Innovative Engineering and Leadership for Achieving National Goals

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This paper can be appropriately started with an epilogue which is a quotation from Dr. Kalam's Book "Thoughts for Change – We Can Do It". He writes "Advances in Technology need to give a quantum jump in the Economical Status of the country. Industry developed countries have understood this fact. If we, too, understand it, then we will be one of the leaders in the world…..If we change our mindset then India certainly has a big chance of becoming a global leader in the knowledge age". His book then focuses on Creative Leadership to Support Innovation. Dr. Kalam has related innovation with economic development; technology and engineering.

Role of Innovation in Competitive Global Economy

Innovation is now the key to growth in the competitive global economy. Government and business have critical role to play in strengthening the Innovation Ecosystem. The government has to provide the enabling policy interventions; strengthen knowledge infrastructure: improve inter-institutional collaborations; provide mechanism of business innovation at all levels, especially medium, small and micro enterprises; and provide vision to a national level road map for innovations. The business organizations have to identify and project the necessary framework of support from the government for enhancing innovative efforts and undertake innovation. Innovation ecosystem when supported by the government as well as the business will have a better chance of survival and growth in developing countries.

Strategic and organizational factors separate successful big-company innovators from the rest of the field. Innovation is difficult for well-established companies. By-and-large, they are better executors than innovators, and most succeed less through game changing creativity than by optimizing their existing businesses.

According to McKinsey & Company since innovation is a complex, company-wide endeavour, it requires a set of crosscutting practices and processes to structure, organize, and encourage it. Often overlapping and non-sequential practices resist systematic categorization but can nonetheless be thought of in two groups. The first group which is 'strategic and creative in nature' helps set up priorities and terms and conditions under which innovation is more likely to thrive. The second group deals with how to deliver and organize for innovation repeatedly over time and with enough value to contribute meaningfully to overall performance.

Opinions differ though those involved in the process of innovation firmly believe that there is no proven formula for success when it comes to innovation. McKinsey & Company recently conducted a multi-year study comprising in-depth interviews, workshops, and surveys of more than 2500 executives in over 300 companies, including both performance leaders and laggards, in a broad set of industries and countries. They observed that a set of eight essential attributes are

present, either in part or in full, at every big company that's a high performer in product, process or business model innovation.

Leadership for Innovation

Corporate transformation through fostering innovation and ideas management is an important issue for discussion. Leadership is looked in the overall canvas of political leadership, corporate leadership and social leadership. At the same time, innovation is also viewed in terms of strategic relevance and developing innovative management practices and converting innovations into commercial reality. Though social innovation is much talked about but it does not dictate or transform the economic markets or set rules for them. Social innovation is globally playing an important role, but it will take time for social markets to make effective inroads into economic development model. Engineering interventions are important for success.

A corporate strategy for innovation needs to be evolved. Experts realize that corporate policies, processes, procedures and support tools should encourage and enable responsible innovation. Board should put a framework in place to encourage intra-preneurship as a viable alternative.

The Board should also identify and tackle obstacles to innovation, barriers to entry and factors that increase the cost, complexity and difficulty of doing business. They should be prepared to work with other companies and with governments to reduce or overcome the obstacles.

Board should agree on their appetite for various forms of risks, recognize that innovation involves risks, and take practical steps to reconcile the requirement of both new developments and maintaining prudent control. Boards need to establish an appropriate balance between entrepreneurship and risk taking; and between the formulation of strategy and its implementation. Building appropriate checks into support arrangements and tools can ensure that new developments do not infringe laws, rules, policies and license conditions.

Essential Attributes for Innovation

In the digital age, the pace of change has gone into hyper speed, so companies must get strategic, creative, execution, and organizational factors right to innovate successfully. It has been concluded that if companies assimilate and apply certain attributes – in their own way, in accordance with their particular context, capabilities, organizational culture, and appetite for risk – they will improve the likelihood that they can light the spark for innovation.

Following eight attributes have been identified by various management companies and experts.

i) ***Aspire****:* US President, John F. Kennedy's bold aspiration, in 1962, to "Go to the Moon in this Decade" motivated a nation to unprecedented levels of innovation. Indian Prime Minister, Narendra Modi's call for "Make in India" has similarly set in motion a large number of innovative actions both in terms of policies as well as programmes though technological and engineering innovations have still to catch on. A far-reaching vision can be a compelling catalyst, provided it's realistic enough to stimulate action today.

ii) ***Choose:*** Innovation is inherently risky, to be sure, and getting the most from a portfolio of innovation initiatives is more about managing risks than eliminating it. Executives must create some boundary conditions for the opportunity spaces they want to explore.

iii) ***Discover****:* Innovation also requires actionable and differentiated insights – the kind that excite customers and brings new categories in markets into being. One can look for insights by methodically and systematically scrutinizing three areas: a valuable problem to solve, a technology that enable a solution, and a business model that generates money from it.

iv) ***Evolve:*** Business-model innovations - with change of the economics of the value chain, diversity of profit streams, and/or modify delivery models – have always been a vital part of a strong innovation portfolio. Established companies need to reinvent their businesses before technology-driven upstarts do.

v) ***Accelerate:*** Virulent anti-bodies undermine innovation at many large companies. Cautious governance process make it easy for stifling bureaucracies in marketing, legal, IT, and other functions to find reasons to halt or slow approvals. Therefore, it is necessary to find pathways to accelerate actions.

vi) ***Scale:*** Some ideas, such as luxury goods and many smart phone apps, are dusting for niche markets. Others, like social networks, work at global scale. Explicitly considering the appropriate magnitude and reach of a given idea is important to ensuring that the right resources and risks are involved in pursuing it.

vii) ***Extend:*** In the space of only a few years, companies in nearly every sector have conceded that innovation requires external collaborators. Flows of talent and knowledge increasingly transcend company and geographic boundaries. Smart collaboration with external partners, goes beyond merely sourcing new ideas and insights; it can involve sharing costs and finding faster rules to market.

viii) ***Mobilise***: How do leading companies stimulate, encourage, support and reward innovative behavior and thinking among the right groups of people? The best companies find ways to embed innovation into the fibers of their culture, from the core to the periphery.

Research has also observed that big companies do not easily reinvent themselves as leading innovators. Too many fixed routines and cultural factors can get in the way. For those that do make the attempt, innovation excellence is often built in a multiyear effort that touches most, if not all, parts of the organization and getting time to mobilize all stakeholders to appreciate the effort.

Indian Model of Innovation

The focus obviously has to be on entrepreneurs or SMEs. This is not accepted conceptually but it is true. We need to trust smaller organizations for innovation.

At the onset of 21st Century a need was felt for the 'Indian Model of Innovation' that focuses on 'affordability' and 'inclusive growth' and which can be a model for emulation by

countries across the globe facing similar challenges for sustainable development. Indian entrepreneurs and policy makers have accepted this inclusive model of innovation.

Creative Leadership to Support Innovation

Whether innovation will be supported or not has a lot to do with the leadership.

Dr. A.P.J. Abdul Kalam, Former President of India, in his Book "Thoughts for Change – We Can Do it" (2013) has elaborated on the linkage between national economic development and creative leadership as below:

- Nation's economic development is powered by competitiveness.
- Competitiveness is powered by knowledge power.
- Knowledge power is powered by technology and innovation.
- Technology and innovation is powered by resource investment.
- Resource investment is powered by return on investment.
- Return on investment is powered by revenue.
- Revenue is powered by volume and repeat sales.
- Volume and repeat sales are powered by customer loyalty.
- Customer loyalty is powered by quality and value of products.
- Quality and value of products are powered by employee productivity and innovation.
- Employee productivity is powered by employee loyalty.
- Employee loyalty is powered by employee satisfaction.
- Employee satisfaction is powered by working environment.
- Working environment is powered by management innovation.
- Management innovation is powered by creative leadership.

Thus, a relationship has been identified amongst economic growth, management innovation and creative leadership.

Each element mentioned above needs to be understood in the contextual framework. The interpretation will depend on economic and social structures in which they are applied. These elements also need to be carefully interpreted in the corporate context. However, the above gives an indicative and broad framework of the role of leadership in a knowledge society where tangibles have been replaced by intangibles.

Achieving National Goals: Make in India, Digital India and Ease of Doing Business Initiatives

The Prime Minister is focused on these three initiatives and is looking forward for suggestions and solutions for implementation of these three initiatives through innovative processes and routes where engineering inputs are crucial.

Dealing with 'Make in India Initiative' first, it is a massive challenge and calls for creating strong capital markets, upgrading technological and engineering base and ensuring skills development appropriate for emerging production needs. 'Make in India' programme can only be a success when people have confidence and faith in 'Made in India' products. The key issue is how can that be ensured? This calls for defect-free and uniform quality production that performs to expected standards, create high level of confidence, first in the Indian consumer and later in foreign consumer. The Indian manufacturers have to understand that they have to follow only

one quality standard for consumer in India and abroad. There is no doubt that once the quality is established Make in India programme will become a success and larger number of foreign investors and producers will flock to India. They will not just come for supposed to be 'cheap labour', 'unskilled manpower' and 'poor quality standard enforcement regime'. This requires new platform and approaches for engineering applications.

'Digital India Initiative' is expected to have an overarching impact and on paper a number of plans have been developed which need to be detailed carefully. All stakeholders including the suppliers and vendors have to be brought in tune with the quality performance so that timely project completion is possible. Sustainable project management practices will have to be incorporated. Emerging fields of engineering will have to be carefully integrated, both for software as well as hardware. Needless to say this again calls for engineering interventions of the highest order.

'Ease of Doing Business Initiative' is generally being interpreted as getting licenses, getting clearances, ensuring taxation compliance and land, water and electricity acquisition. No doubt there are amongst the ten indicators on which the World Bank rates different countries for Ease of Doing Business. Currently India is rated 146 and the Prime Minister has called for an all out effort to improve India's position to at least 50. The Department of Industrial Policy and Promotion has launched an initiative with 14 indicators to support growth on Industry and business in India. The Parliamentary Committee on Ministry of Commerce has called suggestions on, 'Ease of Doing Business'. The issue is highly complex and many of the inputs can only be effectively planned by engineering interventions. It is time that highest platform of engineering professional deliberates on it and provides inputs. Unless the rating under Ease of Doing Business in India improves making India a global manufacturing hub will become a pipe-dream.

The last important issue is that inspite of two decades of 'market reforms' people still distrust the market. The debate is going on between 'pro-market' and 'pro-business'. Experts defined that pro-market is to believe in competition, which helps keep prices low, raise the quality of products and leads to a "rules based capitalism" that serves everyone. To be "pro-business", on the other hand, means to allow politicians and officials to retain power over economic decisions and this leads to crony capitalism.

Whereas the pro-market environment can be created through high level of innovate promotion through technological and engineering innovations, the pro-business model can be promoted irrespective of technological interventions but only through policies favouring a few interest groups irrespective of competitive market benefits accruing to the user.

All the initiatives are expected to create inclusive growth thereby the rural poor also come into mainstream of economic growth through appropriate skills development, digital connectivity and productive labour route.

Leadership of highest level is called to ensure such results through innovation in creating short duration effective skills development programmes for persons with low level of education; improving and disseminating digital literacy; and introducing higher productivity based manufacturing platforms.

Epilogue

Dr. Kalam's mission for the life was to uplift the common man out of poverty. In his book 'Target 3 Billion', Dr. Kalam wrote, "More than 3 billion people live in rural regions, and the empowerment of these 3 billion is an issue that needs urgent attention today as the world talks about inclusive development. The empowerment of rural regions of the world is critically important from the perspective of inclusive development, sustained peace and shared prosperity in the world".

Dr. Kalam has shown how the leadership can bring about a transformational change in growth pattern through innovative measures and its time his preachings are followed.

Conclusion

Innovation is the mantra for future growth and can only be supported by forward looking visionary leadership. The attributes of innovation and the leadership traits have to be matched to ensure that the knowledge society is fully utilizing the emerging technological and engineering prowess and do not hesitate to bring around factor changes through innovation and thereby prosperity to the mankind.