Reshaping secondary education to equip and produce requisite entrepreneurs in this century: the role of stakeholders and the state

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[Mr Chairman Rt. Rev Alexander Asmah
Hon Alan Kyerematen, minister of trade
Hon Dr. Yaw Adutwum, Minister of Education
Hon Kennedy Agyapong, MP Assin Central
Hon Frederick Blay, National Chairman, NPP
Major General Francis Ofori, Commandant of KAIPTC,
Distinguished Guests,
Fellow Santa's and associates,
Ladies and gentlemen.

I am very excited to speak at 112th speech day and it is my first opportunity to attend speech day at Adisadel since I departed in 1966 and therefore feel privileged. I thank Santa ‘97 for seeking me out

Interestingly, I had the occasion of working Hon Alan Kyerematenng on a similar entrepreneurship consideration at Enterprise Africa, a UN OPS project in 90s/2000s]

[We admit,] This is a rather complex topic and [my] contributions would focus narrowly on domain of computing sciences and technology to stay within my expertise. [We are building capabilities at same time developing ecosystem.] Fortunately, there are ample opportunities in this specialty but these can also be illusive [and require precision timing, competitive costs]

There is no doubt this century needs technopreneurs to grow the economies in Africa when armed with technology tools [theres an ongoing race among nation states and economies to determine superiority in cyber space]

In order to equip and produce talents into an ecosystem, a new one [as such], we start with understanding the lifecycle of a ‘technology savvy entrepreneurial workforce’ and determine what to adjust at which stage

Entrepreneurs may emerge at any stage of the educational cycle, elementary, secondary, tertiary and beyond when create a product [when and how do people get off the skills/ education ramp to industry and back. Should be seamless] [products are teams at play]

[An] entrepreneur needs to have good implementation of technology product idea to sell. [the value add] The sophistication of

product idea would be expected to increase along the lifecycle [for a knowledge and technology industry]

We should reshape secondary education to produce entrepreneurs that are equipped with [specific] technology products ready to go to a [local] market.

The policy environment must create [the] markets for these products [especially] for local consumption [and have support institutions in the environment]; when products prove themselves locally,[ie mature,] they naturally become regional and global. [No dreams of becoming sudden unicorns, santaclausians know this well, others have labored to share the glory]

For secondary education in entrepreneurship in computing sciences and technology, one considers reliance on three well established disciplines of physics, mathematics and

economics which contribute directly to computing and it's markets

Some prefer to create new structures for computer science [for ease of management, funding or convenience] but each such would still have to draw on physics, mathematics and economics [otherwise have no roots]

The electronic aspects of computing are largely from experimental physics, physics labs, while much of rest of computing sciences have foundations in mathematics and physics. That is for hardware and software

As innovations have economic and social impact, the models for these innovations are studied in economics [and social sciences]. This is where entrepreneurs would be nurtured so to speak on the technology products

Physics in secondary would support teaching of electronics and learning about devices. This can give exposure to IoT, [sensors] robotic tool kits, instruments etc in programs [of instruction]

Mathematics would buildup on computer science type of math [which is peculiar] and teach software development using elementary languages and solving simple problems

Economics prepare students on models, quantifying, monetizing products [,positioning] and give entrepreneurial skills necessary to compete

It is noted that all of us use computer systems today made by others and we learned to use them much same way we learned to drive car, fly plane or get medical or legal service performed by others, as users

Now, that is different from how to make a new computer system, which is really the foundations we want to teach in secondary and tertiary education. We teach how to make [home grown] innovative technology and engineering products

Role of stakeholders and state

My goal has always been developmental and was never entrepreneurial because of stage of development of technology in Ghana in the 80s/90s when we started seeding technology

As you would appreciate, I could have started my business in USA but returned to Ghana to teach at university of cape Coast and seed IT industry starting with NCS whose contribution to Adisadel, the Santa'97 so well appreciate

We were engaged in a techno liberation struggle or so we believed at the time, but our people gave up and accepted to patronize

global product offerings [instead. It appears we did not believe in ourselves and happy to be user]

I've been speaking here [so far] as a stakeholder, an educator and industry player since 1979

In my search for Africa's computer science heritage I discovered something novel [in our scientific cultural heritage]. That, the Oware board we think of as a game is actually a mechanical computer

Why have we Ghanaians forgotten this heritage?
Am sure many of you know Abacus for early mathematics instruction but don't know that it's equivalent or perhaps superior version is Oware. Oware is a formidable mechanical calculator that can do additions and subtractions. Every computer science student at UCC learns to do calculations on the

Oware board and everyone in secondary should learn how to [..computing is not foreign to Africa]

Suggestions to state.
This field is hands on with problem solving reasoning ability [most often you are investigating your own crimes…debugging they call it] Thus, early exposure to electronics and logic through science kits, puzzles, toy devices, trains sets, river boats, drone sets, [creative art] etc is good preparation and a local industry should be developed creating these

Successful entrepreneurial products in technology are made of several man years of development to set correct expectations [not as simple as a few pretty UIs, it's man years of purposeful logic development]

Perhaps the state should look more inward for supply of its technology needs. Many

technology projects of state can be implemented locally with fore planning especially around decentralization though needs standards

Adjust the national service program. The present formulation disrupts the flow of technology work force to industry. It becomes discontinuous, often takes the service personnel away from computing and lose momentum. At end of service, can't 'see' employers and the personnel goes off radar of employers as well. A recruitment by employers at [academic] institutions brings stronger connection between employers and work force. [This is missing, it's a way for industry to tell academia what industry needs]

Most startup die so have to be pragmatic about our expectations and encourage employment with local companies as well who may contract for government tasks.

Considering preservation of investment and protection for startups, don't watch startup companies die especially the kind that happened to NCS in 2003, that is the company that brought Internet to Ghana and introduced computing to Adisadel college. That was a case a santaclausian causing destruction of a Santa's pioneer company. This requires Santa level deep reflection in chambers

Computing, Internet are things we all need: old/young rich/poor, sick/healthy and does not respect ideology. Any Impedance to access to these technologies has negative impact on economies hence shutdown, high costs and taxes are not recommended.

The country that introduced internet to the world, USA, does not tax it directly and her companies dominate the global internet market.

I brought internet to the subregion. A good advise is not to tax the internet as it affects too many things we ordinarily wish to subsidize for development [once again technology can be illusive as revenue might be elsewhere]

[somewhere in all this is a blue print for reshaping secondary education to produce technopreneurs for the century]

Let's have a good and happy Santa day at 112th speech day

Thank you