

**CHALLENGES FACING EDUCATION AND TRAINING OF CONSTRUCTION
AND TRAINING OF CONSTRUCTION INDUSTRY PERSONNEL
(A Case for Zambia)**

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ABSTRACT

This paper discusses the challenges facing education and training of construction industry personnel in Zambia. The serious lack of capacity in the construction industry poses major challenges to the sector and needs to be addressed by bridging the gap between formal and non-formal education. The National Council for Construction in Zambia recognizes that workforce development is not separate from economic development and that employment, education, and economic development professionals must work together to solve the workforce challenges of the 21st century economy. Historically, the construction industry has largely relied on a core of highly skilled staff to supervise a largely semi-skilled and unskilled workforce. However, new technological advancement and globalization have brought new training needs and challenges to the Construction Industry, which is a core industry that underpins all others (i.e. other sectors of the economy depend on the construction industry to build and maintain the facilities and infrastructure that are vital to their daily operations). The paper also examines challenges in the training and development of construction sector skills in the new millennium, using Zambia as a case study for the region. In particular, deregulation, globalization, technological advancement and HIV/AIDS as well as the current economic boom, is impacting the capacity of Skills Development in the Zambian Construction Industry.

This paper concludes that comprehensive business, education, and workforce development partnership are needed to develop innovative approaches or replicate models that operationally demonstrate how a demand –driven workforce system can more effectively serve the workforce needs of business in the construction sector.

Keywords: HIV/AIDS, Construction sector skills, training, innovation, globalization, technological advancement

1.0 INTRODUCTION

The National Council for Construction in Zambia recognizes that workforce development is not separate from economic development and that employment, education, and economic development professionals must work together to solve the workforce challenges of the 21st century economy. However, meaningful and sustainable skills development requires supporting pieces of legislation as well as growth factors in the economic outlook of a nation.

The Challenges facing the construction sector in Zambia stem from the economic cycles that have taken the country through highly turbulent times since independence in 1964. The Skills shortage and subsequent slow growth stems from the effect of the economic downturn Zambia suffered from about mid 1980s up until 2000 when a large pool of skilled personnel left the country for ‘greener pasture abroad’. This led to a significant drop in enrollment at various levels of education and training system.

Higher education sector is small but influential at other levels and in all sectors of national development and its functions as the only source of qualified professionals, managers and leaders.

Regionally, when it comes to debate on ‘contracting capacity building interventions’, Zambia lags behind in coming up with meaningful and sustainable intervention measures to address rapid engagement in the booming Construction, Mining, Agriculture, Energy and Tourism sectors which have brought immense pressure on the performance of contractors engaged in infrastructure development.

Zambia needs partnerships locally and globally, to enable employers, community, and all stakeholders to strongly participate in developing skills, which are crucial for national development. Training and Development is cardinal to national development because unskilled population will remain unproductive and depend largely on services provided by the Government

Considering the above outline and the main theme for the ‘CI Forum’ our statement problem is the following:

How is the Zambian National Council for Construction Responding to the Construction Sector Skills Development Challenges in the New Millennium?

2.0 CONSTRUCTION SECTOR IN GENERAL

2.1 Economic Performance

According to the Bank of Zambia 2007 Annual report and the 2008 first quarter report of the Central Statistics Office (CSO), Construction is one sector that has continued to post good results over the recent past. The 2007 Bank of Zambia report highlights that Zambia recorded 5.7% real growth domestic product (GDP) marking the fifth consecutive year of economic growth exceeding 5%. Major drivers in this growth were agriculture, construction (sector grew by 12.2% in 2007 representing 1.2% points to real GDP), transport and communications, tourism and manufacturing sectors. During 2006, the construction sector grew by 14.4% and contributed 1.3 percentage points to 6.2% GDP growth the country posted during 2006. However, this outturn was a slump from the 21.2% recorded in 2005 when it also contributed 1.7% points to the 5.2% GDP growth. In fact construction has contributed the largest share of percentage points to GDP since 2003. As for the slump experienced between 2005 and 2006, a plausible reason is that during the latter part of 2006 and through 2007, Zambia endured a shortage of cement, which forced prices of the commodity to escalate thereby constraining construction activities. Some relief is anticipated following investments of amount US \$170million in cement production by the newly rebranded Lafarge Cement Zambia formally known as Chilanga Cement Plc. To crown this anticipated relief, it may be worth mentioning that cement total production figures will be augmented by the new Zambezi Portland Cement in Ndola as well as a cement factory owned by Scirrocco Enterprises in Lusaka. These developments are anticipated to further boost the construction sectors growth in 2009 and beyond. However, experts argue that production may not stabilize prices because of eminent national-wide power supply shortage.

2.2 Management of the Sector

To coordinate the sector's efficient management, the National Assembly passed the National Construction Council (NCC) Act that establishes a private sector dominated autonomous statutory body that advised on policy development for the sector. The NCC Act also provided for the establishment of the Construction School as a department. To that end NCC has two major functions namely:

- ✓ Registration and Regulation of contractors
- ✓ Training and Development of Local Contractors and Consultants

Besides NCC, the Zambia Institute of Architects, Engineering Institute of Zambia, Surveyors Registration Board and the Valuation Surveyors Board of Zambia govern other stakeholder professions in the sector. And to ensure that sanity prevails in the construction sector, NCC has demanded that all construction firms register with the council besides running a campaign for the public to engage only NCC-registered contractors. Conversely, this requirement of only using registered contractors is not being fully adhered to by the private developers especially individual housing units and dwellings.

Although NCC has dealt with the challenge of unregistered contractors, the main challenge now is ensuring that the government honours its commitment in terms of funding construction projects. Should the government honour its obligations in the regard, and fully settle amounts owing to contractors, the sector will have enough liquidity to pump back into the economy, for the good of even non-construction businesses. Further, the issue of local contracting capacity and skills development continue to pose a major challenge for the sector chiefly due to lack of established means for sustainable skills development.

While the number of scarce skills is rapidly increasing in Zambia, the institutional capacity to deliver meaningful and sustainable skills development is still lagging behind other SADC countries in the region, according to 2004 TEVETA Annual Report. Scaffolding, Roofing, Steel Fixing and Crane Operators are on vey high demand due to housing and green-field mining development (Muya et al.2006). Figure 1 illustrates this point.

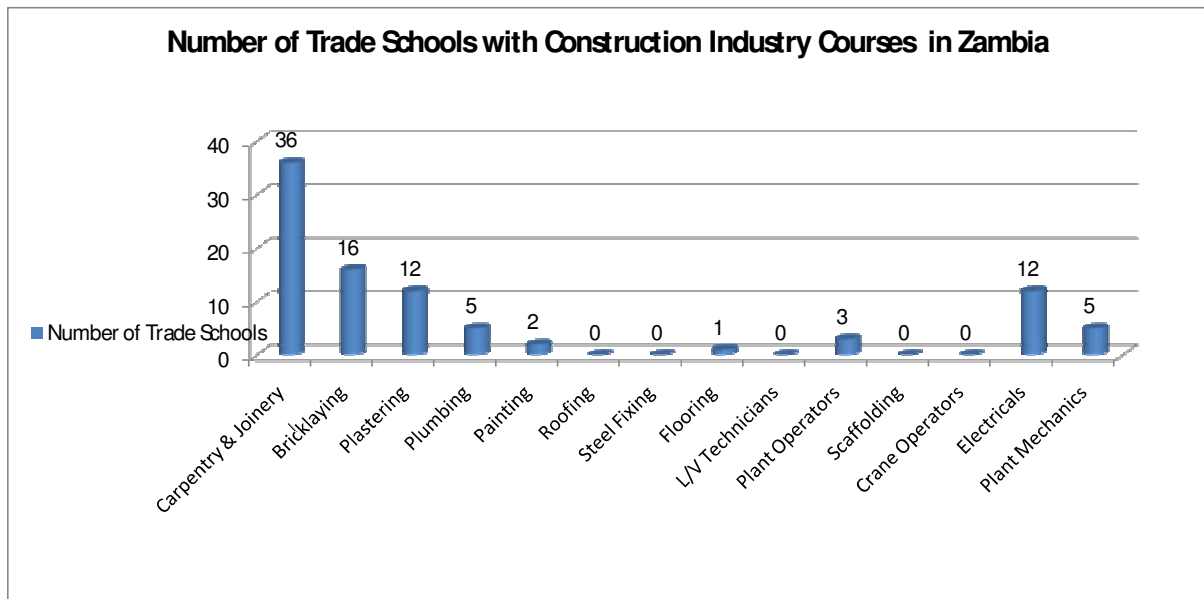


Figure 1: Current Institutional Capacity for Skill Development in Zambia
 Source: Technical Education, Vocational & Entrepreneurship Authority (TEVETA) (2003)

As construction industry struggles to produce more skilled craft workers, TEVETA (2007) reported that new legislation has been passed to bring back apprenticeship schemes and this will improve the proficiency of the graduates from TEVET Schools in Zambia.

3.0 CURRENT DRIVERS OF CHANGE FOR THE CONSTRUCTION SECTOR IN ZAMBIA

The Construction sector has been going through phenomenal transformation over the past 5 years in Zambia. The drivers of change include the following:

1. Globalization - procurement on construction projects has been opened to the International market
2. Deregulation of Public infrastructure development and management
3. The Private Sector/Donor financing policies
4. Increased Foreign Direct Investment
5. Macro-economic stability since 2003 (Bank of Zambia Annual Report, 2007)
6. The immerging Information and Communication Technology role in the Construction Industry
7. Energy crisis pointing to infrastructure development e.g. Hydro/Nuclear Power Station
8. Technological Advancement

3.1 Macro-economic stability

Zambia offers potential investors a generally positive investment climate in which the maintenance of macroeconomic stability and the creation of an enabling environment for private sector activity, industrial growth, export promotion and foreign direct investment (FDI) is a prime concern. The main attractive elements of the Investment climate include the following factors:

- Increased real sector activity
- Improved external sector performance
- Containment of expansion of monetary aggregates
- Decline in commercial banks nominal lending interest rates
- Deceleration of inflation
- A sharp drop in the stock of external debt
- Improved balance of payments inflows following attainment of the enhanced “Highly Indebted Poor Countries (HIPC) Completion point”.

The following table (Table 1) and Figure 2 show the performance of the top five economic sectors in Zambia over the past 7 years:

Table 1: Performance of the Top Five Economic Sectors in Zambia over the past 7 Years:
Percentage Real Sector Growth at Constant 1994 Prices (2001 -2007)

	2001	2002	2003	2004	2005	2006	2007
Agriculture	2.6	1.7	5	4.3	2.8	2.2	1.9
Tourism	2.1	4.8	6.9	6.4	12.1	16.1	14.2
Manufacturing	4.2	5.7	7.6	4.7	2.9	5.7	4.9
Mining	14	16.4	3.4	13.9	2.8	7.3	5.2
Construction	11.5	17.4	21.6	20.5	21.2	14.4	12.2

Source: Central Statistics Office (May 2008)

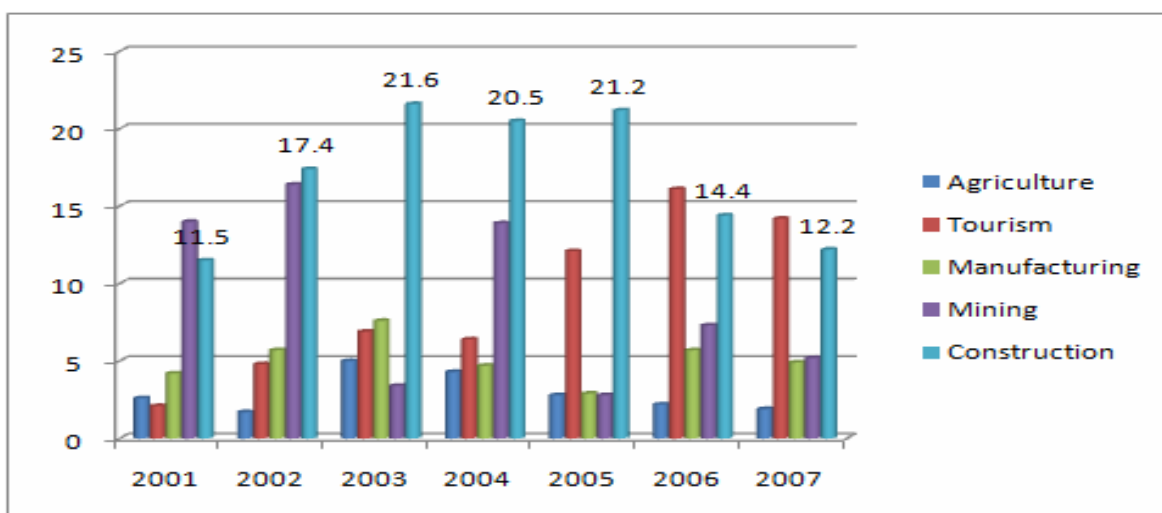


Figure 2: Performance of Top Five Economic Sectors

Source: Central Statistics Office (May 2008) - Zambia

Zambia has worked to diversify its economy away from copper with some success. The Zambia 2008 Forecast Business report, which was published by Business Monitor International (BMI), found that the effects of massive foreign investment have spread throughout Zambia. The report contends that the construction and mining sectors will continue to spur economic growth on the back of improved macroeconomic policy, high commodity prices and foreign investment, which should keep the real GDP growth strong, boost government revenue and expenditure, and help strengthen the currency.

This globalised economy is posing big challenges for local skills development in the absence of established funds for sustainable skills development for general citizenry. The business environment is slowly awakening to the introduction of new legislation called the Citizen Economic Empowerment Commission (CEEC) Act of 2006. The CEEC Act could see changes in the country's regulatory framework in the years ahead, with a shift towards preferential treatment of domestic firms and citizens.

3.2 Increased Foreign Direct investment - (FDIs in Zambia)

Following a continued attractive investment environment, Zambia's foreign direct investments (FDI) increased further in 2007 especially in the 'green-field' Mining establishment (e.g. Lumwana in Solwezi and Albidon at Munali Hills in Mazabuka district). The Bank of Zambia 2007 Annual report indicates that total investment pledges were estimated at US \$1.8 billion in 2007 compared to US \$ 751.2million in 2006 reflecting continued investor confidence as a result of favourable macro-economic performance. These pledges when fully executed, were expected to generate 12, 711 jobs with a subsequent demand for construction skills for timeous execution of preliminary works in mining, agriculture, tourism, agriculture and manufacturing sectors.

3.3 The private sector

Growth in the construction sector is driven by activities in road sub-sector and residential housing. It is also getting a further boost from the development of Equinox Resources Limited's Lumwana Mine and the commencement of Konkola Copper Mines (KCM) Plc's Konkola Deep Mining Project. Furthermore, African Eagle Resources (AER) has found joint venture partners for its projects at Mkushi and Ndola, raising prospects of their development while Zambezi Resources Limited has also partnered with Glencore, which already owns 73% of Zambia's Mopani Copper Mines (MCM) Plc, to develop two projects in Chongwe district.

The private sector has continued strengthening its role in the construction sector by not only establishing a plethora of construction firms but also by undertaking various projects. Since 2003, notable construction projects include Arcades Shopping Centre on Great East Road by Platinum Gold Equity(PGE); Meanwood Housing Project in Ibex Hill, Ndeke Village and Chamba Valley by Meanwood Property Development Company Limited (MPDCL) and the Lilayi Estate Development in Lilayi area.

3.4 Technological Advancement and ICT in Construction - the New Procurement Methods

New technological advancement has brought new ways of constructing. Usage of Building Information Modelling (BIM) is significant and growing, but there remains a dire need for enhanced awareness and about the need for interoperability and the benefits of digital design. These trends serve as challenges for the industry, but represent exciting opportunities for the Construction player in Zambia and the region. The digital design, surveying and e-procurement, Video Conferencing facilities are a new dimension to the Construction Sector and it is doubtful whether this Trend will be reversed. Entrepreneurship and innovation are two areas that are affected when a change in firm's environment occurs, like Shane (2003) and Drucker (1993) point.

There are basically two methods dominating the Zambian Construction Industry namely: Design & Build Method and the Electronic Procurement.

3.4.1 Design and Build Method

Over recent years there has been a significant drive away from traditional procurement routes where contractors find themselves with an increasing responsibility for the control of the design -- a process they have had little experience in managing (Bibby, Austin, and Bouchlaghem, 2006). Clients are increasingly adopting design and build type procurement routes in favour of traditional contracts to reduce their risks associated with construction projects. As a result, contractors are now expected to accept an increasing responsibility for the control of design. The learning curve is steep but they have to adapt accordingly.

Egan (2002) argues that it is necessary to educate an increasing number of people in design management practices and tools to equip them to manage today's fast moving and demanding projects. However, many current design management tools are insufficiently developed for the industry (Bibby et al., 2003a). They are fragmented, insufficiently developed, poorly deployed and couched in abstract terms (Freire and Alarcon, 2000). For example, we have many ICT schools teaching project management in Zambia, but most of these courses are delivered generically and lack deep sectoral data for practicing. Moreover, as they tend to be overly complex and force practitioners into unwanted procedures (Kanter, 2000), are not gaining wide adoption. South Africa for example has more than 20 Sector Training Authorities (SETAs) addressing specialised training needs for each industrial and or economic sector. Therefore, to improve design management in the industry, current techniques must be modified to align them with the needs of the modern manager of the design process in the Construction Sector.

3.4.2 Electronic Procurement Methods

The 'e-procurement method' is an increasing challenge in Zambia. Although this trend is being promoted by the new Mine owners in Zambia (formally owned by ZCCM), the local firms are far from ready in adopting this method. However, in line with global trends the NCC Construction School will soon launch, in liaison with stakeholders, training workshops to address this growing trend. The courses will be tailored to provide guidance on critical aspects of design management practice as well as e-procurement methods necessary for honing competitive advantage of the local firms. These workshops will be imbedded in the mandatory CPD programs for Contractors and Consultants.

3.5 Deregulation of Public Infrastructure Development and Management

In 2003, Parliament enacted the National Council for Construction (NCC) Act that enabled the NCC to become a statutory body. The Act has made it possible for many small and medium scale contractors to become legally registered. It should be noted however, the NCC is a semi-autonomous body as it is still a grant-aided institution under the Ministry of Works and Supply.

Deregulation in the Ministry of Works and Supply actually started with the National Construction Industry Policy of 1995 that also saw the demise of 'force accounting' in the Roads Department of the same Ministry. In 2002, the Public Roads Act No. 12 led to the establishment of the Road Development Agency (RDA). This arrangement subsequently led to the formation of another agency for funding in the name of National Roads Fund Agency (NRFA) in 2004. The agency is able to pool funds for use in the road sector more efficiently. Furthermore, Government also developed a Transport Policy in 2002, under the Ministry of Communication and Transport which subsequently led to the formation of Road Traffic Safety Agency (RATSA). This agency is linked to NRFA through 'Road Tax' and 'Fuel Levy' which has created a sustainable local funding process for road rehabilitation works. The Road fund collection is augmented by donor support as well as the World Bank.

Another significant deregulation exercise was the transfer of Zambia Industrial Mining Company (ZIMCO) and Industrial Development Company (INDECO) properties from the portfolio functions of the Ministry of Works and Supply to the Ministry of Local Government and Housing (National Housing Authority) in 2005.

In 2004, Government made a decision to promote Public Private Partnerships (PPPs). Since then the private sector has shown keen interest in working with the Government especially in public investment programmes like roads, rail lines, bridges and dams. The final PPP policy and Act shall be promulgated before end of 2008 as all preliminary documentation processes have been approved.

3.6 Energy Crisis - Power Supply Outages

The Economist Intelligence Unit (EIU –ViewsWire) Limited in New York, reports that Zambia has not increased its power-supply capacity for at least 30 years according to (‘Zambia economy: Lights out, 2008, EIU’). As mining production declined between 1975 and 2000 so did electricity demand, leaving the country with surplus power. However, the authorities ignored maintenance requirements, as evidenced by current rehabilitation works to recoup more than 450 Mega Watts of capacity from lost potential at the time when demand is growing rapidly. Power supply in Zambia has been outstripped by multiple investments in other mining and manufacturing sectors. On the global level, fuel prices have continued to escalate and this will also impact construction activities in the country.

4.0 WORKFORCE CHALLENGES AND SOLUTIONS

First, the Image of the Industry could be improved among key demographic groups, including youth, parents, and girl-child, educators, and guidance counsellors. Second is declining enrolment levels in the TEVET Trades Schools. Third is the challenges caused by skills gaps indentified due to rapid technological advancement in the construction sector thereby creating need for up-skilling both the incumbent workforce and the capacity and capability of some of the education and training providers. The issue of HIV/AIDs is also taking its toll on the skilled construction personnel. The list is long, but suffices to say the author has only attempted to discuss the few apparent challenges in Zambia.

4.1 Image and Outreach

Perceived unattractiveness of construction industry career among young people. Industry leaders noted that the industry’s image could be enhanced in a number of areas, including safety, skills requirements, and corporate culture. Image could also be enhanced by increased advocacy on the changing role of Women in Construction, improved uptake of ICT skills in the sector, technological advancement and globalisation. To that end NCC has started organising Mobile Site Training Workshops to improve site safety standards and creating awareness on new sector skills. NCC has also been conducting career talks in high schools especially those promoting advancement of girl–child programs. NCC intends to launch a national media campaign (e.g. Quiz or Raffle) to improve the image of the industry and may also create career academies in high schools.

4.2 Inclusivity – the Changing Role of Women in Construction

With the need to achieve the Millennium Development Goals by 2015, as well as changing demographic features in Government in the SADC Region, it has become imperative to purposely grow the number of women participating in the construction Industry. In the UK for example, the concentration of women and men in different kinds of jobs described as occupational segregation is a key issue for Government, employers and individuals today (Gurjao, S., 2006, p.2). As a core industry that underpin all others, the construction industry has been widening the net by capturing a more diverse range of people in terms of age, gender and ethnic origin in order to recruit and develop a high quality workforce that is motivated and skilled to meet the growing construction needs. Gurjao, S. (2006) concludes that increasing the number of women in the workforce would go a long way in reducing escalating labour shortages in many countries with booming construction sectors. Therefore, expanding inclusivity, which includes attracting and retaining more women in the construction sector, is also a key to resolving labour shortage and subsequent skills development.

4.3 Skills Development and Education and Training Capacity

Some industry experts reported that some youth lack academic and employability skill needed in the construction industry Cheryl (2008). As a response to this challenge the NCC through a local Contractor development program sponsored by the Ministry of Works and Supply as well as Barloworld Equipment Zambia Limited has managed to train 93 Number Grade 12 school leaders in three major programs which includes skills in Enhanced Labour – Based Road technology program, Paved Road Maintenance skills and Earthmoving Moving Equipment Operations. Currently, 30% of this group have already been absorbed by the Industry while 70% of the group are still undergoing training and mentorship through a Ministerial Funded program on construction of footpaths and side roads in the capital city of Zambia.

4.4 Education and Training Capacity for Entry-level and Incumbent Workers

The third broad workforce challenge currently facing the construction industry is developing the skills of entry-level and incumbent workers, as well as boosting the capacity and capability of education and training providers that serve these workers. Industry professional stakeholders, especially consulting engineers and architects, have highlighted a number skills development challenges facing entry level workers such as health and safety as well as advancement challenges for non-traditional careers entering construction sector for the first time (e.g. Retrenched Civil Servants, bankers, miners, etc). Other entry-level workers lack the skills to effectively use the increasingly complex technology being utilised in the construction industry, such as equipment used in heavy construction projects.

Incumbent workers face challenges as well, particularly the need to boost their leadership and management skills. Some workers have little experience working with non-traditional labour pools. Effective Management of Construction work processes and reduction of down time in a serious challenge for this ICT integrated processes. Old and highly experienced supervisors now need ICT skills. To that end the NCC Secretariat has started running short modular sector ICT appreciation courses for the Construction Managers, Consultants and Entrepreneurs.

4.5 Limited Funding for NCC School

Limited funding has continued to pose phenomenal challenges for construction sector skills. It must be noted that although the Zambian Government (through the Ministry of works and Supply) has done so well with its limited resources, many training and developmental activities that are required to bring the sector skills up to speed with International Standards require more funds. Each training project by the Construction school is there to remedy a particular pressing concern. Cut backs effectively mean choosing which pressing concern to ignore. The Construction School is intending to roll out demand driven courses to appropriate tertiary institutions around the country so that it can concentrate on scoping and developing standards as well as conducting research and developmental studies for the construction sector.

The competing needs of government can not end. The only sustainable solution for skills development is to vigorously lobby for establishment of Sector Skills Development Fund

Consultants are also invited as Guest Lectures to participate in the Development of manpower policies in order to address the future skills needs of the construction.

4.6 Low Capacity of Sector Skills

It is surprisingly very similar that issues of labour shortage and training, according to Versace V. (2008, p. 3), are faced by countries worldwide. Low capacity to undertake works by contractors in the sector was identified as one of the challenges that was to be faced and addressed as implementation of the FNDP progressed in Zambia. This low capacity is also evident from the fact that the majority of registered contractors under the NCC Act of 2003, are in Grade six (6), the lowest project value execution capability class as illustrated in Table 2 and Figure 3.

Table 2: Registration of Contractors

Month/Year	Category	Number of Contractors	Grade					
			G1	G2	G3	G4	G5	G6
Nov-06	B	745	11	3	16	33	92	590
	C	97	6	3	13	11	12	52
Nov-06	M	96	3	2	4	7	29	51
	E	29	0	2	0	8	3	16
	R	688	11	3	8	14	62	590
	Total	1655	31	13	41	73	198	1299

Key:

B = Buildings; C = Civil; M = Mechanical; E = Electrical; R = Roads; Grade 1 is the highest grade with “unlimited ceiling on bidding price criteria” and Grade 6 is the lowest with “ceiling amount” of below US \$ 1500 on size of maximum bidding price

Source: National Council for Construction in Zambia (2007)

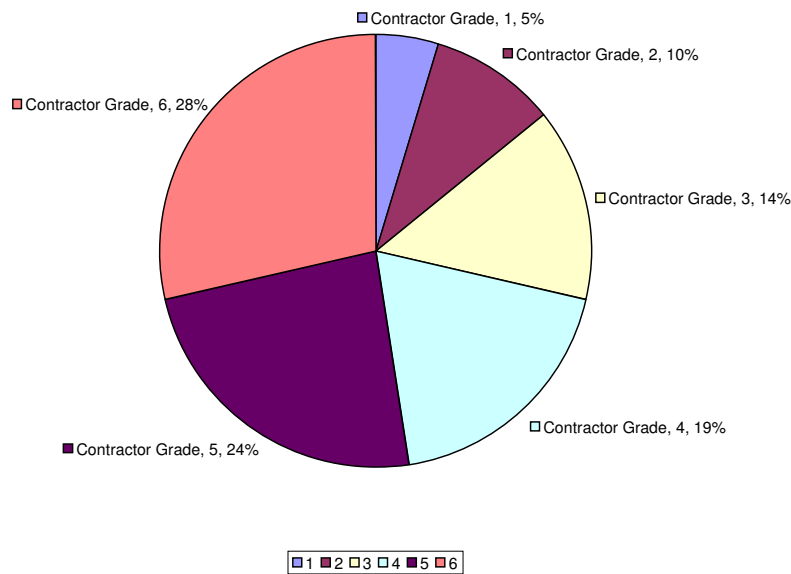


Figure 3: NCC-Contractor Grading as at November-2006

Source: National Council for Construction in Zambia (2007)

The current surge in public outcry regarding the Activities in the Construction Industry point to one important element in the function of NCC as outlined in the NCC Act of 2003. The Public expectation of NCC role regarding the Construction Industry still remains very high. However, the NCC’s attempt to address the ills of the industry has brought to the fore a lot of industry gaps which will take time to address.

Chakonta (2007), who is a director development at TEVETA, observed that the low literacy levels in the country and un-regulated entry of Contractors into the Construction Sector coupled with low enrollment of tradesmen into technical colleges is having its toll on the quality of the products in the sector. Concerted effort from TEVETA in establishing the TEVET Qualification Framework would probably address this challenge. To augment this process NCC Construction School needs to carry out a Construction Industry Skills Audit (Chakonta, 2007)

Chakonta (2007) further observed that the Local Authorities who possess statutory powers to test construction materials on every construction site and to ensure adherence to approved set standards are simply not doing so leaving industry players with no quality monitoring activity. On the other hand, the Government and the public have no luxury of time to wait for these problems to be fixed. Pressure is mounting as more and more local Sector SMEs manifest performance weaknesses on many projects countrywide.

4.7 Public Private Partnership (PPPs) in Training and Development

Public Private Partnerships with the private in sharpening the skills of our citizens is the way forward improved and enhanced delivery of quality education in the Construction Industry of Zambia. The pace of technological advancement and globalization is too vivid to ignore, hence the proposal to shift on establishing effective links with the industry.

The NCC, TEVETA and Barloworld Equipment Zambia have partnered to enhance the provision of skills training and development in Zambia through appropriate MOUs signed in early 2008. The NCC- Barloworld partnership is covering the training of Operators for Earthmoving Equipment in Zambia and the region while TEVETA signed an MOU with Barloworld on the training of Mechanics and Lectures at three tertiary institutions in Zambia. Further Barloworld donated 2 old heavy duty caterpillar engines as well as 2 latest state-of- art engines to TEVETA for use in the training of Zambian Heavy Equipment Mechanics.

These two partnerships have kicked off phenomenal interest from the Construction and Mining Sectors. If implemented and managed well the systems will go a long way in producing highly skilled and motivated workforce.

4.8 HIV/AIDS in Construction Industry

According to Barnett and Whiteside (2002) the deeper an industry is located within the unregulated “informal” industry, the greater its vulnerability to the impact of HIV/AIDS. Skilled construction workers have the second highest HIV prevalence rate of all other occupations, higher even than general labourers. A possible reason for this is that general labourers are often hired as limited-duration employees from the area where the project is being undertaken and are therefore do not necessarily have to live away from home for long spells. Skilled construction workers, on the other hand, are more likely to be permanent employees of the companies concerned, because of their higher skills level, and are thus more likely to move around with construction projects, hence increasing their prevalence rate. An interesting finding is that the majority of skills construction workers are 30-39 years old, while general unskilled labourers are predominately 20-29 years old. This indicates that the skill level and age are positively correlated (Barnett et al, 2002)

Thus the results from these data are consistent with the literature (Meintjes *et al*, 2007) where employees (other than foremen) who spend time away from home and semi-skilled employees have the highest HIV prevalence rate compared with other occupational groupings. The high HIV prevalence among the low/semi-skilled employees is attributable to a combination of low education, low-semi-skilled employment and mobile/migrant labour. Construction firms need to take cognizance of the presence of these risk factors, and undertake targeted interventions such as education, treatment and support programmes – with particular emphasis on ‘areas of high prevalence’.

While any conclusions are constrained by the limited range of risk factors measured by the recent survey in South Africa, the following conclusions are suggested by this analysis. ‘White-collar’ workers tend to be higher skilled, have permanent monthly employment with lower travel, and clearly have a lower prevalence of HIV/AIDS compared with all other occupation categories. This derails tracer studies for trained personnel and impacts on sustainable and meaningful skills development efforts.

Further, Phillips (2007) reported in the Wall Street Journal of 17th July 2007, that HIV/AIDS in Zambia has reduced the average life span to 38years. This means reduced capacity for highly skilled construction experts.

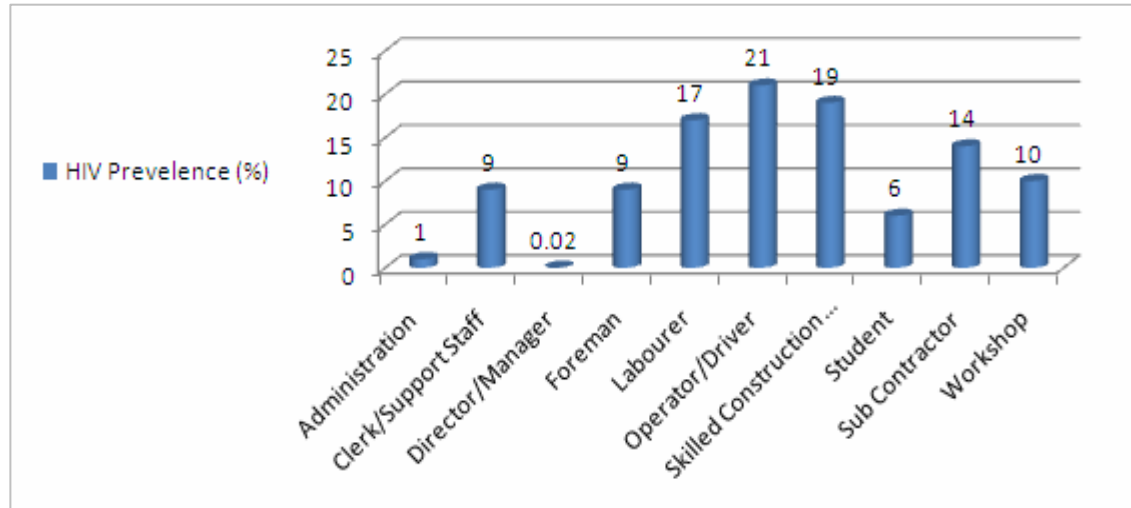


Figure 4: HIV Prevalence by Occupation (%) in RS

Source: Bowen et al. (2008) – ‘HIV/AIDS empirical study in the South African Construction Industry’

Figure 4 illustrates the prevalence of HIV in relation to occupation, according to Bowen et al. (2008). The research found that out of the sample of 10243, the occupation status of 9365 (91%) participants were recorded. The results from the research indicated Operators/drivers have the highest prevalence (21%) of HIV and the Directors/Managers have the lowest rates ($\leq 1\%$) while disparate occupation with very small numbers were ignored (Bowen et al., 2008, p.6.)

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

- Higher education in Zambia has a critical role to, play in developing and advancing the national education system through generating and disseminating research knowledge in areas such as curriculum, teacher training, reading , financing, management, quality of teaching, gender, equity, education management, policy and planning. A research mission helps to generate knowledge, technological and other innovations critical in national education and national development.
- Campaigns for increased funding for higher education are due to its perceived contribution in national development and in achieving Millennium Development Goals of: eradicating extreme poverty and hunger, promoting gender equality and empowering women, combating HIV/AIDS, ensuring environmental sustainability and developing a global partnership for development.

- As the construction sector continues with non-stop boom, according to the ‘BMI 2008 Zambia Forecast report’, it has become necessary that NCC refocus attention on effective and sustainable human resources development strategies for the sector. The recent research conducted by (Muya et al. 2006 , p. 224), cites the need for construction sector specific training levy would be the most viable, sustainable and industry –wide supported option for supplementing Government funding in the training of construction skills in Zambia

5.2 Recommendations

- Comprehensive business, education, and workforce development partnership to develop innovative approaches or replicate models that operationally demonstrate how a demand –driven workforce system can more effectively serve the workforce needs of business while also helping workers find good jobs with good wages and promising career pathways are being promoted by NCC. To augment this, Government’s Technical Education, Vocational and Entrepreneurship Training (TEVET) Policy seeks to create a national system for TEVET that will act as a vehicle for improved productivity and income generation in the economy; to achieve this government has embarked on various initiatives which aim at enhancing the quality of skills provision in collaboration with key stakeholders. However, this intention is constrained by society’s inadequate appreciation of the role of technical competences in national development.
- NCC is recommending skills competition across the entire ‘construction sector value creation chain’ so as to improve the image and attraction of careers in skilled trades and technology. It is envisaged that the competitions if run properly could bring to the fore the following outcomes:
 - ✓ Heightened awareness of the role of skills acquisition in production.
 - ✓ Appreciation of skills possession by workers as strategic assets.
 - ✓ Employer’s increased participation in skills training.
 - ✓ Help to measures the actual output for local skills, thereby helping to benchmark against regional and global standards
- Recently, the National Council for construction implemented a national bricklayer’s competition during the Lusaka Agriculture and Commercial Show held between 30th July 2008 and 4th August 2008. The finalists in the competition were drawn from the 9 provinces of Zambia where they emerged as winners of provincial competitions that were conducted at TEVET registered trades schools.

The Lusaka province being the host had two finalists. The provincial events were sponsored by Ministry of Science and Technology in liaison with TEVETA and the National Association for Small and Medium Scale Contractors (NASSC), while the final competition was sponsored by Lafarge Cement Zambia and NCC with Association for Civil Engineering and Building Contractors (ABCEC) sponsoring the actual prize money for the four best bricklayers in the country.

- Worldwide workforce skills are widely regarded as being central to economic productivity and general prosperity. People with the right skills are crucial to the success and competitiveness of any business. Thus construction companies must be in the driving seat when it comes to designing and delivering Training. In order to enforce this, NCC will next year 2009 introduce mandatory Continuous Professional Development training programmes for Construction Managers, Consultants and Entrepreneurs. Furthermore, all training staff at NCC will undergo pedagogical training before end of 2008 in order to ensure quality assurance in delivery of sector skills.

NCC will require to source for more funds for implementing unique, industry-driven skills training, certification, and career ladder development programs that support identifies construction workforce and economic development needs.

- The NCC is committed to identifying successful models and resources through the funds from the Ministry of Works and Supply to implement job training initiatives in the construction industry and share the same methods with the public workforce system. Sharing these models and resources will enable industry stakeholders around the country to develop effective partnerships that simultaneously help the industry address its key workforce challenges and help prepare workers for jobs in high growth industry such as construction and mining that is vital to the economy.
- Finally NCC-Zambia wishes to suggest that, in trying to isolate reasons for the low contractor capacity in the construction sector, one has to focus on the two (2) primary factors that determine the dynamics of the industry; these are people and institutions. These institutions can be private such as business enterprises involved in actual construction activities, or indeed concerned with financing construction projects; and public sector institutions playing regulatory and facilitation roles such as the Ministry of Works and Supply

and the National Council for Construction (NCC). Capacity issues pertaining to people, and which ultimately will influence institutional capacities, generally revolve around technical, managerial and entrepreneurship skills. Entrepreneurship in this context being defined as the ability and habit to identify opportunities for enterprise start-up or expansion as an individual interacts with his/her environment, and exploiting them for individual or communal gain, having taken due consideration of the investment risks involved.

REFERENCES

1. Bowen, Paul, Dorrington, Rob, Distiller, Greg, Lake, Harry and Besesar, Sarika(2008) 'HIV/AIDS in South African Construction Industry: an empirical study', *Construction Management and Economics*.
2. L Bibby, S Austin, D Bouchlaghem (2006) The Impact of a Design Management Training Initiative on Project Performance. *Engineering, Construction and Architectural Management. Bradford: Vol. 13, Iss. 1; pg. 7*
3. Bibby, L., Bouchlaghem, D. and Austin, S. (2003b), "Design Management in Practice: Testing a Training Initiative to Deliver Tools and Learning", *Construction Innovation*, Vol. 3 No. 4.
4. Egan, Sir J. *Accekrating Change: A Report by the Strategic Forum for Construction, Rethinking Construction c/o Construction Industry Council, London, 2002.*
5. Freire, J. and Alarcon, L.F. "Achieving a lean design process", *Proceedings of the 8th International Group for Lean Construction Conference, Brighton, England, Lean Construction Institute, Ketchum, 2000.*
6. Kanter, J. (2000), "Have we forgotten the fundamental IT enabler: ease of use", *Information Systems Management*, Vol. 17 No. 3, pp. 71-7.
7. Drucker, P. (1993) *Innovation and Entrepreneurship – Practices and Principles*, Harper *Business*, p. 76-87.
8. Sane S. (2003) *A General theory of Entrepreneurship, Edward Elgar.*
Central Statistics Office Quarterly Report (2008). *Performance Indicators for Top Economic sectors in Zambia. Lusaka,2003.*
9. The UNESCO and Zambia 2007 Annual Magazine. 4th Edition. Lusaka, 2007. pp. 139.
10. The Zambia 2008 Business Forecast Report. Business Monitor International [BMI]: Schneider Markus – BMI Head of Africa Country Risk. Lusaka, 2008.
11. The 2005 Strategic Plan for the Ministry of Works and Supply (2006 -2010). Republic of Zambia. Lusaka, 2005.
12. The 2007 Bank of Zambia Annual Report. Lusaka, 2007.
13. The Republic of Zambia Fifth National Development Plan 2006 – 2010 Summary. Ministry of Finance and National Planning. Lusaka, 2006.

14. Gurjao, S. Inclusivity: The Changing Role of Women in the Construction Workforce. *University of Reading. Published by the Chartered Institute Of Building (CIOB). Reading, 2006..*
15. Chakonta, D. 'TEVETA presentation paper at the 2007 Annual Construction Indaba'- Zambia. Lusaka, 2007.
16. Cheryl Cullen (2008, March). Turner Construction Company: reaching out to the community. *Building Design & Construction*, 49(4), 66. Retrieved May 17, 2008, from ABI/INFORM Global database. (Document ID: 1447074001).
17. Heather M Henyon (1999, January). Integrating southern Africa. *Independent Energy*, 29(1), 32-35. Retrieved May 17, 2008, from ABI/INFORM Global database. (Document ID: 39718709)
18. Lamont, James. Shortage of skills 'will curb growth in S Africa': [London edition]. *Financial Times*. 10. Retrieved May 17, 2008, from ABI/INFORM Global database. (Document ID: 87576879). London, 2001.
19. Phillips, M., M., (2007, July 17). In Africa, Mortgages Boost an Emerging Middle Class: Zambians Experiment, with U.S Help, Aims to create a New Suburb-Lilayi Housing. *Wall Street Journal*
20. Barnett, T. and Whiteside, A. *Aids in the 21st Century: Deasese and Globalisation. Palgrave Macmillan. New York, 2002.*
21. Meintjes, I., Bowen, P.A and Root, D. S (2007) HIV/AIDS in the Southern African Construction industry: understanding the HIV discourse for a sector-specific response. *Construction Management and Economics. pp 25, 255-66*
22. Versace,V. (2008). Construction Industries around the world face Similar Issues. *Journal of Cormmerce: CBCA Business*, pp. 3.
23. Muya, M., Price, D. F. A.,& Edum-Fotwe, T. F. *Construction Craft skills requirements in Sub-saharan Africa: a focus on Zambia. Emerald Group. Lusaka, 2006*