghana, comprehensive and empirical assessments exploring its nature and extent as well as the underpinning factors of the

mismatch are scarce. King et al (2006) (cited in World Bank, 2008 p.72) noted that in Ghana there has been virtually no empirical research investigating how effectively the skills acquired by graduates are being translated into the labour market. Thus, policy making is not rooted in evidence-based arguments to meet the objectives of the training schemes of the graduates. Atta-Quayson (2007) for instance has argued that the educational sector operates on the assumption of an educational system with a structure and content which reflect the socio-economic, environment and manpower needs of the country even when such needs have not been empirically assessed.

On the backdrop of these outlined needs of policy makers coupled with the imperativeness of the subject matter, this study seeks to unravel the elements of mismatch between tertiary education and the needs of industry in Ghana, and the factors underpinning the mismatches. By unearthing the key issues surrounding the disconnect between skills of graduates and the needs of industry, this study will contribute to improving the relevance of tertiary education, both in terms of its provision of job-relevant skills and its alignment with the needs of the labour market. This broad aim will be achieved by ascertaining answers to the following questions:

1. To what extent does tertiary education meet the requirements of job-skills required in industry?
2. What can be done for tertiary education programmes, in both public and private institutions, to be shifted towards the demands of industry?
3. Under what conditions will the ideal structures of tertiary education function in Ghana?
4. How have other countries aligned tertiary education to meet the demands of a transforming economy in times of accelerated industrial growth?

The rest of the paper is segmented as follows: section two reviews relevant literature on the subject matter as well as the establishment of a conceptual framework to shape the paper; section three deals with the methodological approach used to investigate the topic; section four discusses the mismatches between job-skills requirements by firms vis-à-vis the skills of tertiary graduates; section five encompasses the analysis on the foundation of mismatches; while the paper is concluded with some recommendations in section six.

2.0 LITERATURE ON HIGHER EDUCATION AND DEVELOPMENT LINKAGES

The widespread recognition of higher education as a major driver of economic competitiveness has made tertiary education more important than ever in both industrial and developing countries. The World Bank (2003) notes the importance of a knowledge based economy for sustainable development premised on higher education. Tertiary education has therefore become central to this development agenda. The Organisation for Economic Co-operation and Development (OECD) (2008) defined four major means by which tertiary education contributes to social and economic development:

- The formation of human capital (primarily through teaching);
- The building of knowledge bases (primarily through research and knowledge development);
- The dissemination and use of knowledge (through interaction with knowledge users);
- The maintenance of knowledge (primarily through inter-generational storage and transmission of knowledge).

Many countries, especially OECD and transitional economies have responded to these four pillars advocated by OECD (2008) through significant investment in higher education and other knowledge generating activities (Yusuf, 2008). Developing countries are also witnessing an expansion of higher education, although slower than the developed countries, because of the myriads of challenges faced by tertiary education systems (World Bank, 2008).

2.1 Tertiary education and economic development

The contribution of higher education to economic growth and development has been debated over the years. It has been argued that, tertiary education has been neglected as a means to improve economic growth and development in the past (Bloom et al, 2005; Pillay 2010). The inattention to higher education within development initiatives according to Bloom et al (2005) and Pillay (2010) is due to unavailability of empirical evidence; thereby affecting growth and development in an economy. The theory of "human capital" for instance posits that higher education yields no benefit to society apart from the benefit that accrues to the individual students (Friedman and Friedman, 1979). In furtherance, it hypothesizes that an investment in

higher education may promote "social unrest and political instability". Vedder (2004) questioned the link between public investment in higher education and economic development. Accordingly, none of the states in the USA spending more on higher education have faster economic growth than states with lower spending (Vedder 2004). This finding supported the position of Friedman and Friedman (1979) that higher education yields no social benefits to the society.

Bloom et al (2005), however, challenged the long-held notion that higher education contributes little to social and economic development. Accordingly, a year's increase in the total education stock in Africa could raise productivity, output and GDP in Sub-Sahara African by 0.63 percent (Bloom et al, 2005). The findings corroborated other findings that higher education enhances economic development in poor developing countries through technological catch-up.

The work by Payea and Baum (2005) on the benefits of higher education also concluded that higher education benefits not only the individual, but society as a whole. In discussing the monetary benefits to society, they argued that in addition to widespread productivity increases, the higher earnings of educated workers generate higher tax revenue to the state and consistent productive employment reduces dependence on public income transfer programs. Payea and Baum (2005) further identified ways by which society derives non-monetary benefits from higher education: increase in the level of civic participation such as voting and governance: development of positive perception and attitude towards health by graduates, etc. In its study in 2008, the World Bank supported the argument that higher education contributes to economic growth since tertiary education can help developing economies keep up with more technologically advanced societies. Higher education graduates are likely to be more aware of and better able to use technologies, more likely to develop new tools and skills themselves (World Bank, 2008).

The acceleration of economic growth and technology development in any country hinges on a strong link between university and industry (Yusuf, 2008). As a result every industrialized country is striving to make university-industry link a centerpiece of their innovation system, to increase productivity, sustain progress and remain competitive in the global economy. The strength and success of this approach is the notion of triple helix – that is, the symbiotic relations between the government, the universities and the business community/industry (Elzkowitz, 2002). In this regard, Hatakenaka (2006) observed that the confluence of interests has led

universities and industry to work together, and for governments to create supportive environments for such partnerships. Various studies have noted that the rapid transformation and development of the newly industrializing countries such as China, India, Singapore, Brazil, among others are attributed to effective university-industry links. According to studies including (Jiang et al, 2007; Wu, 2007; Wong, 2007) strengthening partnership between tertiary institutions, industry/labour market and government is a means to augmenting the innovation capability of these economies. As a result firms in these countries are attaching more importance to developing links with universities that relate to programmes' development, recruitment of graduates, internships and consultancies.

Even though access to higher education is expanding in Africa, recent studies (Azcona et al, 2008; World Bank, 2007) indicated that it is the levels of quality in the education received and not merely enrolment rates or years of school, which are strong predictors of long term economic growth. Azcona et al (2008) observed that the rise in higher educational attainments in Sub-Sahara Africa is not accompanied by quality training and skills development. The decline in quality and relevance of tertiary education according to some analysts and researchers (Bloom et al, 2005; Pillay, 2011; World Bank, 2007) are generally attributed to inadequate funding, low levels of investment in research and development; and weak linkages between tertiary institutions and industry. The cumulative effect of these problems is a mismatch between the skills, which graduates acquire from tertiary institutions and those that are sought after in the labour markets.

Studies including (Boateng and Ofori-Sarpong, 2002; Dabalen et al, 2001; International Labour Organisation (ILO), 2011) show that although there are large numbers of unemployed graduates in the African continent many enterprises struggle to fill open positions. In Egypt for example, it is estimated that about 1.5 million graduates from tertiary institutions are unemployed (ILO, 2011) while at the same time private sector firms cannot fill 600,000 vacancies. In South Africa, an estimated 3 million young people are unemployed, of which 600,000 are university graduates versus 800,000 vacancies that are unfilled (The Economist, 2012).

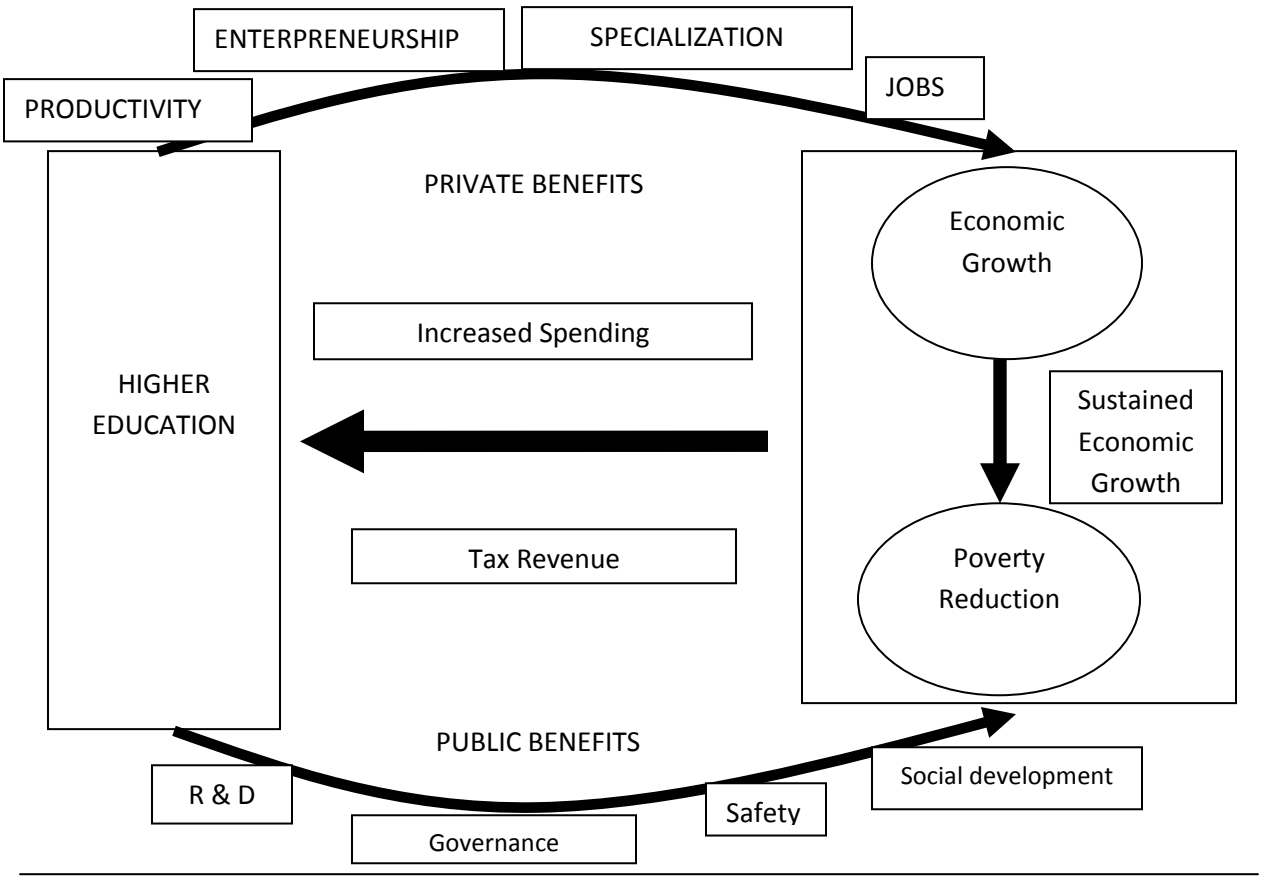
2.2 Conceptual models linking higher education to economic growth

Conceptual models and frameworks linking higher education to development that have been reviewed in this paper include those by Bloom et al, 2005; Nikolopoulou et al, 2010; Moore and Ulrichesen, 2010. The review of these models has helped shape the development of the conceptual framework for this paper.

2.2.1 Bloom et al's (2005) model higher education and economic development

Bloom et al, (2005) developed a conceptual model that shows that higher education can lead to economic growth through both private and public channels (Figure 1). The private benefits identified include better employment prospects, higher salaries, and a greater ability to save and invest. On the other hand, the public benefits include increase in tax revenue for government for social development, governance, safety and research and development (Bloom et al, 2005).

Figure 1 Conceptual framework leading higher education to economic growth (Bloom et al, 2005)



Source: Bloom et al (2005)

Bloom et al (2005) supported their conceptual model and linkages empirically by assessing improvement in labour productivity and output per worker as levels of tertiary education increase in Africa. Accordingly, Africa appears to be 23 percent lower than its production possibility frontier, which is the highest productivity gap compared to all regions of the world. Their study investigated two different means by which tertiary education can improve economic growth:

i. Raising GDP through productivity; and

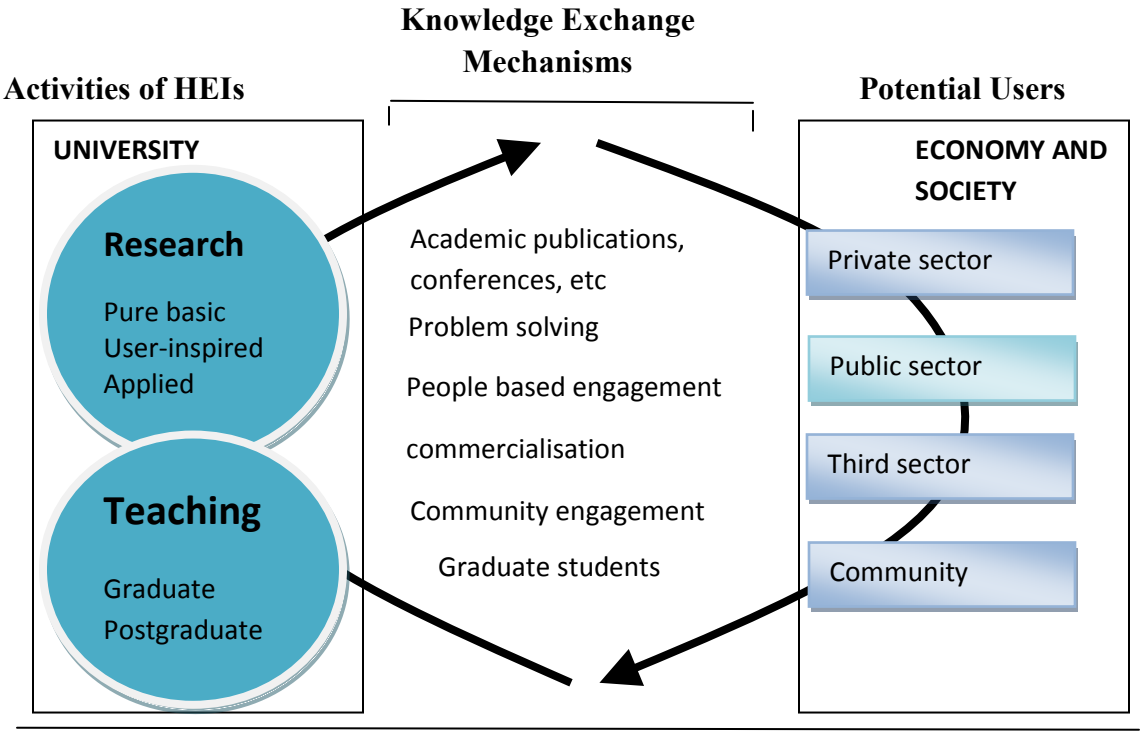
ii. Increasing the speed at which a country adopts technology and raises its total factor Productivity.

The study found out that a one year increase in the total education stock in Africa would raise GDP by 0.24 percent points per year; and a one year increase in tertiary education stock would raise productivity and output by an added 0.39 percent per year. This generates a total increase of 0.63 percent from increased tertiary education. Boom et al (2005), however, acknowledged a missing link between African universities and firms since they have not made enough efforts to reform their curricula in response to rapidly expanding scientific knowledge and changing economic opportunities.

2.2.2 Holistic innovation system framework (Moore and Ulrichsen, 2010)

Moore and Ulrichsen (2010) premised the innovation system framework on the idea that innovation is a continuous learning process involving the application of knowledge, pre-existing or otherwise to new context geography (Figure 2). Higher education institutions (HEI) form a critical part of the innovation infrastructure, serving as the conduits for global knowledge streams. According to them, effective engagement of higher education institutions with the potential users of their outputs (that is graduates) through knowledge exchange mechanisms leads to economic and social development. The role of higher education institutions in the innovative system framework is presented in Figure 2.3 below.

Figure 2: The role of HEI in the innovative system framework



Source: Moore and Ulrichsen, (2010)

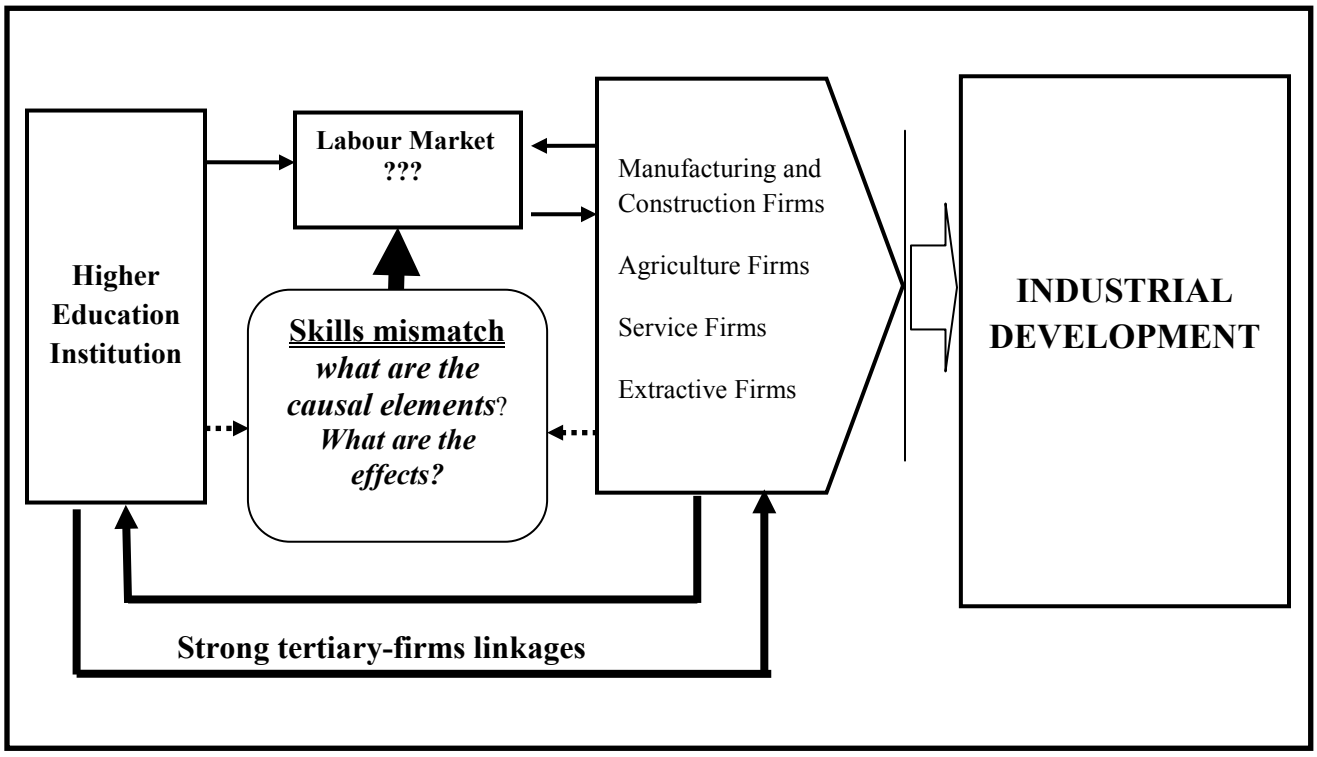
2.2.3 Conceptualisation of Graduate-firm/labour market skills mismatch in the Ghanaian economy

Generally, it is perceived in Ghana that the various forms of training being offered by the country's tertiary institutions are not addressing the needs of the labour market (National Employment Policy 2009; Education Sector Performance Reports, 2010 and 2011). The Ministry of Employment and Social Welfare asserts in the National Employment Policy (2009: 12) that the educational system in Ghana "continues to pour unskilled, semi-skilled and unemployable graduates into a job market with comparably few opportunities, and there is a need for sober reflection and deeper thoughtfulness on the kind of policy intervention which will be needed to overcome the challenge…". The Ministry of Education also lamented on the extent of skills-labour mismatch in the Ghanaian economy. According to the National Education Sector Performance Report, 2010:

"New businesses in Ghana list lack of skills as a major factor influencing their decision to relocate elsewhere. Job vacancies cannot be filed because of lack of skills. Ghana is losing business to competitors as a result of the lack of skilled workers. Skill gaps within employers' existing workforce are also a significant problem..." (p.8).

Studies have shown that skills mismatch occurs between the educational qualification acquired by an individual and what is demanded in the labour market (Gondwe and Walenkamp, 2011). The determinants of such mismatches are many and varied. Boateng and Ofori-sarpong (2002) found out that university-business interaction in Ghana is very lukewarm. In working on the alignment of higher professional education with the needs of the local labour market in Ghana Gondwe and Walenkamp (2011) concluded that a few training programmes at the tertiary institutions are relevant as far as the skills required by the labour market are concerned, while majority of the programmes are not aligned with the needs of the labour market. Figure 3 below presents the conceptual framework that guides the study.

Figure 3: Tertiary education-firms linkages and industrial development in Ghana: A conceptual Framework



Source: Authors' construct 2012

The conceptual framework guiding this study has been developed based on the literature reviewed. From the framework above, higher education institution - *defined as an institution which offers a post-secondary education and is recognized by law including, universities, colleges, polytechnics and professional institutions* – train and supply graduates into the labour market. Labour market here is defined as "*any place where labour services are demanded and supplied.*" Industry (composition of firms) buys (demands) labour services from the labour market. Industry, in this framework is categorized into *(i) manufacturing and construction firms, (ii) agricultural firms, (iii) service firms, and (iv) extractive firms.* The productivity of industry contributes to industrial growth and development.

Various shortcomings emanating from tertiary education institutions and industry will result in information asymmetries in the labor market. In other words, the quality of the labour services will depend on the vibrant linkages between tertiary institutions and industry, while the causes of mismatch could emanate from both. Skills mismatch in labor market according to Fasih (2008) manifest as (i) unemployment or underemployment of educated labour force; (ii) a shortage of skilled labour resulting from inadequate education; or (iii) migration.

3.0 METHODOLOGY

Qualitative and quantitative methodologies were employed for data collection and analysis for this paper: in-depth interviews, documentary reviews, structured questionnaires, content analytical approach and descriptive statistics. Data was gathered from various firms, the three government agencies governing tertiary education delivery in Ghana (National Accreditation Board – NAB; National Council for Tertiary Education – NCTE; and National Board of Professional and Technician Examination – NABPTEX), Ministry of Education (MOE), Association of Ghana Industries (AGI), departments of tertiary institutions and graduates of tertiary institutions.

Purposive and simple random sampling techniques were used to select respondents. NAB, NCTE, NABPTEX, MOE and AGI were purposively sampled. Departments of tertiary institutions were selected based on the commonality of programmes offered. In all 45 departments from 10 tertiary institutions within the Greater Accra Region were selected, but only 40 participated in the study (Table 1). Also, 82 firms were contacted randomly in a two-stage data collection process and 62 (representing 75.6%) of them completed the questionnaire:

manufacturing firms (15), service firms (24), construction and engineering firms (8) extractive firms (3), agricultural and agro-processing firms (5) and other firms (7).

Table 1: Departmental respondents from various universities in Accra

Tertiary Institutions Visited	Number of Departmental Respondents
University of Ghana	15
Institute of Professional Studies	2
Ghana Institute of Journalism	1
Accra Polytechnic	4
Valley View University	5
Ashesi University College	1
Pentecost University College	4
Central University College	4
Wisconsin University College	2
Islamic University College	2
Total	**40**

Source: Field data, October, 2012

In addition, 450 graduates of tertiary institutions were randomly sampled within Accra, making up of 304 (67.6%) males and 146 (32.4%) females (Table 2). Majority of them were within the age ranges of 26 – 32 years (41.1%), and 25 years and younger (≤ 25) (20.7%). This implies that views expressed from graduates in the study are mainly from the youth. A youth, according to the Ghana National Youth Policy (2010) is someone within the ages of 15 years and 35 years. Most of the graduates (86.7%) attended public tertiary institutions. Bachelor of Arts (BA) degree was the dominant qualification possessed by the graduates (43.3%) followed by Bachelor of Science (23.3%) degree and Diploma (16.9%). The total percentage of respondents who pursued programmes in humanities (BA and BFA) was 51.7 percent (43.3 + 8.4), which is more than twice the number that pursued science related programmes (Bsc and Bsc Adm). Some of the graduate respondents also possessed postgraduate degrees such as Mphil, MA and MBA. Majority of the graduates (60.9%) in the study were unemployed.

Table 2: Background characteristics of graduate respondents

Background characteristics	Graduate respondents	
	Frequency	Percentage
Age		
<=25	93	20.7
26 – 32	185	41.1
33 – 39	63	14
40 – 46	14	3.1
47 and above	4	0.9
Sex		
Male	304	67.6
Female	146	32.4
Total	450	100
Status of institution Attended/attending		
Public	390	86.7
Private	60	13.3
Highest qualification attained		
BA	195	43.3
BSc	105	23.3
Diploma	76	16.9
BFA	38	8.4
Mphil	12	2.7
MA	11	2.4
BSc Admin.	9	2
MBA	4	0.9
Current Employment Status		
Employed	165	36.7
Unemployed	274	60.9

Source: Field data, 2012

3.1 Analytical approach

Generally, there are difficulties in establishing objective set of indicators to measure the gaps that exist between what is expected from graduates by firms and the skills offered by graduates. This paper relied on a list of skills desired by firms and the availability of these skills in the labour market. Firms were asked to distinguish between skills that are of high demand, but are in short supply versus skills that are of low demand, but are in high supply. The paper regrouped the multitude of skills that were listed by firms, into nine categories of functionality at the work place. In the paper, the authors also tried to infer the quantum of resources used by firms to re-train fresh graduates to make them functional. This was done through the assessment of whether

they have the need to retrain, and the additional resources they require to retrain graduates to be more efficient. An analysis of employment data from 2000 and 2010 Population and Housing censuses was done to discuss how tertiary graduates are engaged in the Ghanaian economy. Tertiary education was broadly expanded after the 2000 census by the inclusion of diploma programmes as tertiary programmes in post-secondary professional courses in nursing, teacher training and others. This category of graduates was excluded from the analysis of graduates' employment status in 2010. The analysis was based on people aged 25 to 59 years who had completed tertiary education (first degree and post graduate degree). The dynamics of unemployment and employment within the period were assessed. The sector of employment and the occupational status of the employed graduates were also studied to throw light on the destination of graduates in the labour market.

An explanation of the underpinning factors of the mismatches was done through critical review of the tertiary educational system in Ghana: student numbers, quality of education, infrastructure, available financial resources for training, the roles played by firms in shaping the overall outlook of tertiary education, and others.

4.0 ANALYSIS OF MISMATCHES BETWEEN JOB-SKILLS REQUIREMENTS BY FIRMS VIS-À-VIS THE SKILLS OF TERTIARY GRADUATES

The analysis starts by looking at what firms expect from the graduates of tertiary institutions and the assessment of their level of satisfaction with the skills they provide in two ways. However, the section first delves into the skills acquisition and innovation among tertiary education graduates. This is then followed by an assessment of firms' satisfaction level on graduates who are attending interviews as well as their satisfaction level on graduates who they have worked with over the past five years. The employability of graduates is also analysed to find out the extent to which jobs are accessible at the firms.

4.1 Skills acquisition and innovation among graduates of tertiary institutions in Ghana

Ghana's ambition of using technological skills and innovation to drive its socioeconomic development is an age-old development issue. In spite of the post-independence push to create much of the current science and technology capacity, not a lot has been achieved in ensuring that science, technology and innovation drive socio-economic activities. For instance, over the years, entrepreneurs in Ghana have been critical of the inability of tertiary education graduates to avail

themselves of technology and innovative approaches to solving problems (Dadzie, 2007; Dasamani, 2011). Particularly, concerns have been raised on the inadequacies surrounding their analytical capacity, problem-solving skills, communication and technical proficiency skills, familiarity with computers or the tools that firms use in production, and exposure to certain modern equipment at the workplace. The low skills acquisition coupled with the limited knowledge in innovation are manifestations of the ill-preparedness of the Ghanaian graduates for the job market (Palmer 2005; Dadzie, 2007).

Indeed, efforts have been made by the state to shore up tertiary graduates' skills acquisition and knowledge in innovative technologies, including the introduction of the Ghana Industrial Skills Development Centre and the promulgated National Science, Technology and Innovation Policy (Ministry of Environment, Science and Technology, 2010). The Ghana Industrial Skills Development Centre was designed to work in close collaboration with the Association of Ghana Industries (AGI) and the Ghana Employers Association (GEA), with the mandate of harnessing financial and material resources required for achieving excellence in skills training (Roeske, 2003). This intervention, however, has failed to realise its goals as a result of lack of adequate training resources. Other technical training institutions below the tertiary levels such as the Integrated Community Centre for Employable Skills (ICCES) and the Intermediate Technology Transfer Units (ITTU) in the country, have also been ineffective in inculcating practical technical skills in graduates due to inadequate infrastructure, logistics, weak linkages with local industries for hands-on-experience for both instructors and trainees and so on (Dasmani, 2011).

The cardinal thrust of the 2010 National Science, Technology and Innovation Policy, lies in ensuring that science and technology propel effectively all sectors of the economy, including the skills of tertiary education graduates. However, at present evidence of the extent to which this policy is enhancing the landscape of skills acquisition among tertiary graduates in the country is still lacking based on the agitations of firms concerning skills of graduates. Arguably, the implementation of the provisions of this policy is yet to materialise.

4.2 Job-skills requirement by Ghanaian Firms

The job-skills requirements by various firms in Ghana were investigated in the study (Table 3). Majority of the 62 firms placed emphasis on the ability of graduates to analyse data, followed by

the ability to work effectively in a team, the ability to multi-task, possession of numeracy and IT skills, the ability to argue logically and taking responsibility of own actions and inactions. Although below 50%, a significant number of firms drummed home their need for technical skills and leadership and innovation skills. One stakeholder noted the essentiality of numeracy skills when he remarked in an interview:

"The concern is that there is a mismatch between the current graduates and the skills required by industry. They should have basic numeracy skills so that we could give them in-house training. That is why you see adverts and they are requiring a minimum of 5 years" (A senior researcher at AGI).

Table 3: Skills requirement of firms from tertiary graduates

Skills Required	Number	% of firms (N=62)
Ability to analyse data/situations; propose solutions and make decisions	52	83.9
The ability to multi-task (plan, organize, and co-ordinate)	38	61.3
Team work (working effectively with others)	43	69.4
Logical argument and problem solving skills	33	53.2
Numeracy and IT skills	37	59.7
Leadership and innovation	26	41.9
Taking responsibility of own action and inactions	32	51.6
Technical skills specifically needed for this industry	30	48.4
Oral and written communication skills	38	61.3
Others	7	11.3
Total number of firms		62

Source: Field data, 2012

Similarly, the study also sought the views of firms apropos their expectations of newly recruited graduates as far as job-relevant skills are concerned. A very significant number of firms agreed strongly that they expect newly recruited graduates to have high level of self-discipline, function effectively in a team, possess basic ITC skills, good knowledge of the organisation they are working with and possess leadership skills (Table 4). Slightly above 50% of firms also agreed strongly that newly recruited graduates should be able to manage their own career development

Table 4: Expectations of firms from newly recruited graduates

Expectations of firms	% of firms that strongly agree or agree to the following statements
Newly recruited tertiary graduates in this organization must have high level of self-discipline in order to succeed.	95.2
Leadership skills are expected from newly recruited graduates	75.8
Newly recruited tertiary graduate needs to manage his/her own career development in order to succeed	54.8
Newly recruited graduates must have basic skills in ICT.	90.3
Newly recruited tertiary graduates must understand how this organisation functions in relation to its competitors.	80.6
Newly recruited graduates should be able to function effectively in a team	93.5
Total number of firms	**62**

Source: Field data, October, 2012

Meanwhile, the background characteristics of firms that participated in the study revealed that 52 percent have employees size above 250 while the 48% do not have the capacity for more than 250 employees. The study results show that firms in Ghana are beset with expansion challenges (Table 5). These include high cost of production (60%), lack of adequate resources (44%), lack of graduates with the requisite skills (40%), unavailability of raw materials (32%) and constraining legislative instruments (24%).

Table 5: Constraints of firms to expand and function effectively

Constraints	**% of firms**
High cost of production	60
Lack of adequate resources	44
Lack of graduates with requisite skills	40
Unavailability of raw materials	32
Constraining legislative instruments	24

Source: Field data, 2012

4.3 Mismatches between firms' expectation and skills provided by tertiary graduates

One of the approaches used to determine the mismatch was to get firms' view on the availability of requisite skills from graduates in the labour market. Thirty out of the 37 firms who responded to questions on skills' gaps indicated that there are significant number of skills that are lacking in the labour market, but are in short supply by tertiary institutions (Table 6). This, contrasts

markedly with 16 of the firms indicating that there are significant skills in low demand that are churned out into the labour market annually. This mismatch issue was more prominent in the service sector than the others.

Table 6: Number of firms that report unavailability of skills, by sector of firms

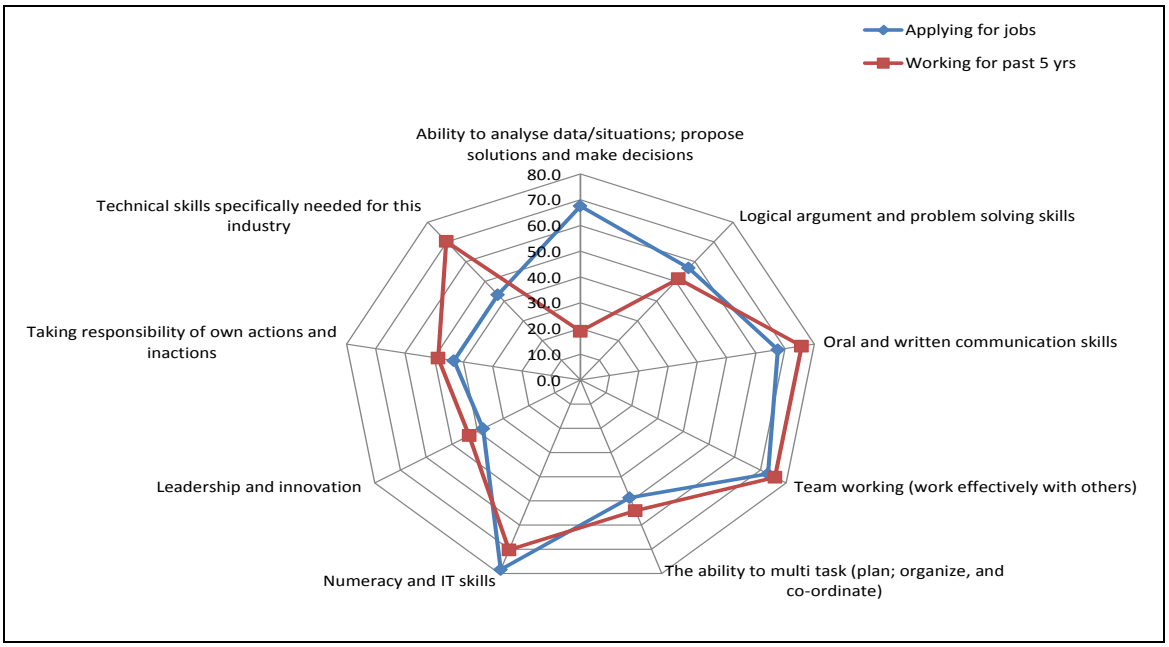
Sectors	Number reporting that there are skills in high demand but in short supply	Number reporting that there are skills in low demand but in high supply
Agriculture and agro-processing	5	3
Service	12	2
Manufacturing	2	3
Construction and engineering	4	3
Others	7	5
Total	**30**	**16**

Source: Field data, 2012

The satisfaction levels of firms with respect to specific skills provided by tertiary graduates are presented in Figure 4. The skills are grouped into nine functional areas, of which the firms were asked to rate graduates who applied for jobs in general and, graduates that have been working for them in the past five years. At the job interview sessions firms' level of satisfaction of skills provided by tertiary graduates are higher in four areas than others: numeracy and IT skills, the ability to analyse situations, teamwork, and oral and written communication. The level of satisfaction for these skills ranges from 68% to 80%. Areas they rate low at the job interview sessions are leadership and innovations, technical skills needed for the firms, and graduates' ability to take responsibility of own actions and inactions.

On the other hand, firms' assessments of graduates they have been working with for the past five years are slightly different from the above picture. They rate the graduates high in three areas (numeracy and IT skills, teamwork, and oral and written communication) as they did for graduates at the interview sessions. Paradoxically, their assessment of these same graduates on their ability to analyse data/situations and propose solutions is abysmally low. Just about 20% of the firms are satisfied with graduates they have been working with in the past five years as far as this skill is concerned. Firms' assessments on graduates' ability to take responsibility of their own actions and inactions, and their leadership and innovation skills are also very low.

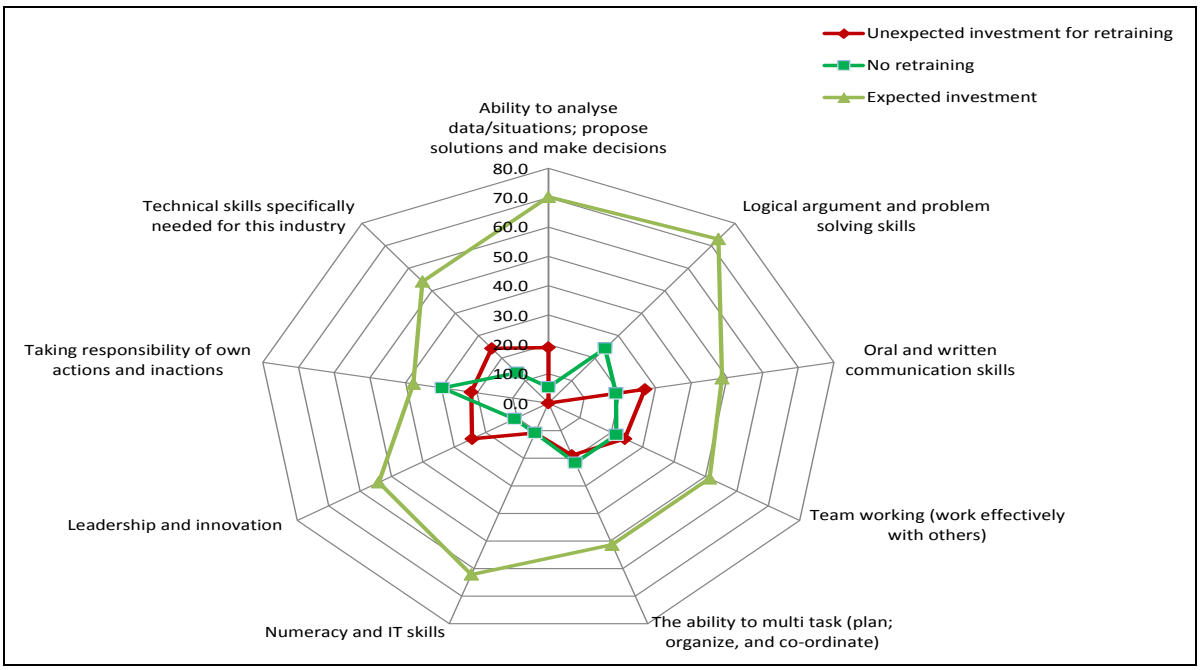
Figure 4: Percent of firms that are either satisfied or very satisfied with specific skills of tertiary graduates



Source: Field data, 2012

Irrespective of the training, which tertiary institutions give to graduates, firms expect to commit some level of resources in the retraining of employees in order to make them very efficient at the work place. One will expect a significant level of additional resources to be devoted to retraining if there are significant mismatches between expectation of firms and skills provided by tertiary education. Figure 5 shows that in this study firms make significant level of additional investments in four skills' areas: oral and written communication skills, leadership and innovation, technical skills needed for specific firms, and the ability to analyse situations. These are skills areas where firms who make more than expected investments to retrain tertiary graduates dominate as compared to those who do not see the need to retrain.

Figure 5: Levels of investment on retraining of tertiary graduates (%)



Source: Field data, 2012

4.4 Employability of graduates of tertiary Institutions

The most critical aspect of Ghana's tertiary education is to train graduates who will be useful and productive in the labour market. Findings in this paper revealed that graduate unemployment is much higher than general unemployment in the Ghanaian economy. Whereas unemployment rates in 2010 for all adults (15-64 years) and (25–59 years) were 4.5% and 2.2% respectively, that for tertiary graduates (25-59 years) in the same year was 6.5% (Table 7).

Table 7: Employment status of tertiary graduates (first degree and post graduate degrees) aged 25-59 years in 2000 and 2010

	2000 Population Census		2010 Population Census		% change in number of people
Employment Status	Number	Percent	Number	Percent	
Worked or has job	**143,897**	**76.3**	**175,333**	**86.8**	**21.8**
Unemployed	**13,358**	**7.1**	**13,218**	**6.5**	**-1.0**
Worked before, seeking work and available for work			2,800	1.4	
Seeking work for the first time and available for work			10,418	5.2	
Other	31,235	**16.6**	13,462	**6.7**	**-56.9**
Total (completed tertiary education)	188,490	**100.0**	202,013	**100.0**	**7.2**

Source: Computed from 2000 and 2010 censuses

The analysis of the 2000 and 2010 Population and Housing censuses indicate that graduate unemployment in general decreased marginally from 7.1% to 6.5% as a result of an improved situation for graduates aged between 30 and 59 years. As depicted in Table 8, graduate unemployment is a recent phenomenon, especially for the younger population. Whilst unemployment rates for the older groups (30-59 years) reduced within the decade, the rates for graduates aged 25 to 29 years rose sharply from 9.8% to 18%. A further decomposition of the unemployment rate in 2010 also shows that more of the unemployed are those who were seeking work for the first time (5.2%) as compared to those who had worked before, but were looking for new jobs.

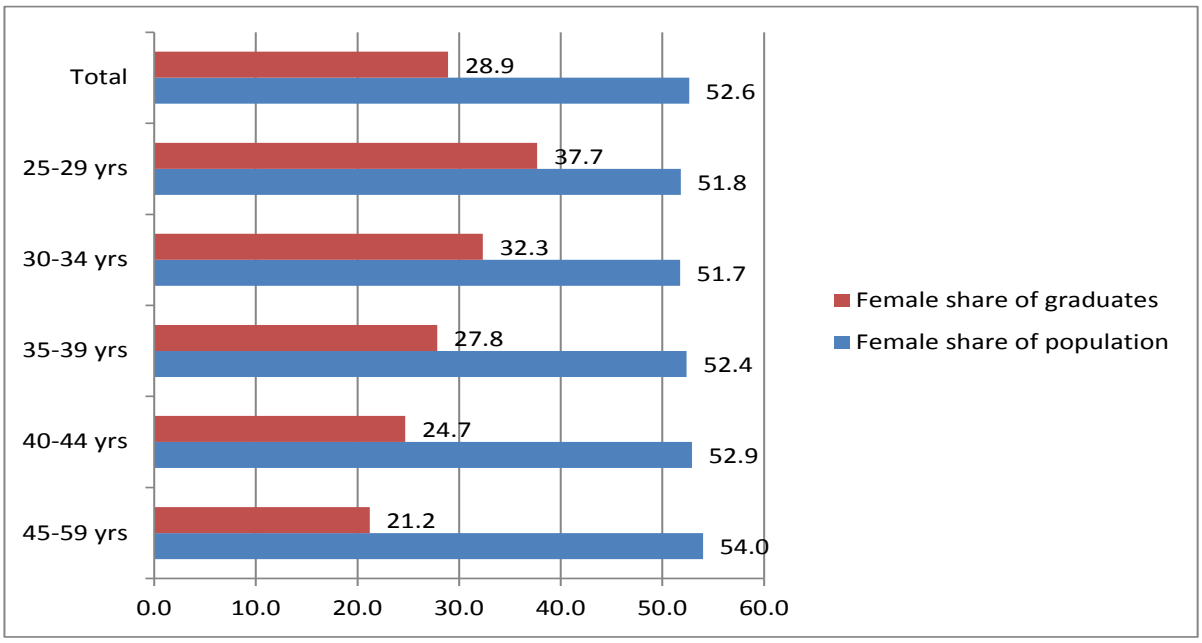
Table 8: Unemployment rates in 2000 and 2010 for tertiary graduates (first degree and post graduate degrees) aged 25-59 years, by age group and sex (%)

	2000			2010		
Age group	Male	Female	Total	Male	Female	Total
25-29 yrs	9.6	10.1	9.8	18.8	16.7	18.0
30-34 yrs	7.3	9.1	8.0	5.7	6.1	5.8
35-39 yrs	6.2	7.9	6.8	2.9	2.9	2.9
40-44 yrs	5.1	8.4	6.1	1.8	2.1	1.9
45-59 yrs	5.0	7.7	5.8	1.2	1.1	1.2
Total	6.4	8.6	7.1	6.2	7.5	6.5

Source: Computed from 2000 and 2010 censuses

The census data shows quite interesting shifts in the share of graduates within the labour market. The number of people aged 25 to 59 years who completed first degree and post graduate degrees rose by 13,523 between 2000 and 2010. About three-quarters (76.3%) of this group worked 7 days before the census night or had jobs to return to in 2000. This percentage rose to 86.8% as a result of the large number of graduates who entered the labour market in 2010 (Table 7). The share of females graduates has been rising relative to their share of the population. The per cent of females among the graduates aged between 44 and 59 years was about 21% as compared to the share of graduate females among the 25-29 years group in 2010, which was about 37% (Figure 6).

Figure 6: Difference between the female share of tertiary graduates and female share of population aged 25-59 years (%)



Source: Computed from 2000 and 2010 censuses

The other interesting aspect about the dynamics in the market is the growth in the number of graduates who work as employees versus the reduction of graduates who engage themselves as self-employed. This is more or less a pointer to the observation about the need to strengthen the entrepreneurship components of graduate training. The share of graduate employees as at the year 2000 was about 75% of all graduate workers (Table 9). This increased to about 87% in 2010 at the expense of the share of those in self-employment without employees, whose share reduced from 15.4% to 5.9%. The share for those in self-employment but with employees stayed almost the same between 2000 and 2010. One expects remarkable increase in the number of highly trained individuals to drive this aspect of the economy if improvement in technological advances and industrial development are to be observed in the future.

Table 9: Occupational status of tertiary graduates (first degree and post graduate degrees) aged 25-59 years in 2000 and 2010

	2000 Population Census		2010 Population Census		% change in number of people
Employment Status	Number	Percent	Number	Percent	
Employee	117,411	74.7	155,082	87.1	**32.1**
Self employed without employee(s)	24,142	15.4	10,530	5.9	**-56.4**
Self employed with employee(s)	9,127	5.8	9,919	5.6	**8.7**
Other	6,575	4.2	2,602	1.5	**-60.4**
Total	157,255	100.0	178,133	100.0	**13.3**

Source: Computed from 2000 and 2010 censuses

The public sector continues to absorb a large number of tertiary graduates. The sector's share of graduates in the year 2010 nearly increased by 10,000 from the number observed in 2000. By far the largest gainer in terms of growth in the number of graduates is the private formal sector, which almost absorbed an additional 20,000 of the graduates. This is a positive development to observe given that the share for private informal sector also went down considerably (Table 10). An improved situation on leadership, innovation and other skills areas needed for the growth of the modern sector, which the firms alluded to in the earlier section (Section 4.2) could lead to a significant growth of the economy if tertiary education leads the role well cut out for it.

Table 10: Sector of employment of tertiary graduates (first degree and post graduate degrees) aged 25-59 years in 2000 and 2010

	2000 Population Census		2010 Population Census		% change in number of people
Sector of employment	Number	Percent	Number	Percent	
Public	84,291	53.6	94,250	52.9	**11.8**
Private formal	38,682	24.6	57,092	32.1	**47.6**
Private informal	27,697	17.6	19,693	11.1	**-28.9**
Semi-public/Parastatal	3,030	1.9	1,448	0.8	**-52.2**
NGO/Int. organisation	1,851	1.2	4,723	2.7	**155.2**
Other	1,704	1.1	927	0.5	**-45.6**
Total	157,255	100.0	178,133	100.0	**13.3**

Source: Computed from 2000 and 2010 censuses

Broadly, emerging from the analysis of the data for this paper are two critical mismatches between the needs of firms in terms of skills and the ones possessed by graduates from tertiary institutions in Ghana: insufficiency of certain skills (the ability of graduates to analyse data/situations and propose solutions, leadership and innovation, technical skills, and graduates' ability to take responsibility of own actions and inactions) and the growing lack of employability of young graduates.

5.0 FOUNDATIONS OF MISMATCH BETWEEN TERTIARY EDUCATION'S OUTPUT AND SKILLS NEEDED BY INDUSTRY IN GHANA

Several factors account for the incongruousness between the jobs–relevant skills of graduates from tertiary institutions and the desires of industries. This study unearthed the following factors as accounting for this incongruity in Ghana.

- **Tertiary education Provisions vis-à-vis Provisions in Ghana industrial policy**

The 1992 Fourth Republican Constitution of Ghana, the Education Act, 2008 (Act 778) and the Education Strategic Plan (ESP) 2010 – 2013 are the three main legislative and regulatory instruments binding on education in Ghana. The extent to which these instruments make adequate provisions for tertiary education is of critical importance herein. The constitution only acknowledges that "*higher education shall be made equally accessible to all on the basis of capacity, by every appropriate means and in particular, by progressive introduction of free education*" (See Article 25(1c) of the 1992 Constitution). On the hand, apart from mentioning in Article 16 subsection (1) and (2) that the NCTE and NAB should perform their respective functions as specified by the Acts establishing them; the Education Act, 2008 does not make any direct provision for the development of tertiary education in the country. Besides, the Education Strategic Plan (ESP) 2010–2013 has no strategic initiative, benchmarks and measureable indicators for the development and delivery of quality tertiary education in the country, even though tertiary education is revered as the source of skilled human resource for industry, public sector and the economy as a whole. Arguably, the provisions, which these three legislative and regulatory instruments have made for tertiary education in Ghana, are woefully inadequate to promote commitment of resources to the delivery of quality tertiary education.

Interviews conducted with key stakeholders of tertiary education further revealed that aside the shortcomings in these three institutions; the country lacks comprehensive policy on tertiary education.

"No, the country has no comprehensive policy for tertiary education" (A senior member, Tertiary Education Division, MOE, 2012).

"I think that we have tried in a large measure to develop policies for tertiary institutions but perhaps, we could have done more than we are doing now" (A senior member, NCTE).

The absence of a comprehensive policy implies that tertiary education delivery in Ghana lacks a guiding framework. This situation therefore resulted in the lack of integration or harmonization between other sectors' policies, especially the industrial policy and the foci of tertiary institutions. The Ghana Industrial Policy has been designed to promote increased competitiveness and enhanced industrial production, with increased employment and prosperity for all Ghanaians. The policy seeks to enhance productivity, efficiency and growth of Ghana's industrial sector. It has its strategic thrust derived from several national development agenda including Ghana Poverty Reduction Strategy one and two (GPRSI and GPRSII), National Trade Policy, National Medium-term Development Framework (MDTF) 2010–2013; and Private Sector Development Strategy (PSDS) Phase I and II. The success of this policy, however, will be measured by the extent to which it empowers the private sector to expand and create opportunities for employment as well as reduce poverty and spatial inequalities in Ghana.

The policy has three strategic components: production and distribution; technology and innovation; and incentives for industrial development. For example, the production and distribution component of the policy acknowledges the inadequate supply of skilled labour for industries. However, policy prescriptions aimed at increasing the supply of skilled labour to meet the needs of firms are very general, without targets and measureable indicators that are linked to what should be happening at the tertiary education level. The prescriptions failed to address the issue of aligning training programmes and courses in tertiary institutions to the skills needs of industry. Thus, even though 77.5% of the academic departments interviewed indicated that there have been changes in the programmes they have been running in the past five years compared with 22.5% who did not change programmes over the same period, the changes were predominantly informed by unavailability of teaching and learning infrastructure (100%),

changes in the global economy (66.7%) and changes to meet international standards (66.7%). Less than half of departments (46.7%) indicated that they modified academic programmes in a bid to meet the skills demand of firms, since they are not mandated by the industrial policy to so.

Similarly, rhetoric provisions have been outlined in the policy concerning technical and vocational training, as it states that "government will commit increased resources to technical, vocational and commercial education and training to develop skills and manpower resources for industrial development". This lip service provisions in the policy was further corroborated when a senior member of NABPTEX noted the inadequacy of funding of key technical and vocational training institutes such as the polytechnics over the years, thereby forcing them to admit more students in business, marketing and social science programmes to raise funds for sustainability.

The second component of this policy, technology and innovation acknowledges that there is an "overall low level of science, technology, research and development and innovation in industry." The policy traces the source of the technology and innovation gap to the educational system, noting that it lacks adequate infrastructure for the study of science and technology. Also, it points out that there is a general lack of interest in science and technology programmes at tertiary institutions, which is evidenced in the limited number of students that apply to study science and technology, particularly at the tertiary level. These shortcomings notwithstanding, the policy objective to raise the quantity and quality of the labour force and also strengthen linkages among key agents in the science, technology and innovation systems are vague, without any clear timelines and targets.

- **Ineffectiveness of institutions charged with oversight responsibility for ensuring quality in tertiary education**

NCTE, NAB, NAPTEX, and the Tertiary Education Division Wing of the Ministry of Education (MoE) are the cardinal institutions in Ghana that have been entrusted with mandates in different forms, to oversee the establishment of quality in various tertiary institutions in Ghana (See Appendix I). In the discharge of their respective mandates as far as quality assurance in tertiary institutions is concerned, these bodies have chalked different successes. In an in-depth interview with a senior management member of NCTE for instance, it came out that the body has been able to set standards to measure quality at tertiary institutions as well as guidelines for requesting government support for academic programmes. Accordingly, NCTE in conjunction with NAB

has also established certain norms such as the ideal staff-student ratio for different programmes (See Appendices II and III), infrastructural requirement and so on, prior to the approval of programmes.

A board member of NABPTEX also recounts the successes of the body to include the successful implementation of four programmes in polytechnics in the country through the Competency Based Training (CBT): Agriculture Engineering (Ho, Bolgatanga, Tamale, and Wa Polytechnics); Civil Engineering (Tarkoradi polytechnic); Fashion Design and production (Accra Polytechnic); Automobile Engineering (Koforidua polytechnic). The Tertiary Education Division at the MoE has also mediated in several ways between NAB, NCTE NABPTEX and various tertiary institutions as a result of ensuing misunderstandings.

Notwithstanding these successes, these bodies have been ineffective in discharging their mandates comprehensively. Their ineffectiveness stems from the myriad of challenges confronting them. With respect to NCTE for instance, the Law establishing this body does not empower it with enough authority – it is merely an advisory body. Consequently, it lacks the authority to sanction certain tertiary institutions or the mandate to overrule decisions taken by government or public authorities. In an in-depth interview, a respondent at NCTE narrated the weaknesses of the Legislative Instrument that establishes it as follows:

> "*One of our major challenges is our laws. One is the pronouncements of politicians. For instance, Institute of Professional Studies (IPS), out of the blue, they developed their law and they are now a university. Now, the Kofi Annan Centre is also trying to become a university. We don't have the power to stop some of these things. When they wanted to start a medical school in Cape Coast, NCTE said no but they went on because they had a government support. So our problem is lack of authority to sanction…we can't sanction the politicians and some other tertiary institutions. Ours is to develop standards for the institutions and then advise the Minister of Education. You can advise the Minister of Education and the advice may or may not be accepted. At times decisions are taken before we are informed. You can't fight government decision"* (A senior management member, NCTE, 2012).

The weaknesses of NCTE to act decisively, especially in the setting up of various tertiary institutions by government, were further buttressed when a stakeholder noted the politicization of

the establishment of Universities in the country in a response to the question regarding the body that recommends for the setting up of Universities;

> *"You go according to your party manifesto decisions. Before the government comes to power they set up their task force to set up the universities"* (A senior member – Tertiary Division, Ministry of Education, 2012).

NAB regards the issues of dishonesty on the part of several tertiary institutions, especially the private ones, inadequate logistics and well qualified staff as the main banes to the delivery of its mandate. Through an in-depth interview, the following challenges confronting NAB were raised by a key stakeholder:

> *"In our part of the world, you will make a mistake to say that a certain institution is a religious institution so what they are saying is right…that is the note I have revised in my head. Most of the public universities already have laid down procedures…if you don't have PhD they will not take you on as a lecturer; but unfortunately for the others, if you close your eyes, an elementary teacher will be teaching an undergraduate programme. We have to police all the institutions all over the country. We need logistics to go round and monitor. However, at the moment not many of the staff members understand the administration of tertiary institutions. If they were to be honest it will have saved a lot of time and resources"* (A board member – NAB, 2012).

With respect to NABPTEX, the study unearthed one very critical challenge confronting its effective functionality: the ill-composition of the board, that is, the 15 member governing council. It was found that the significant roles of certain members of this governing council to foster the delivery of its mandate are very questionable, while on the other hand identifiable institutions, which could contribute significantly to the realisation of NABPTEX's mandate are absent from the board. A major stakeholder expressed dissatisfaction with the current composition of the board as follows;

> *"I think some should stakeholders not be on the board…for instance GNAT doesn't have to be on the board; they have something to do with second cycle education. Polytechnic Teachers Association of Ghana (POTAG) rather is not on the Board. Now we also have Council for Technical and Vocational Education and Training (COTVET) as the umbrella body in charge of tertiary and vocational education in this country but they are not on the*

Board. If you want this place to function very well we need people who have the skills, experience and understand technical and vocational skills on the board. Industry representation is inadequate" (A board member – NABPTEX, 2012).

❖ **Poor integration of relevant stakeholders**

Integration and effective cooperation of relevant stakeholders in tertiary education is a necessary condition for building quality and skillful workforce for industrial productivity and economic development. Findings from the study, however, unveiled issues which point to the fact that poor integration exists among key stakeholders in the tertiary education sector. Key among the findings are: weak interaction and communication between industry and tertiary institutions; ineffective cooperation or, lack of inter-agency cooperation between institutions governing tertiary education; and inept attitude of industry's players.

The weak interaction and communication between firms and tertiary institutions were evident in responses concerning their interactions (See Appendices IV, V, VI). As evident in Appendix IV for instance, out of the 35 departments who indicated that they do interact with firms, only 17.1 percent, 11.4 percent and 2.9 percent respectively interacted with firms on issues of joint monitoring of programmes, funding of programmes and business incubation. The weak interaction and communication are further manifested in Appendix V where as much as 45 percent (18 out of 40) departments did not involve firms in the development of their programmes, with 94.4 percent (17 out of 18) noting that firms do not honour invitations to participate in programmes' development. Similarly, majority (15 out of 25) of firms that took part in this study indicated that they did not participate in the development of courses at tertiary institutions (see Appendix VI), attributing their non-involvement to two major factors: tertiary institutions not seeking their inputs; and the lack of channel of communication between firms and tertiary institutions.

Another perspective that has emerged on the poor integration of stakeholders is the issue of ineffective co-operation or, lack of inter-agency cooperation between institutions governing tertiary education. Documentary analysis revealed industry as having representation on the governing boards of all the three major tertiary institutions (NCTE, NAB and NABPTEX). Some form of inter-agency cooperation also exists among the NCTE, NAB and NABPTEX. The NCTE and NAB for instance, jointly developed standards and norms for the accreditation of

tertiary institutions' programmes; while NABPTEX also participates in programmes organised by NCTE and NAB, etc. These interrelationships or co-operations are, however, not well entrenched, as these institutions are saddled with ineffective communication challenges. Through in-depth interviews one stakeholder threw light on the ineffective communication and integration among the three institutions.

> "*We always invite NCTE and NAB to our programmes and workshops, but when you talk about total integration I don't think we are at all… sometimes they give accreditation to some institutions (institutions offering professional, technical and vocational programmes) and we (NABPTEX) are not consulted"* (A board member – NABPTEX, 2012).

Also, there appears to be a communication gap between firms and some of these governing agencies. Both literature sources and findings in this study show that various firms hold the view that graduates being produced at the various tertiary institutions are not "*up to scratch*" and do not possess the skills required by them. In an interview to ascertain the actions firms have taken over the years to address these challenges, a senior member of the AGI declared that they have sent complaints to some of the governing agencies and institutions.

> *"Yes, we have done it through our members who are on the NAB board…We have made a lot of recommendations…on how to bridge the gap between the training and research that the universities are doing and the needs of industries. We have been making these recommendations year-in-year-out but we don't get any positive feedback…"* (A senior member of AGI, 2012).

However, in an interview with a respondent at the NAB, he demurred that firms and AGI have been communicating to them regarding their concerns of the quality of tertiary graduates.

> *"This is NAB, if people are having some negative things about the way graduates are produced, then they should put it on paper and submit it; that I think you should advise the universities to look at these aspects of their training because that they are not performing to the expectations of industry…there have not been any formal complaints from industry concerning the quality of graduates"* (A senior member, NAB, 2012).

Furthermore, another issue that clearly illustrates the poor integration between AGI and tertiary institutions is the inept attitude of firms' players in ensuring quality tertiary education delivery.

Firms' players seem to lack the tenacity to see to it that concerns they raise on quality of graduates from tertiary institutions are being followed to their logical conclusions. The view expressed by firms' respondent in the course of an interview illustrates this ineptitude of firms as players in ensuring quality tertiary education in the country:

> *"…we usually put the proposal on the table and we expect the universities to come up with implementation plans…But we have also not been doing well because we have not been making serious follow-ups. So may be what we have to do as industry is to make follow ups to see what will come out of these"* (A senior member of AGI, 2012).

- **Absence of a national development plan linked to tertiary education/lack of a comprehensive tertiary education policy in Ghana**

A major factor contributing to the mismatch between tertiary education and industrial development in Ghana is the absence of a national development plan. A national development plan serves as a comprehensive framework that identifies the needs of the country, sets the long term developmental objectives in relation to the resources available; and also identifies various strategies and approaches that will be used to achieve these objectives. Situating tertiary education within this framework will help the country build the needed human resource capacity that will meet the demands and the needs of the economy at every point in time. Most newly industrialised countries such as Korean Republic, Singapore and Taiwan developed development frameworks that linked tertiary education to the needs of industry[1] and development. These countries situated competent human resource development at the centre of growth and created a knowledge base economy which is serving as the foundation and driver of sustainable development[2].

In Ghana, the absence of a national development plan implies the lack of adequate preparation for the needed human resource base for the various sectors of the economy and the delivery of tertiary education in the country. Currently, the tertiary education sector does not know the respective human resource needs of the various sectors of the economy and, also has no comprehensive policy guiding its activities. The overall outcome of this situation is that the tertiary education sector in Ghana lacks a clear direction, and therefore fosters the disproportionate production of graduates from different disciplines as well as the uncoordinated

[1] Mathews and Hu (2007) Universities and public research institutions as drivers of economic development in Asia
[2] ibid

nature of the governing bodies of tertiary institutions. The following views illustrate the crux of the challenges confronting the nation as a result of the absence of a harmonized national development plan linked to tertiary education:

> *"We don't have a national curriculum framework as a country. If we talk about curriculum framework we mean an educational map right from nursery defining the various paths that are available for career progression"* (A senior member of NABPTEX, 2012).

> *"…we need to define what our priorities are. If it's agriculture we want to go into lets work towards it. Let me tell you, Kennedy wanted to go to space, he set up plans, developed the skills and people to go to space so where do we want to go? We need to determine and develop the relevant skills"* (A senior member, NCTE, 2012).

In addition, when commenting on the rapid growth of private universities in Ghana, an interviewee at the AGI lamented about the lack of national development priorities linked with the structure of programmes being ran at the tertiary institutions in the following statement:

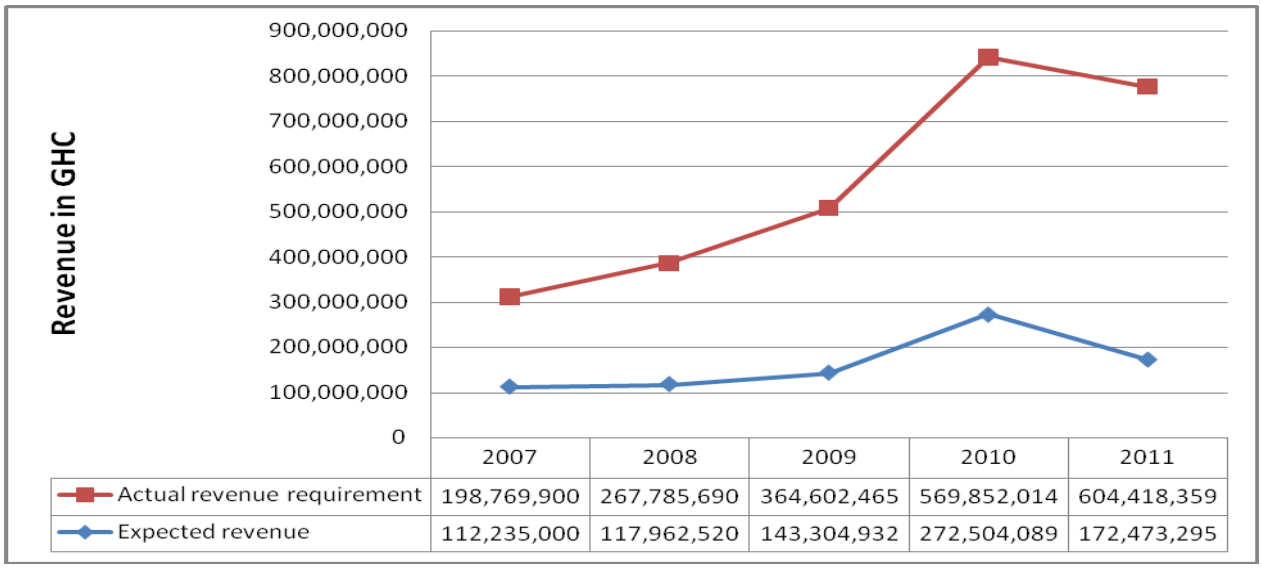
> *"Private universities are profit making institutions, so when they are established they will run programmes such as Businesses where there is a lot of demand…If you go into the sciences you need a lot of money before you can start, so many of the universities want to get some courses that they can break even early before going into the sciences" (*A senior member of AGI, 2012).

- **Inadequate funding**

The shortfall between the actual expenditure needed to finance quality tertiary education and the expected revenue from the funding sources over the past five years continues to widen and, is one of the fundamental factors underpinning the mismatches. Data on annual expected revenue for funding tertiary education and the actual annual expenditure needed for funding to ensure quality training shows a gulf between the two over the past five years (Figure 7). In 2007, expected revenue to fund tertiary education was estimated at GHc 112,235,000 compared to the actual needed expenditure of GHc 198,769,900 (NCTE, 2011). This implies that, there was a shortfall of about GHc 86,534,900 in the actual amount of money needed for tertiary education in 2007. Between 2008 and 2010, the shortfall between the expected revenue and the actual

revenue needed more than doubled the expected revenue, while in 2011 the shortfall was thrice the expected revenue.

Figure 7: Funding of tertiary education in Ghana (the gap between the actual and the expected)



	2007	2008	2009	2010	2011
Actual revenue requirement	198,769,900	267,785,690	364,602,465	569,852,014	604,418,359
Expected revenue	112,235,000	117,962,520	143,304,932	272,504,089	172,473,295

Source: NCTE, 2011

Industries' contribution to funding tertiary education has been very insignificant. According to the NCTE (2011), government has been the major source of funding for public tertiary education over the period under consideration, followed by Internally Generated Funds (IGF), comprising mainly of fees, consultancies and donor supports. In an in-depth interview, some senior members of NCTE and NABPTEX made the following strong observations on the funding pattern of tertiary education:

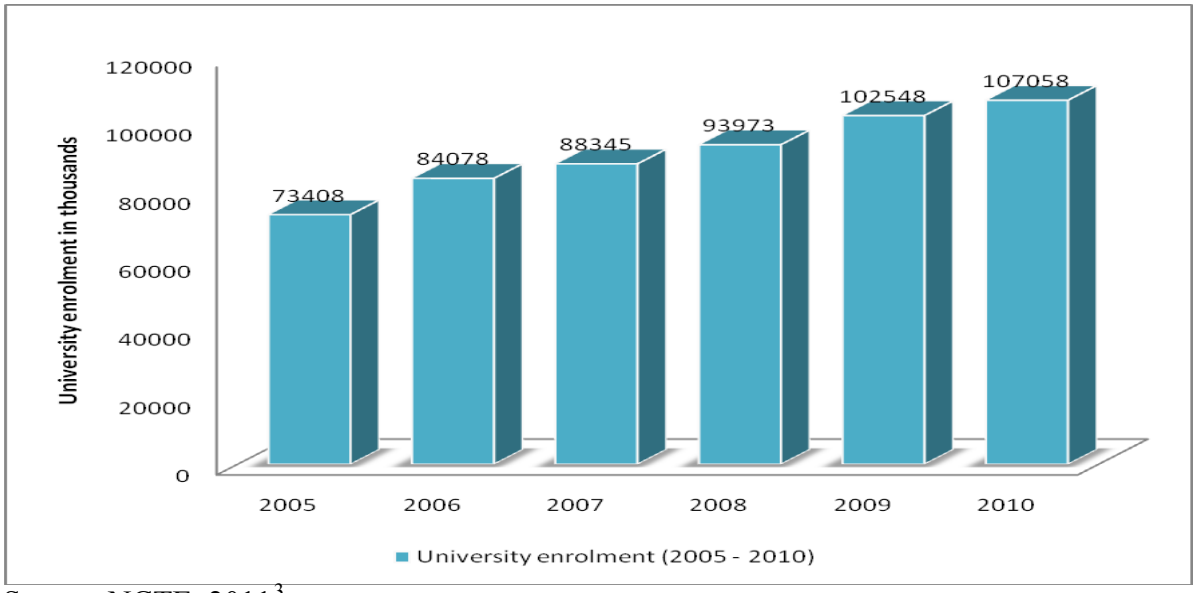
> *"Low budgetary allocation to the entire polytechnic and technical education in the country has been our major challenge.…the mandate of polytechnics is demanding, to train middle level technical and professionally skilled human resources to feed industry but allocation of funds is inadequate"* (A senior member of NABPTEX, 2012).

> *"…lack of facilities and lack of innovative funding of science. If it were some countries, once you say you want more science, you put in a mechanism to fund the sciences; they don't just say it without funding it, and it becomes a mere proposal"* (A senior member of NCTE, 2012).

❖ **Inadequate personnel and infrastructure at tertiary institutions versus increase in students'**

A critical element affecting the quality of training received by students in tertiary institutions in Ghana, and by extension reinforcing the mismatch between tertiary graduates and the needs of firms, is the students-lecturer ratio (SLR). Data on enrolment into tertiary education institutions over the years indicates an increasing demand for tertiary education (Figure 8).

Figure 8: University enrolment trend from 2005 – 2010.



Source: NCTE, 2011[3]

According to the NCTE (2011), between 2005 and 2010, enrolment into universities increased from 73,408 to 107,058 (Figure 8); and distance education enrolment increased from 20,772 in 2006 to 37,589 in 2010; while enrolment into polytechnics also increased from 24, 903 in 2005 to 46,076 in 2010. Data from the NCTE shows that the SLR is very high in many programmes offered in Ghanaian tertiary institutions and has exceeded the ideal standards developed by the NCTE and the NAB. The situation is, however, worse in the Humanities and Business programmes. From Table 11, the existing SLR for Social Sciences and Humanities in University of Ghana is 84:1, about thrice the ideal SLR of 27:1 set by the NCTE. The situation is worst at Accra Polytechnic where the SLR for Management and Business Administration (130:1) is five

[3] The enrolment data gathered from an NCTE presentation during the National stakeholders' dialogue on funding tertiary education in Ghana in August, 2011.

times the ideal SLR of 25:1 (Table 12). These findings parallel Azcona et al, (2008) and Bloom et al, (2005) findings of high students-lecturer ratios in Africa.

Table 11: Ideal versus existing students-lecturer ratio in tertiary institutions in Ghana: the case of University of Ghana 2009/2010 academic year

Programme	Ideal Students-Lecturer Ratio	Students Population	Lecturers population	Existing Students-Lecturer Ratio
Social Science and Humanities	27:1	19589	232	84:1
Business Administration	27:1	2184	48	46:1
Science	18:1	2910	134	22:1
Engineering	18:1	250	21	12:1
Engineering (KNUST)[4]	18:1	3619	120	30:1

Source: NCTE (2010)

In an interview, the views expressed by a senior researcher at the AGI corroborate the problems of the high number of students per a lecturer in the country's tertiary institutions:

> *"...when it comes to the public universities, the challenge for the students is that they are now too many in the class and the lecturers are not able to have a one-on-one interaction with them, to know their concerns. Actually the concern is quality of instruction not because the lecturers are not good but the students are too many"* (A senior member of AGI, 2012)

Table 12: Ideal versus existing students-lecturer ratio in tertiary institutions in Ghana: the case of Accra Polytechnic 2009/2010 academic year

Programme	Ideal Students-Lecturer Ratio	Students Population	Lecturers population	Existing Students Lecturer Ratio
Management and Business Administration	25:1	4059	31	130:1
Applied Science	18:1	1249	38	33:1
Engineering	18:1	1278	41	31:1

Source: NCTE (2010)

[4] The SLR for the Engineering Department in Kwame Nkrumah University of Science and Technology (KNUST) is included because this department is older than the one in Legon and may reflect the real SLR situation.

In addition, findings from the study showed that about 47.5% of the departments who participated in the study are without adequate infrastructure (See Appendix VII). The infrastructural challenges in most of these departments include: inadequate lecture halls (52.6%) (See Plate 1), less stocked libraries (57.9%), lack of reading rooms (73.7%), lack of IT infrastructure (68.4%), unavailable research centers (42.1%) and lack of office spaces for lecturers (89.5%) (See Appendix VIII). The findings further revealed that departments within public universities have more infrastructural challenges compared to private institutions. Plate 1 manifests the seriousness of the inadequate infrastructural issue in one of the public tertiary institutions in the country - students on the veranda of a lecture theater during lecture while teaching was going on.

Plate1: A pictoral example of the imbalance between students population and infrastructure in one of the public Universities in Ghana

Source: NCTE, (2011)

- **The shift in focus of some tertiary institutions**

The shift in focus of some tertiary institutions in the country has also been identified as a major contributing factor to the skills mismatch that has characterised the Ghanaian labour market. Polytechnics are the main culprits in shifting from their core mandate. This phenomenon was captured in the following responses:

"We wanted polytechnics to do more of the vocational type of programmes, but if you go to the polytechnics, you will see that about 60% of the students there are reading procurement, marketing, accounting courses, etc. So there is a shift from their core mandate… and we don't blame them because, they have to survive as institutions. It is like a church - a church without members is no church. In the same way, a school without students is no school. So, in spite of this lofty noise about enrolling 60% of students into the science and technology, it's rather the other way round" (A senior member, NCTE, 2012).

Reflecting on the cause and effect of polytechnics shifting from their core mandate of providing quality middle manpower from the technical disciplines, a respondent at NABPTEX noted the following during an in-depth interview:

"A challenge confronting polytechnic education is the departure from their initial mandate and dying engineering and technology programmes. Governments have been paying lip service to financing competency based training. But if we want this country to move forward in the new millennium then we have to invest in CBT by getting ultra-modern equipments. Funding of polytechnics, however, has been low, but because they must survive, they have to go more into the business and social science programmes to raise funds in order to survive". (A senior member, NABPTEX, 2012).

❖ **Industrial challenges**

The performance of the industrial sector influences the nature of growth and the level of employment/unemployment in an economy. In countries such as Taiwan and Korea where industry has in recent times taken a centre stage in development, the phenomenon of graduate unemployment seems to be minimal and economic growth is on the increase. In Ghana, even though the GPRS II (2006 - 2009) and the GSGDA (2010 - 2013) have the private sector and industry as the engine of growth, the industrial sector currently has two major challenges impeding its ability to contribute effectively to economic growth and curb the problem of graduate unemployment.

The first challenge is the lack of capacity of the industrial sector to expand and employ trained graduates. The study identified high cost of production and lack of adequate productive resources to be the leading factors accounting for a decline in industrial growth, hence its capacity to

employ graduates in the labour market. Respondents at NCTE and AGI opined on the capacity of firms to absorb tertiary graduates as follows:

> *"The manufacturing firms are not there. How many are they? The firms are not there. If we cannot get firms, especially for industrial attachments, what is the student going to learn? If you train me in mechanical engineering and I get out, where am I going to work? It's not that easy…the national economy itself is becoming more and more service based so people will be attracted there. There are few manufacturing firms… even those that are there, they are not even manufacturing…"* (A senior member of NCTE, 2012).

> *"The declining of industries means numbers that can be absorbed are reducing and mass production means graduates looking for jobs are increasing. So the issue is a problem of declining capacities of industries as well as lack of basic necessary skills possessed by graduates that are in demand with industries"* (A senior member of AGI, 2012).

The second major challenge confronting the industrial sector is the lack of enabling environment for expansion. In an interview with the AGI, a senior member confirmed the nature of the challenge in the following reflection:

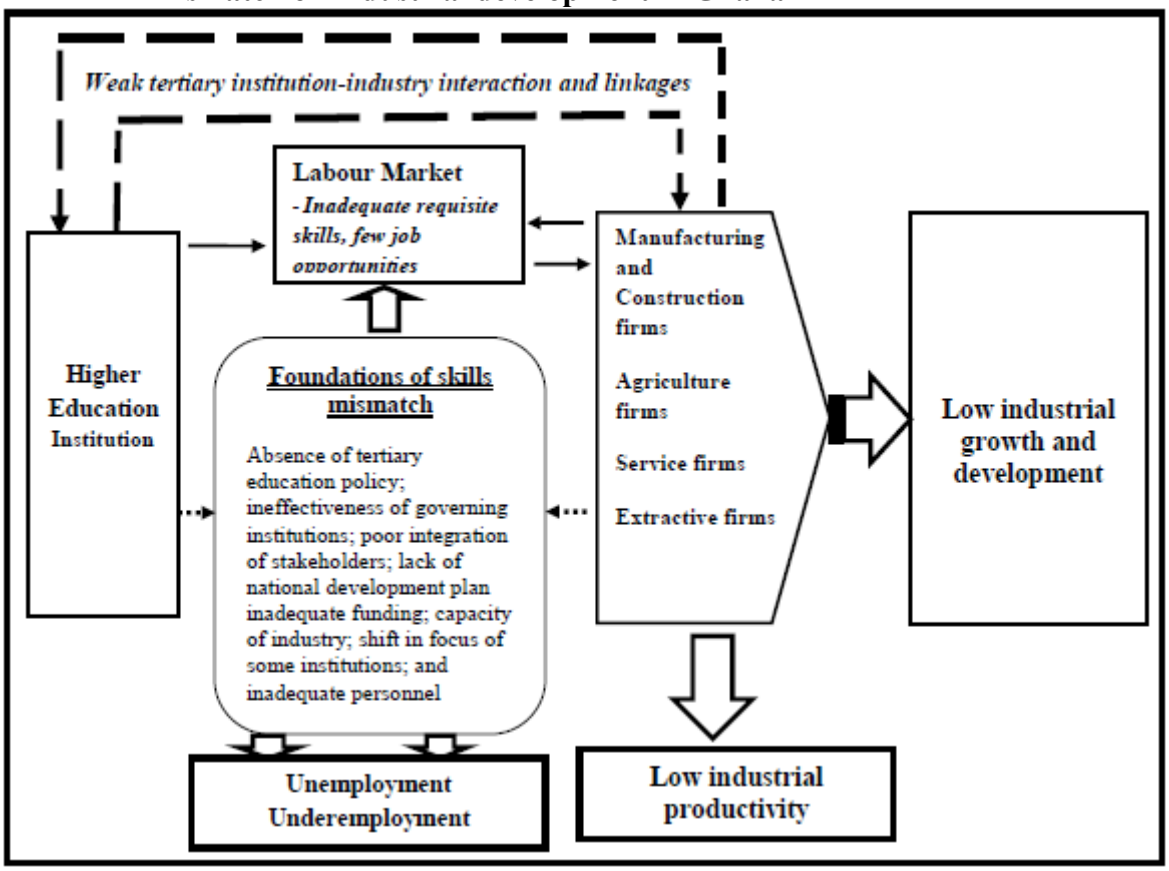
> "*…lack of support or enabling environment for private sector to expand and establish new businesses is limiting its ability to employ more graduates. The government used to be the largest employer in the Ghanaian economy, but now it's the private sector. And because we now have a liberalized economy we need to support the private sector to expand especially those in businesses to grow. They can only employ more when they expand. There should be support to start-up businesses so that they can also be sustainable, grow and employ more graduates…So the private sector is not growing because of lack of support. It is not growing because politicians don't see them as partners, they see them as competitors…"* (A senior member AGI, 2012).

5.1 Summary of the skills mismatch – an operationalisation of the conceptual framework

Based on the findings from the study, the foundations of skills mismatch between what graduates possess and what is needed by firms can be broadly classified into eight (8) subcomponents: non alignment of tertiary education provisions with Ghana industrial policy; ineffectiveness of institutions charged with oversight responsibility for ensuring quality in tertiary education; poor

integration of relevant stakeholders; absence of a national development plan linked to tertiary education/lack of a comprehensive tertiary education policy in Ghana; inadequate funding; inadequate personnel/ infrastructure at tertiary institutions; the shift in focus of some tertiary institutions; and industrial Challenges. The mismatches between tertiary education and the needs of firms have three major effects on the Ghanaian economy: labour market, productivity, and development effect (Figure 9).

Figure 9: Framework of the foundations and effects of tertiary education-firms skills mismatch on industrial development in Ghana



Source: Authors' own construct 2012

Labour market effect: The labour market effect is manifested in the growing unemployment for young graduates. There are a significant number of graduates that are unemployed after completing various tertiary institutions in the country. This is partly because firms consider them as not possessing job-relevant skills and partly due to the low capacity of firms to absorb them. The phenomenon has become precarious to the extent that there is currently an association in the country called 'Unemployed Graduates Association of Ghana'. Aside the teeming masses of unemployed graduates, there is another group who are doing jobs such as shop keeping, taxi driving and so on, that are below the skills and trainings acquired from the tertiary institutions.

Productivity effect: The mismatch between skills possessed by graduates and what is needed by industries compel them to spend considerable amount of resources in retraining newly recruited graduates. This results in high cost of production as well as low industrial productivity and profitability. In some cases, particularly in the extractive firms, highly skilled jobs have to be given to expatriates since such skills are lacking in the domestic labour market.

Development effect: The development effect of the skills mismatch is manifested in the form of low industrial growth and contribution to the gross domestic product of the country. According to the AGI, firms are collapsing and existing ones also lack the capacity to grow. The high unemployment resulting from graduates' skills mismatch and capacity of industry to absorb graduates from tertiary institutions is leading to high dependency rate and increase in social vices in the economy. These negative effects thwart the socio-economic development processes of the country.

6. CONCLUSION AND RECOMMENDATIONS

Aligning tertiary education to meet the needs of firms and the economy has been acknowledged as a vibrant paradigm for holistic development. Empirical evidence exists pointing to the fact that, countries that have created knowledge based economy by situating higher education and skills training at the heart of their development are the fastest growing economies in the world (Wu, 2008). Countries such as China, the Asian Tigers (Korea, Taiwan, Singapore) and the newly industrialised Brazil from the global south are all examples of countries that develop policies, enact laws and create environments in which higher education-industry linkages are thriving. The success of these countries have propelled the international development community to encourage governments of developing countries to invest in higher education, develop policies that will reposition human capital development at the core of their developmental agenda.

Many stakeholders in Ghana including the MOFEP, MOTI, MOE , AGI, etc. have expressed interests in the need to align tertiary education programmes to the needs of firms and the economy. This study was therefore premised on the overarching need to ascertain the extent to which a synergy between tertiary institutions in Ghana and industrial development could exist by examining the existing linkages and mismatches between them.

This study therefore delved extensively into the key issues of tertiary education and industrial development in Ghana by unraveling first and foremost the mismatches between the skills possessed by graduates vis-à-vis the skills needs of firms, and followed up to unearth the

elements informing the mismatches. This was realised through the employment of an eclectic mix of methodological approaches – questionnaires and in-depth interviews were used to gather data, complemented by documentary sources, and analyzed qualitatively and quantitatively.

The mismatches uncovered included the insufficiency of certain skills in the labour market that are highly needed by firms: the ability of graduates to analyse data/situations and propose solutions, leadership and innovation, technical skills, and graduates' ability to take responsibility of own actions and inactions. Another mismatch unearthed is the reduction in employment opportunities in the labour market. Critical among the issues uncovered as informing the mismatch between skills training at tertiary institutions and skills required by firms include: absence of a comprehensive tertiary education policy; inadequate funding, ineffectiveness of tertiary education governing bodies, poor integration and cooperation among stakeholders in tertiary education sector, absence of a national development plan; lack of a conducive environment for tertiary-industry linkages to take place; inadequate personnel and infrastructure; shift in focus of some tertiary institutions; and lack of capacity of industries to absorb all graduates from tertiary institutions. Based on these findings, the following recommendations are put forward to ensure that tertiary education and firms reinforce one other for industrial development in Ghana:

1. Development of a comprehensive tertiary education policy:

There is the urgent need for the development of a tertiary education policy which must be situated within the long term developmental objectives of the country. The policy development process should be informed by the industrial policy and also make provisions backed by law for the tertiary institutions and industry linkages. The tertiary education policy should define the human resource needs of the country and how tertiary education institutions will train human resources to meet the demand. This policy, if developed must also foster the development of private tertiary institutions in areas that are of priority to the country. These institutions must be made to receive some sort of assistance from government to expand with adequate infrastructure to support quality training. With efficient and well-resourced private institutions, a central admission system akin to what exists in some developed countries (such as Germany, Canada, china, etc.) can be developed to control students' admission and placement into tertiary institutions nationwide. This will help decongest the traditional public universities and also reduce the problem of high student-lecturer ratio.

2. Revamp the tertiary education governing bodies

For the nation to achieve development through competent human resource training there is the need for the government to put in measures that will strengthen institutions charged with oversight responsibility of ensuring quality tertiary education. For instance, the law establishing the NCTE limits the council to performing advisory roles, with less authority to sanction or take decisions. It is recommended that the law be amended to give the NCTE the authority to take decisions, sanction and overrule decisions taken by politicians that are not in accordance with national priorities and development goals as far as tertiary education is concerned. The governing institutions must also re-examine all their establishment laws, understand them very well and know what their functions are supposed to be. Also, there is the need to overhaul the composition of governing boards for some of these institutions in order to make them vibrant. The NABPTEX for instance is not having representatives from POTAG and COTVET - two key players in the delivery of technical and vocational education in the country. To give the NABPTEX the impetus that it needs to contribute to the quality development of tertiary education in Ghana, the representation of POTAG and COTVET on this board is indispensable.

3. Enhance both vertical and horizontal integrations among stakeholders in tertiary education sector

There must be effective integration and inter agency cooperation between stakeholders in the tertiary education sector. Communication and feedback mechanisms must be well developed and instituted among all key stakeholders to promote access to and flow of information among the stakeholders. This will enhance well-informed decision making in the sector. For instance, an effective integration among stakeholders can enable the AGI provide information on their skills needs and expectations of graduates, as well as their concerns and grievances to the NCTE, NAB, NABPTEX, other governing bodies and tertiary institutions and vice versa. Ultimately, this integration will inform the development and accreditation of programmes, and the mode of instructions in the tertiary institutions, thereby resulting in the production of the caliber of graduates needed to steer the industrial and other development processes of the country.

4. Enhance the recruitment of lecturers and boost up funding for tertiary education

It is very imperative for government in partnership with tertiary institutions to recruit more lecturers and teaching personnel to enhance teaching and learning. The recruitment of more lecturers will ensure that the ideal students-lecturer ratios for various courses that have been

outlined by NCTE and NAB take effect. In addition, with the continuous widening gap between expected revenue from funding sources and actual expenditure needed to fund quality tertiary education, there is the need to boost the funding of tertiary education in Ghana through innovative means. First and foremost, government must be more committed to funding existing public tertiary institutions by way of supporting the recruitment of more qualified human resource personnel and infrastructure development rather than the creation of more tertiary institutions. In doing that, infrastructure at these establishments will be improved to contain more students, while students-lecturer ratio will also be enhanced for quality training. Secondly, public tertiary institutions must be given more autonomy to commercialize knowledge and own business enterprises in order to promote a strong linkage and partnership with industry. For instance, a knowledge generated through tertiary institution-industry linkage will be protected by patent and copy right laws and that will enable both universities and industry to generate revenue out of knowledge generated through research, besides the benefits of students graduating with competent skills relevant to industry. The private sector must also be encouraged to contribute to the Ghana Education Trust Fund (GetFund) and the Tertiary Institutions Infrastructure Development fund in order to boost allocation of funds. In addition, industries must endeavour to fund programmes in tertiary institutions that best address their needs in terms of skills development and training.

5. Create a greater enabling environment for the private sector and industry to thrive

A critical challenge underpinning graduates unemployment phenomenon in Ghana has been the lack of capacity of firms to absorb all graduates from tertiary institutions. Findings in this study revealed how high cost of production and weak legislative environment are serving as banes to industries to expand. It is therefore recommended that government creates a more conducive environment for the private sector including tax rebates, efficient legislative instrument, etc. in order to boost the expansion of firms, thereby enhancing their capacity to absorb graduates from tertiary institutions.

6. Mainstream entrepreneurship course into all departments programmes

Some of the critical skills mismatches (leadership and innovation, and graduates' ability to take responsibility of own actions and inactions) unveiled in this study border heavily on the minimal involvement of entrepreneurship training in Ghana's tertiary education system. At a time when

entrepreneurship is advocated globally for development, it is recommended herein that all tertiary institutions should mandate all departments to introduce entrepreneurship as a compulsory course for students in their final year. This will help develop graduates' entrepreneurship skills to foster the initiation and proper management of micro enterprises by graduates who are unable to secure employment with the public or private sectors after completing their courses.

7. The promulgation of a legal instrument to compel industries to open up for research

Managements of many firms operating in the Ghanaian economy do not allow their employees to respond to research questions from researchers. The reason often given is that it is part of the firm or company's policy not to answer such questions. In this study for instance, many industries refused to fill in the questionnaire, citing the same reason or indicating bluntly that they are not interested in the. The irony, however, is that many of such firm are among those complaining about the caliber of graduates being produced from the tertiary institutions in the country. The continuous non-involvement of various firms protracts the processes in findings solutions to many of the mutual challenges confronting them and tertiary institutions. Against this backdrop, there is therefore the need for a legal instrument to compel firms to open up for research, especially when it is geared towards the development of the nation, for example, a study such as this one.

8. Create an integrated platform for dialogue on national provisions for tertiary education and the needs of the Ghanaian economy

Some of the critical issues that surfaced in this study include disagreement among some stakeholders regarding entry requirements into various tertiary institutions, lack of comprehensive policy on tertiary education, limitations in the law establishing some tertiary education governing bodies, weak linkages between programmes/courses and the needs of industry; among others. To resolve these challenges and improve upon the effectiveness of tertiary education, there is the need for the creation of a non-political as well as a non-partisan platform for key stakeholders to dialogue on the state of tertiary education, develop a policy framework with long and medium term goals, performance indicators and benchmarks. These performance indicators and benchmarks must be assessed annually, to ascertain progress and effectiveness of the tertiary education sector in building the skilled labour force needed for industrial and economic development.

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APPENDICES

Appendix 1

Institutionalized Framework for quality tertiary education in Ghana

A. *The National Council for Tertiary Education (NCTE)*

The NCTE was established by an Act of parliament (ACT 454[5]) to oversee the proper administration of tertiary education in Ghana. According to article 2(1), the NCTE is to perform the following key functions:

a. to advise the Minister on the development of institutions of tertiary education in Ghana;
b. to enquire into the financial needs of the institutions of tertiary education and advise the Minister accordingly;
c. to recommend to the Minister for the purposes of the preparation of the annual national education budget including block allocations of funds towards running cost; and grants towards capital expenditure of each tertiary institution, indicating how the allocations are to be disbursed;
d. to recommend national standards and norms, including standards and norms on staff, costs, accommodation and time utilization, for the approval of the Minister and to monitor the implementation of any approved national standards and norms by the institutions;
e. to advise governing councils of institutions of tertiary education on suitable measures for generating additional funds for their institutions;
f. to advise the institutions of tertiary education on the applications for and acceptance of external assistance in accordance with government policy;
g. to advice the Minister generally on rates of remuneration and other conditions of service of staff of the institutions; and
h. to publish information on tertiary education in Ghana.

Article 2(2) further stated that the NCTE, in performing its advisory roles should *"take into account the total national resources, needs and development programmes, especially those of the entire education sector."*

The NCTE is governed by a board made up of government appointees, representatives from universities, polytechnics, industry and professional bodies who are stakeholders in tertiary education in Ghana.

B. *The National Accreditation Board (NAB)*

[5] The National Council for Tertiary Education Act (454) was promulgated in 1993 by Parliament of Ghana

The National Accreditation Board (NAB) was established in 1993 by PNDC Law 317. The mandate of NAB is to accredit all tertiary institutions (Universities, professional institutions and all non-university tertiary institutions) and their programmes in the country. The specific functions of NAB include:

a. to ensure some form of minimum quality standards for all tertiary institutions in the country;
b. establish equivalencies between credentials awarded by the institutions in Ghana and elsewhere;
c. publish the list of all accredited institutions every year.

The NAB is made up of 15 members: government appointees, representatives of private and public universities, polytechnics, non-university tertiary institutions, professional bodies and industries.

C. *The National Board of Professional and Technician Examinations (NABTEX)*

The NABPTEX was established by an Act of parliament (Act 492) with the mandate to formulate and administer schemes of examinations, evaluations, assessment, certification and standards for "skills competence" and "syllabus competence" for non-university tertiary institutions, professional bodies and private institutions with accreditation by the NAB. Specifically, NABPTEX is to perform the following functions[6]:

a. provide administrative and structural facilities and expertise for the organization and conduct of professional and technician examinations;
b. conduct examinations and award national certificates and diplomas based on the result of the examinations in consultation with the relevant polytechnics and professional institutions;
c. at the request of government or any other body, conduct any examination;
d. review syllabuses for general curriculum enrichment;
e. appoint examiners and moderators and determine methods for the proper conduct of examinations;
f. make regulations to govern its examinations and awards;
g. devise a scheme for testing skills for competence and for testing aptitude; and
h. provide such guidance and counseling services as would be needed by non-university tertiary institutions.

The NABPTEX is governed by a 15 member board with representatives from Ghana Education Service (GES), Ghana National Association of Teachers (GNAT), West African Examination Council (WAEC), polytechnics, UNESCO, Ghana Private Tertiary Institutions (GHAPTI), Joint Matriculation Board and industry. The board is headed by a chairman who is appointed by the president and the executive secretary serves as the secretary to the Board.

[6] See the National Board for Professional and Technician Examinations Act (492) of 1994

D. ***Tertiary education division of the Ministry of Education (MoE)***

The tertiary education division of the MoE was created in 2006. The division serves as the policy administrative unit for tertiary education within the Ministry of Education. The division also serves as a referee between all the governing bodies of tertiary education (NAB, NCTE, NABPTEX) and the tertiary institutions in the country. The division is headed by a director who reports directly to the Deputy Minister of Education in charge of tertiary education.

Appendix II

Ideal Student-Lecture Ratio Developed by National Council for Tertiary Education

Student: Academic staff ratio (STR) - Universities

Subject categories	**STR**
Social sciences and Humanities	27:1
Business Administration	27:1
Science	18:1
Applied Science, Technology and Health Science	18:1
Engineering	18:1
Pharmacy	15:1
Medicine	12:1

Source: NCTE, 2012

Appendix III

Ideal Student-Lecture Ratio Developed by National Council for Tertiary Education (Polytechnics)

Student: Academic staff ratio (STR) - Polytechnics

Subject categories	**STR**
Social sciences and Humanities	25:1
Business Administration	25:1
Science	20:1
Applied Science, Technology and Health Science	18:1
Engineering	15:1
Dispensary Technology	18:1

Source: NCTE, 2012

Appendix IV

Nature of departmental interaction with firms

Nature of interaction	Frequency (N = 35)	Percentage
Student attachment and vacation jobs	33	94.3
Participation in tertiary education workshops/seminars	29	82.9
Career development meeting with students	15	42.9
Cooperative research programmes	12	34.3
Consultancies	11	31.4
Graduate recruitment	7	20
Joint monitoring of programmes with firms	6	17.1
Faculty attachment	6	17.1
Funding of graduate/undergraduate program	4	11.4
Business incubation centres	1	2.9

Source: Field data, 2012

Appendix V

Reasons for the non-involvement of firms in the development of programmes in the past five years

Reasons	Frequency (N = 18)	Percentage
Firms do not honour invitations to participate in courses/programmes' development workshop/fora and conferences	17	94.4
Programmes offered in this department are not of interest to firms	17	94.4
Department does not ask for input from firms when developing course/programmes	7	38.9
There is no channel of communication between industry and this department	7	38.9
Lack of willingness of firms to co-operate/partner tertiary institutions	5	27.8

Source: Field data, 2012

Appendix VI

Participation of firms in the development of programmes in tertiary institutions

Firms participation in programme development	Percentage
Yes	27.3
No	68.2
Don't know	4.5

Source: Field data, 2012

Appendix VII
Adequacy of infrastructure in departments

Response	Frequency		Percentage		Total	
	Public	Private	Public	Private	N = 40	%
Yes	6	15	15	37.5	21	52.5
No	16	3	40	7.5	19	47.5
Total	22	18	55	45	40	100

Source: Field data, 2012

Appendix VIII

Inadequate infrastructure at departments that responded NO

Inadequate Infrastructural	Frequency		Percentage		Total	
					N = 19	%
	Public	Private	Public	Private		
Lecture halls	10	-	52.6	-	10	52.6
Libraries	10	1	52.6	5.3	11	57.9
Reading rooms	13	1	68.4	5.3	14	73.7
Laboratories	10	-	52.6	-	10	52.6
IT Infrastructure	11	2	57.9	10.5	13	68.4
Research Centres	6	2	31.6	10.5	8	42.1
Office for lecturers	15	2	78.9	10.5	17	89.5

Source: Field data, October, 2012

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International Growth Centre,
London School of Economic
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Houghton Street,
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