

Skill Ecosystem - Journey to Vocationalization of Education

A lecture in memory of the
late Mr. Nani A. Palkhivala

S. Ramadorai



FORUM
OF FREE ENTERPRISE

"Free Enterprise was born with man and shall survive as long as man survives".

- A. D. Shroff
Founder-President
Forum of Free Enterprise

Editorial Introduction

For the past many decades, the nature and dimensions of skilling challenges faced by India have been matters of constant and enormous concerns. This subject still remains on the forefront of public policy discourse thanks to the fact that appropriate vocational training and formal skilling that employers normally seek, continue to be dominant weak links in India's educational system as well as in her other crucial socio-economic activities. Despite all the efforts made by the government/s in power in recent times, India's status in formal vocational training pales into insignificance in comparison with not only advanced countries of the world, but also with many Emerging Market Economies. Thus, it is fairly well-known that only about 2.3% of India's workforce is considered to have received suitable formal skills training in contrast to as high as 96% in South Korea, 80% in Japan, 75% in Germany, 68% in UK and 40% in China.

At the same time, what also transpires is that over the last quarter century India is witnessing (a) unprecedented structural shifts in the economy from agriculture to manufacturing, and more prominently, towards services sector; (b) transition towards modernization, globalization, competitiveness and the knowledge economy; and (c) sustained annual large entrants of young

labour-force. All these changes are building up relentlessly stronger demands for newer generation of education, training and skills formation. The failure to respond to these requirements certainly promises to impair India's capacity to realize her fuller potential of growth and development.

Against this brief macro contextual perspective, we, at the FORUM, have truly been fortunate to publish and present this brilliant and scholarly lecture recently delivered by Mr. S. Ramadorai at the IIT Bombay, in memory of the late Mr. Nani A. Palkhivala, on the subject that is of immense topical interest, namely: "Skill Ecosystem – Journey to Vocationalization of Education". Mr. Ramadorai has not only been a great doyen of India's computer software and information technology industry, steering as he did the helm of affairs of TCS for well over thirteen years (1996-2009) with a fabulous record of professional achievements, but has also been involved thereafter in public service in the area of skill development. He was the Chairman of National Skill Development Agency and the National Skill Development Corporation for five years during 2011-16. His approach was to standardize the skilling effort, ensure quality and commonality of outcomes by leveraging technology and create an inclusive environment to cooperate, collaborate and coexist. He has been passionate about empowering the youth with the right skills, which can define the

future of the country. At present, he is the Chairman of the Advisory Board at Tata STRIVE, which is the Tata Group's CSR skill development initiative.

Given such extraordinary credentials and commitments, Mr. Ramadorai happens to be an exceptional authority to reflect on the scale and complexities of this chosen subject under deliberation. By way of a prelude, the author makes a very insightful observation about the intensity of inequity in India and states that “this inequity does not come from capability issues, it comes from lack of opportunity”. Obviously, the lack of opportunity, which he has in mind relates to the neglect of educational reform in general, and vocational education in particular. Therefore, he underscores the importance of making our growth model inclusive, and for which purpose, our education system has “to make our youth better prepared and therefore resilient for the dynamism of the jobs of the future”.

Mr. Ramadorai dwells astutely on technological changes, which are going to pervade Indian industry (illustratively, the automobiles) and E-commerce businesses (illustratively, Amazon.com), wherein automation and robots would come to assume significant force to reckon with. Keeping this in view, he observes that “we can safely assume that anything that can be automated will be, hence skills

that cannot be digitized or automated will become more valuable and these are what our education system should build". He then goes on to highlight challenges before our education system, which "need to cover lost ground and deliver to the real needs of the economy AND more importantly, it needs to re-engineer itself to be continually responsive to the dynamism of industry".

Having so said, Mr. Ramadorai covers at considerable length several major on-going facets of reforms of India's educational reforms, keeping in view the imperatives of skill development, which has now become a national agenda. Further, he also talks about institutional evolution in recent times, which is also helping in kick-starting an appropriate ecosystem of skill development, especially through interventions at the school levels. He then goes on to make a very meaningful suggestion on specific interventions required at the University level – by offering "non-traditional degree specialisations for example BA in Retail, BSc in Environment, BCom in Logistics". Also, he refers to various other initiatives such as the one taken by the Tata Institute of Social Sciences (TISS-SVE); another by Tata's (Tata STRIVE); and yet another by IIT Bombay (LAKSHYA program); etc.

All these are very significant developments, which are indicative of positive shape of things to come.

But at the same time, these convey how stupendous and complex are the tasks in the construction of Skill Ecosystem in India, wherein there has to be consistent, collaborative and cohesive efforts of all the stakeholders – the government, the private sector, the educational institutions, and, of course, of students and youth at large! We are sure this booklet by India's one of the most versatile technocrats and accomplished professionals will be of immense relevance to all those concerned with this subject of intense and immense national importance.

Sunil S. Bhandare
Editor

Skill Ecosystem - Journey to Vocationalization of Education

**A lecture in memory of the
late Mr. Nani A. Palkhivala**

S. Ramadorai*

It is a great honour to be speaking as part of the Nani Palkhivala Lecture series, for he is a person I hugely admire. In fact it was only in February 2016 that I recall delivering a speech at the Nani Palkhivala Memorial Lecture series in Chennai. It has been the most fascinating and enriching experience to be able to read about his vast experiences and learnings from several resources that we collated

* *The author is Chairperson, Governing Board, Tata Institute of Social Sciences (TISS), Former Vice-Chairman, Tata Consultancy Services (TCS) and Former Chairman, National Skill Development Agency (NSDA) and National Skill Development Corporation (NSDC). This is the text of his talk at IIT Bombay on 25th September 2018 delivered as part of a series of lectures arranged, in memory of the late Mr. Nani A. Palkhivala at IITs, IIMs and NITs, by Nani A. Palkhivala Memorial Trust, Mumbai.*

since then. As students, I would sincerely advise you to go back and read the several books that have been penned on the journey of this great legend.

Tribute to Mr. Palkhivala

Fortunately for me, I was associated with him when he was the Chairman of the executive committee of TCS for several years. He witnessed through TCS, the changes led by the digital revolution, and was gifted with the ability to see far beyond his time.

I would like to imagine that if he was living today, he would be excited about the potential of today's technologies and would have urged us to launch an assault on poverty, inequity and unemployment; at the same time the humanitarian in him would urge us with equal gusto to beware of technology's irresponsible use.

Such was his magnetic personality and illuminative mind that people thronged to hear his Union Budget lectures which were the largest-ever, public meetings on an economic subject - he spoke with a clear mind and strong heart. He fought for the highest ideals of constitutional rights and for democracy even as he lived a simple life. In his own words –“he was not obsessed with material possessions or worldly success, he was far more attracted by things of the mind and the spirit”. In today's material world Mr. Palkhivala's words are a breath of fresh air.

Inequity

It is a paradox of our times that the more we make things equal the more unequal our world becomes. Technology highways are enabling information equity but the same cannot be said about income. As per a survey by the international rights group Oxfam, in India the richest 1% hold 73% of the wealth generated in 2017. This is not a sustainable model.

This inequity does not come from capability issues, it comes from lack of opportunity. I am a great believer in the ingenuity of the Indian to progress and thrive when there is an opportunity. We see this in the great strides made by India in many fields be it our world-renowned space programme or our capabilities in IT. We reap the benefits today of the investments made decades ago in institutions of higher learning including the IIT's.

Back then, we needed scientific talent to match the great emphasis on Swadeshi and adoption of a path of industrialisation, based on heavy and capital-goods industry. But this came at a great cost, the least attention, if I may say so, to primary and secondary and vocational education. Today we are paying a price for it and the time has come to invest and correct the past wrong.

Neglect of Vocational Education

Clearly the past is inextricably linked to the present; as will our present determine our future. For the future to be sustainable, our growth model has to be inclusive, this is not a choice, it is about survival. At school, we learnt about Darwin and evolution. Evolution, we were told, happened in a time scale of millions of years. But evolution was taking place in 18 month cycles powered by Moore's Law and not in time scale of millennia. Furthermore, from Darwin, we took home the severe and unforgiving lesson of the "Survival of the Fittest." From India's perspective, it is not only about fiscal fitness, but a certain institutional and social resilience that enables us to survive geo-political stress and technological disruption.

Resilience is a worthy possession, given that today's societies are faced with multifarious challenges. For a nation whose average population is young, clearly the top position amongst these challenges is that of Jobs and Livelihoods. Our education system therefore needs to make our youth better prepared and therefore resilient for the dynamism of the jobs of the future. And we need to invest in that NOW.

We built and nurtured our IIT's; but we built and neglected our ITI's. The oldest IIT Kharagpur was established in the year 1951 while the ITI's were first started just a decade later in 1969 with the aim

of promoting industrialization in India. But both had different trajectories. We celebrated the power of our mind and denigrated the artistry of our hands. Today we are trying to salvage "respectability" for working with your hands when it has long been in a time warp, enveloped and covered with a complex web, of perceptions of negativity. So perhaps we can find it in our hearts to acknowledge that the IIT's owe something to the ITI's.

Industry 4.0 and Automation

India's cheap labour force will soon have to compete with the rise of autonomous machines. Although modest today the annual shipments of robots to India is likely to double in next 3 years, there are 58 robots for every 10,000 workers in the automobile industry, big data market is estimated to be Rs. 1 lakh Crore market in India by 2025. Juxtaposition this with the fact that the vocational training capacity as a percentage of our workforce is under 1%.

The E-commerce retailer Amazon.com was one of the first e-tailers to experiment with the use of Kiva robots to move boxes around its fulfilment centres and it found the robots so useful that it bought the company that made them. Amazon deployed 1,000 Kivas to work in its warehouses. Then it ramped that to 10,000 robotic workers and further to 15,000. At last report, Amazon had 100,000 robots working for it. To put that in context, the total number of

employees of Amazon is only 5.6 lakh. As of today, one in every five full-time employee of Amazon is a robot. The labour market will need to undergo dramatic change, with the loss of some kinds of jobs and the creation of new types of jobs that need skills that we do not teach today. We can safely assume that anything that can be automated will be, hence skills that cannot be digitized or automated will become more valuable and these are what our education system should build.

Educational reform

Our Education system needs to cover lost ground and deliver to the real needs of the economy AND more importantly it needs to re-engineer itself to be continually responsive to the dynamism of industry.

As a philosophy we need to actively embrace and promote vocationalisation of education. Broadbasing what we teach and how we teach is the first step. Today manufacturing is as much about the art of design, as selling is about the science of preferences. Differences are blurring, using approaches that connect different disciplines eg. Rangoli to teach geometry will bring in multidisciplinary thinking and pattern recognition, encouraging the study of arts and humanities will bring in design thinkers and social engineers, most importantly including vocational training at an early

stage of learning will eradicate biases and will make it the new normal.

How we shape the minds, what skills we develop must be guided by the demands of the future. On one hand educational reform needs to inculcate analytical skills, critical evaluation, pattern recognition and other such cognitive skills, on the other it needs to offer opportunities for creativity, design and working with the hands. Our young need to explore their own interest and grow their talent rather than be guided by narrow pre-determined hierarchies or status symbol jobs.

The downward slide of values is also reflected in respectability for skilled vocations. As a colonized nation, we may have, in fact, even diminished the stature of highly skilled artisans and craftsmen. For example, in Japan, a skilled weaver or a carpenter is venerated as a living national treasure. For decades, our government has indeed been honouring skilled craftsmen with awards but somehow, we have missed the opportunities for celebrating and advocating skills. Thus, when our PM tenderly holds the withered hands of an aged weaver in public, it sends out a powerful message. But nevertheless, how do we as entrepreneurs, and technologists, communicate the pride in the unparalleled skills portfolio that our nation still has.

A farmer's child should grow up excited about the possibilities of smart technologies that he can bring in agriculture that will help increase yield, and a family of craftsman should look up to the young girl in the family who enables a direct market connect through a portal.

Mr. Palkhivala believed – that Education was the technique of transmitting civilisation, but in order that it may do so it has to perform two major functions – it must enlighten the understanding and enrich the character. Who but him, could remind us of the higher purpose of education- to build the moral fabric of society.

Skill Development becoming a national agenda

It took another visionary Prof CK Prahlad to drive home the realisation that we were walking on a dangerous chasm -on one side was the potential of harnessing a skilled youthful population to fuel growth on the other a social disaster led by frustrated jobless youth. This was back in 2007-8, and it was around this time that the issue of skill development got national attention.

I was invited in 2011 by the erstwhile Prime Minister to put my experience behind this burning national challenge and I gladly took up the honour. Initially it felt strange to be seated along with Govt officials

and opposite to my colleagues from the industry, but I soon got used to it.

I realised that the scale and complexity of India's skilling problem was unprecedented in the world compounded by the fact that demand and supply data was minimal, there was no ecosystem for vocational training apart from the ITI's, no national standards. Clearly we had to develop a whole new industry vertical, and we made a beginning on all fronts.

Skill Development framework

Today there is a strong institutional structure with the Skill Ministry at the helm, supported by NSDC spurring the creation of Training Providers, the Sector Skill Councils creating National Occupation Standards across sectors, National Skills Qualification Framework, that enables equivalence between mainstream and vocational education and the National Skill Development Agency that provides the necessary quality oversight. All Govt skilling schemes follow common norms of payments and Skill Development Missions in the State have a greater participation in implementing Govt schemes.

I am also convinced that convergence of initiatives like Skill India, Digital India, Start- up India, Make

in India, will have a multiplier effect the impact of which will be visible in 3-5 years.

Progress of interventions

The creation of the framework has helped kick-start an ecosystem of investors, private training providers, industry driven competency standards and standardisation of content and more recently new financial instruments such as development impact bonds, all of this is flowing into what is becoming an institutionalised Skilling Sector.

To bring about lasting change a twin phenomenon is required in the skilling value chain. The higher education and Universities system needs to be vocationalised and at the same time Industry must open up as the learning arena through internships and apprenticeships.

School interventions

While this is not without challenges we must celebrate small successes. A successful example of vocational training integration with school began in 2012, when a pilot was launched for students in 9th to 12th standards in 40 Schools of Haryana covering 4 sectors - IT-ITeS, auto, retail and security with 4,000 students. Skill subjects were offered into the academic choices. The model developed by NSDC in association with MHRD and Haryana School Department has today progressed in the state to

cover 1001 schools, in 12 sectors and covering more than 1.5 lakh students. From 2013 onwards, the Haryana model was rolled out nationally in 27 States including Union Territories covering overall 8398 schools and catering to over 7.5 lakh students from 9th to 12th standards. As on date, to impart skill training in schools, States now have options to choose from 73 NSQC-cleared Job Roles across 21 Sectors. The curricula and contents are developed in association with respective Sector Skill Councils (SSCs).

Brazil too has similar socio-economic and demographic profiles as India. They have a three tiered vocational education and training system. The Continued Formation level courses are for the broadest targeted population and anyone can enrol in this type of program. There are no requirements regarding educational degree or age. Their goal is to provide an initial qualification to those whose level of educational achievement is low or have no practical training or experience. The second level is Technical Courses which provide professional training to students enrolled in secondary school and secondary school graduates. The third level is Technological courses which are equivalent to tertiary level courses and last for three years.

University interventions

Talking of three year courses, our Universities are seeking a large number of first generation learners given our glamour for degrees. However, there is little realisation that mere degrees do not get jobs, unless Universities begin to offer non-traditional degree specialisations for example BA in Retail, BSc in environment, a BCom in Logistics. With a much needed push from the top, many progressive universities are broadening their offerings with support from Sector Skill Councils and Industry partnerships. What is also happening is the recognition given to credits earned from certificate and diplomas courses with National Qualification Framework which over time will be mainstreamed.

As Chairman of Tata Institute of Social Sciences we too saw the potential of enhancing and enriching the University system through vocationalisation. The National University Student's Skill Development Programme (NUSSD) implemented by TISS is one such scalable model that helps students acquire job related skills while they pursue their degree courses, this can be easily replicated across several thousand colleges in the country thereby addressing the issue of large scale unemployability amongst graduates in India. The NUSSD program today has reached over 20,000 students across 5 States and continues to grow.

TISS-SVE (School of Vocational Education) through its training partners, also provides the requisite structured classroom sessions while inducting them into the work settings. This initiative enables those who have dropped out of the formal education system after 12th standard to pursue education in the vocational streams. Today, there are 7162 active students as part of this program and over 27,000 students have graduated to join the workforce across cities in India.

Industry interventions

The Govt tenure opened my eyes to the real India through my travels to remote corners of North East, Kashmir to furthest South. I met youth, women, parents and I was gripped by their problems. I also became convinced that the house of Tata's must respond in a stronger way to this national challenge. A large business and community footprint was a unique Tata capability. This led to the formation in 2014 of Tata STRIVE a skill development initiative created to serve the needs of the most disadvantaged youth. Today Tata STRIVE has impacted over 2.5 lac youth through a model that uniquely combines pedagogy, methodology and technology.

I spoke earlier about the need for equity of opportunity. MOOCs (Massive Open Online Course) brought in by Coursera, Edx, Khan Academy etc. has brought learning into the homes of people. The

trend has already begun. AI tutors by Carnegie will use this for personalized tutoring of students requiring remedial learning, thereby reducing the cost of collegiate education. AI-based methods for automatic grading of students, is getting popular. The challenge to deploy such platforms in vocational education is twofold – the readiness of the learner and the challenge of demonstrating the skill to be tested. A middle path is emerging – the Phygital Model which allows for instructor led learning, self-directed learning and practical training combined in a pedagogical sound way. By creating a meta system of partners- classroom provider, digital platform provider and hands on training provider the model becomes scalable and enables anytime anywhere learning. Such models are being tried already by Tata's as an alternative to the "slower to develop" brick and mortar one.

IIT role

Am happy that IIT Bombay has also undertaken a number of technology enabled initiatives towards skill development.

The LAKSHYA program is an interesting initiative of ESOS (Educational Services for Outreach at Scale) and CDEEP (Centre for Distance Engineering Education Programme). LAKSHYA combines online learning with face-to-face sessions. Providing the learner the freedom of engaging at any time and

place convenient to them, and then having an option of an active discussion to ask doubts and questions, clarified by the faculty and also face-to-face sessions on weekends is a powerful model.

Also impressive is the Spoken Tutorial initiative of 'Talk to a Teacher' activity of National Mission on Education through Information and Communication Technology (ICT), launched by MHRD. The Spoken Tutorial has a 10-minute-long audio-video tutorial, created for self-learning being dubbed into 22 Indian languages exponentially increases the accessibility to students across India.

Its benefits can be varied, as seen from the successful training module for new mothers and health-workers on child health care, which cover crucial topics and vital information that will help them to easily understand and grasp the basics of health and nutrition of a new-born baby in order to curb infant mortality and spread awareness on malnutrition. I am told that thousands of mothers and health workers have benefited through this training.

Another spoken tutorial course is for construction of bio-gas plants which is designed in Marathi language for masons to help them understand construction process of a bio gas plant on their own.

A very innovative Spoken Tutorial is being designed to help train aspiring paramedics on how to handle

the ECG and other facilities in special ambulances. Using this special ambulance, Dr. Thomas Alexander of Kovai Medical Centre hospital recently demonstrated that the mortality rate can be reduced by 90% through a year long pilot.

All of these are highly commendable initiatives and my congratulations to the teams leading them. Apart from such institutional measures many of you would be contemplating venturing out on your own, I would urge you to look at the many problems to be solved and opportunities waiting to be harnessed.

India can bridge the gap

As mentioned before with the impact of Industry 4.0 and the resultant automation it brings- some jobs will become obsolete, new still unknown jobs may find their way and people will need to continually unlearn, relearn and upskill. This is a great opportunity for us to re-invent ourselves, to help those excluded from the digital revolution, the disadvantaged communities leap frog and catch up. The pathways can be novel and different, leveraging the technology tools we have at our disposal.

India is unique in that we are the only country where a majority of the population continues to pursue pre-industrial jobs, using pre-industrial tools and methods. Where else in the world can you find over a million handloom weavers? Where

else can one find snake-catchers? They are the duck-billed platypus of the skills/jobs world. They are a befuddling anomaly that should theoretically not exist. And yet they do. How do we craft pathways to 21st Century livelihoods for these people? For example, we are trying to work with a group of Irula snake catchers and IIT Madras researchers to extract high value proteins from snake venom. What aspects of their archaic skills should we treasure? Creating pathways to the 21st century is the need of the hour.

Through our work with weavers in the North East, we have found that the most valuable skill that millions of our illiterate weavers have is the extraordinary ability to implement hundreds, if not thousands, of unique designs straight from their head, using some of the most primitive looms, without even making a sketch on a piece of paper. And yet the weaver bears the entire risk of error for weaving with the middlemen buying imperfect designs for as little as 10% of the cost of raw materials. This creates an enormously punitive disincentive for the weaver to try any new designs.

As a solution, a TCS team and I, as their mentor created a platform for weavers to access to 21st century skills and markets and it has been successfully launched in the North East, Varanasi and Kanchipuram.

In Gondia, Buffalo horns are exported at low value to Germany. Digging deeper, we discovered that Buffalo horn from Gondia ends up in hand-crafted high-end Swiss spectacle frames with 1000 times the value of the raw material. It takes fairly little effort to acquire the skills needed to reach higher up in the global value chains. Going into the 21st century, India has to necessarily equip itself by investing in science, technology, mathematics, design and engineering skills and move up the skills value chain.

I share these examples with a reason. There is an existing resource or talent, an opportunity that offers immense value including monetary benefit. Now to connect the two, you need the entrepreneur or the visionary and that could be you – you have what it takes to spot the opportunity and in doing so you would be empowering a community.

Today the world looks at India as a laboratory for democratic and inclusive development. Indeed, many believe that innovations from India have great salience and resonance across the rest of the world. Without us realizing it, India has become the center of innovative ideas and solutions that create positive changes in the lives of people across the world. I hope and believe that with a collective effort from you, we will have many more of these successes in the future.

Conclusion

Finally I would like to conclude by reminding ourselves of the ideals with which we need to live our lives. If Mr. Nani Palkhivala were here he would have said "on the university campus we must stress the importance of self-fulfilment but not self-indulgence, group cohesiveness but not group jingoism, work and achievement but not power and acquisitiveness for their own sake".

Our biggest tribute would be to follow this path in the best way we can.

The views expressed in this booklet are not necessarily those of the Forum of Free Enterprise.

"People must come to accept private enterprise not as a necessary evil, but as an affirmative good".

- Eugene Black
Former President,
World Bank

FORUM

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In recent years the Forum has also been focusing on the youth with a view to developing good and well-informed citizenship. A number of youth activities including elocution contests and leadership training camps are organised every year towards this goal.

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Forum of Free Enterprise, Peninsula House, 2nd Floor, 235,
Dr. D. N. Road, Mumbai 400 001. Tel.: 022-22614253.

E-mail: ffe@vsnl.net; Website: www.forumindia.org;

Twitter: [@ffeconnect](https://twitter.com/ffeconnect)

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