

Training and Education

The ability of a society to acquire and commercialize knowledge is critical for economic growth and consequentially improved living standards. Knowledge is the most important single factor in economic development. Most would agree a deficit of knowledge and learning is killing Africa - and not too softly. Despite a proliferation of schools and colleges, the lack of true learning and creativity has held the African captive to underdevelopment.

This project is all about the transfer of technology - and knowledge needed to support it. There are other factors of industrial development, such as the entrepreneurial spirit, the ability to innovate, the ability to work hard and the ability to learn, but Africans have all these abilities - one only need walk down the main street of Lomé, or any provincial or capital city almost anywhere on the continent to see it - the tyre changing aid in the local repair shop fabricated from pieces of scrap metal and welded with a jury rigged welding system hooked up to a car battery is one simple example. In context - such things demonstrate an innovative capability on a par with anything seen in the west.

It has been said most African countries higher education systems seem to have been established primarily to train administrators for the postcolonial governments and time has not really changed this focus, so they turn out graduates who are just producing what they were taught in school, instead of producing new things. This then leaves Africa with millions of graduates who are failures as far as life and service is concerned. A Master's degree holder moves with little or no creativity and thousands of poorly educated people only wait for opportunities to work where others have worked. Few are involved in the creation of new things - the outdated education they received then just gives birth to confusion

Possibly true - but it does rather miss an important point. Western education systems were not directly responsible for the West's industrialization. Sure - nobody without some education is likely to have created any sort of industry, but "business" schools and universities did not turn out graduates who rushed out and started productive companies that led to industrialization - more they exist to teach people specific skills needed to work for industries that are already there.

Henry Ford was a farm boy with a little education and an aptitude for things mechanical. That was enough to get him a job first as a machine shop apprentice, and then later with the Edison Company where he very quickly worked his way to the position of Chief Engineer. The founder of the Edison Company itself had but 3 months of formal education - he learnt his 3 R's from his mother, she also succeeded in teaching him how to teach himself - obviously successfully.

Nikola Tesla, the inventor of the AC power system which proved so much superior to Edison's, was very well educated - a graduate engineer with a lot of experience - however his invention was successfully commercialized not by himself, but by George Westinghouse - another machine shop apprentice who had used his skill to develop a braking system for railway trains, and a successful business from it. Another who had just high school - but received a solid education in mathematics and physics from the army - founded the European Siemens Electric Company. The Hewlett Packard Company was founded and run by two graduate engineers.

Inventions show the same mix - of the two men credited separately with the commutated electric motor - one was a blacksmith and the other a journeyman bookbinder. The much-improved AC induction motor came later from Tesla - an engineering graduate. Of the two key inventors in steam engines - one was an ironmonger the other an instrument maker.

All these companies rely on well-educated personnel to function - but they were actually not all created as business entities by higher education. Expecting therefore African graduates to produce "new things" is perhaps a little unreasonable. Engineering graduates tend to improve things and solve problems with existing things - if an engineering graduate has no industry to join after graduating - there is no rule that says he should be able to create one.

It is however equally true that no society can expect to develop and grow its industry without higher education and engineering graduates - so the question becomes simply one of how does industrialization start.

Borrowing, and paraphrasing, an observation from one Jeremy Weate

The more you look at Africa - the more you realize that technological interventions or money pumped in by donors will do little to transform anything, unless there is a primary focus on business processes... Africans enjoy the benefits of cars, laptops, mobile phones and other modern technology, but live in a society which does not understand the discipline and rigor it takes to produce such technology. This creates an alienated culture where technology and modern industrial processes are seen as a mystery. No one seems to be able to create value-added manufacturing processes; no one seems to stem the tide of an import economy, turning it into an export economy. So few technological interventions (in any sector) meet with any kind of success.

Truly intellectually curious, technologically innovative and self-sustaining societies cannot be built off a bedrock of reactive thinking coupled with disinterest and indolence. The challenge is to disrupt these ossified ways of thought and catalyze the forces of creativity.

That is a true enough observation and makes the key point - "a primary focus on business process" - accept that - then the problem just becomes one of defining precisely what business process actually is. What is the process whereby innovators and opportunists can create value added manufacturing processes.... and how does a society learn the discipline and rigor involved in producing technology-based product and economic growth.

And, perhaps most importantly, can this happen without introducing "Taylorism" which in its purest form imposes the skills of the few on "unquestioning masses" in order to eventually benefit everybody.

The Master and Apprentice

The Great Exhibition of 1851 celebrated the achievements of English industrial and creative might by housing the greatest array of inventions in the industrial arts and sciences the world had ever seen in a mighty Crystal Palace erected in Hyde Park just for the occasion. Six million visitors from all over Britain poured through the exhibition to see a display of human ingenuity on a scale never before thought possible.

The exhibition celebrated British creative genius and demonstrated just what a nation of skilled craftsmen could do. The inventors whose wonders were on display - men like George Stephenson - the Brunels (father and son) - Richard Arkwright - John Smeaton - were all former craftsmen who had each served long apprenticeships. Few of them had gone to school for any length of time and most regarded school as subordinate to what they had learned on the job.

These were the men that forged the "industrial revolution" which created England's wealth - Masters and Apprentices. Men educated the same way also created most of the "developed worlds" industrialization and wealth. The English school system of the day at best taught basic literacy to a part of the population with the higher education reserved for the "ruling class" and the children of the "nouveau riche" class created by that very industrialization.

That higher education then did not include any of the engineering and sciences so necessary to maintain England's leading role in that sphere - while the very nature of the industrialization by 1850 had all but eliminated the position of craftsmen and artisans - and along with it the older Master Apprentice education system. It took that another 100 years to disappear almost completely. Britain won almost all the prizes for wondrous innovations at that Great Exhibition - the next Exhibition in Paris saw them take home less than 10% - just 40 years later the other European Nations had taken over that lead.

The British Empire certainly grew as that tiny percentage with the "higher education" colonized and plundered half the world - protected by the mighty Navy her industries produced. The "new world" of North America received enough craftsmen to develop its own industrial growth after cutting loose from England many years earlier - but those colonies that could not cut loose were simply plundered of their manpower and natural resources in order to feed the English and European appetites. Appetites as insatiable as the developed worlds demand for fuel oil is now.

Ruled until independence by a class with no understanding of technology - it is perhaps not surprising that little industry developed in the African colonies, and that any education system developed after independence was modeled on the worst features of the system that created the colonists in the first place. So perhaps it is fair to say the African formal education system actually is designed simply to produce post-colonial administrators and maybe just give some basic literacy to as many others as possible.

The Master Apprentice system in itself is a more natural order of things - Father/Son - Mother/Daughter - Artisan/Apprentice, and as familiar to Africa now as it was once to the so called developed world. For whatever reason Africa now needs to be part of that world. Unfortunately Africa does not have the Masters and Craftsman skilled in those arts - the west has very few since the apprenticeship system finally died in the 1970's - industry in an incremental improvement mode does not need Master Craftsmen. Germany still has such a system though - perhaps no coincidence Germany is still doing so well with machine tools.

Schooling in science and technologies alone cannot do it. The mystery surrounding any technology can only be cleared by understanding - and understanding can only be gained by doing - and doing needs to be taught one on one by someone who can. That applies as equally to an electric generator manufacturing plant being built in Senegal - as it does to running an agro-industrial business in Zimbabwe.