

New perspectives for industrial competitiveness: Exploring the role of IITs

Kirankumar S. Momaya¹

***Abstract:** Changing worldwide contexts and discontinuity can create opportunities for India or countries with youth power. Building on a long and exciting journey of competitiveness research, the author attempts to give a glimpse of context and of elements of new perspectives on industrial competitiveness. For that, trends in competitiveness journey of India and select countries are reviewed. Glimpse of emerging competitiveness perspectives that focus more on human factors and cooperation, and seem to give better guidance, is given. While actions are needed by many stakeholders, we focus on opportunities and implications for young professionals who are keen to shape competitiveness for masses.*

Keywords: Industrial competitiveness, flexibility, institutions, IITs

Type: Developmental Paper

¹ Kirankumar S. Momaya, Shailesh J. Mehta School of Management, IIT Bombay
Powai, Mumbai- 400076 ,Phone: 022-2576-7759, momaya@iitb.ac.in

1. Brief background

Discontinuities in world markets and financial meltdown should be considered opportunities for evolving better alternatives for competitiveness and development. The last century and a half, since the industrial revolution, has witnessed unparalleled material development and consumption. The economic model paid less attention to equity and replenishment of natural capital, threatening the future progress of humanity by challenges posed by increasing income inequalities, widespread poverty, terrorism and alarming degradation of the environment. Symptoms have become visible in phenomenon such as global warming and climate change, which impacts the poorer sections even more; Indian sub-continent will continued to be the home to largest mass of such sections.

Practices and theories are shaped by contexts and competitiveness also needs relook as the context is changing rapidly. Competitiveness concept and theories have come a long way since the Adam Smith era. Recent theories such as “Competitive Advantage of Nations” (Porter, 1990), “Competing for Future” (Hamel and Prahalad, 1994) evolved in contextual factors in North America and may need significant extensions, if not replacements as the context is significantly different for populous emerging countries such as India. Since per-capita endowments for several populous countries are very low compared to most developed countries, new perspectives on competitiveness are needed to meet aspirations of masses. For instance, for 17 % of the world’s population (on average more younger, aspiring and growing) India has only 4 % of fresh water resources and 1 % of global forest resources.

Paper is organized as following. We begin by quick review of trends in competitiveness journey of India. The need for scale-up in competitiveness is assessed. Preliminary findings from ongoing research about institutional competitiveness are highlighted to identify areas for further research. A unique contribution of the paper may perhaps be more balanced perspectives building on more than decade and a half diverse experiences in the Indian, North American as well as Japanese contexts.

2. Competitiveness journey of India

Youth is among the most exciting stage in competitiveness journey of a country. Most countries aspire to be developed; very few achieve it at the pace that also matches with aspirations of masses. With several countries in Asia and Europe progressing quite

effectively, the aspirations have been rising in India. Success in climbing to double digit growth rates, sustaining them and climbing up the ladder demands industrial competitiveness and rapid scale-up. A country's youth can drive the exciting stage in its competitiveness journey. Is youth leadership in India building skills and capabilities to climb to new heights? Seeing the talent, energy and team efforts of youth at IITs, NITs and other institutions, we are optimistic.

Scale-up in competitiveness is quite an exciting and demanding concept. Competitiveness is an interdisciplinary area having relevance across levels: country, industry, cluster and firm. In context of firm, drivers and enablers can be from any function, e.g. Operations, HR, marketing, finance or technology. We will attempt to simplify it for benefit of readers who are actively striving for such a scale-up irrespective of their context: corporate, government or institutions. We considered many perspectives on competitiveness and popular definitions to experiment and evolve generic definitions and frameworks to evaluate competitiveness (Momaya 1998, Momaya 2001; Banwet et al., 2002; Ajitabh and Momaya, 2004). In this article, the focus is on the macro: a key dimension of scale-up for country competitiveness. In simple terms, a country's competitiveness can be defined as its capability to produce goods and services that meet the test of local and international markets while simultaneously enhancing the real wealth of its citizens (CC, 1984). In practice, it is evaluated as a relative competitive position and is measured on more than 200 criteria including the best of Prof. Porter's Diamond Framework and its extensions including more relevant human factors. Data for benchmarking in our research is taken from a comprehensive country competitiveness report after careful analysis (Momaya, 2011): National Competitiveness Research.

The significant leap in competitiveness that India has achieved in the last four years is indicative of the challenging opportunities on the road ahead. Rarely in the past has India jumped that high on competitiveness ranks as in the last half decade—from 47 to 28 (see Table 1). China's massive scaling up over several decades with double digit growth enables it to jump to rank 4 in the large strong country group and it is aiming for rank 2 within few years. Vast gaps in per capita GDP of India as compared to developed countries hint at huge potential opportunity. While some leaders in G7 can say that Indians should be content with development they can have with annual per capita income below Rs. 1 lakh (say about US\$ 2,500 by 2015), that may not be acceptable to many in India, particularly the youth teams that have energy and capability to play in challenging arena internationally.

Table 1. Trends in competitiveness ranks of India and select countries

<i>Country</i>	<i>Per capita GDP</i>			<i>National Competitiveness Research</i>				
	<i>US \$</i>			<i>Year of Survey</i>				
	<i>2009</i>	<i>2008</i>	<i>2007</i>	<i>2009</i>	<i>2008</i>	<i>2005</i>	<i>2004</i>	<i>2003</i>
USA	46,381	46,716	46,849	2	1	1	1	1
Canada	39,669	42,030	39,901	3	4	2	3	8
Australia	45,587	47,498	43,752	7	10	15	16	14
Japan	39,731	38,443	40,207	20	16	19	19	30
Korea	17,074	19,115	16,740	23	22	22	25	27
China	3,678	3,263	3,593	17	20	24	32	31
India	1,031	1,068	904	28	33	47	42	42
Out of No. Countries	67	67	67	67	67	66	68	56

Notes: 1. Ranks for Guatemala in NCR in 2006 and 2007 were 49 and 50 respectively.

2. Ranks for India in NCR in 2006 and 2007 were 38 and 32 respectively.

Sources: Developed based on data from National Competitiveness Research (various years)

Evolving working definition of industrial competitiveness

At this stage evolving a generic working definition of industrial competitiveness of a country can be useful. OECD and select serious countries have been evolving definitions of competitiveness at different levels. Building on our ongoing research about competitiveness and context highlighted above a working definition can be proposed as:

The ability of companies and industries of the country to produce goods and services that meet needs locally and internationally, and generate relatively high factor employment and income levels on a sustained basis.

The above generic definition will require adaptation for specific contexts. For instance, international trade balances has been long accepted as a good proxy for industrial competitiveness in several countries that could actually increase employment and incomes. Glimpse of years of lag for India (if not decades) is given in the facts in next section.

3. Why scale-up in industrial competitiveness for India now?

India has been working hard to accelerate its development journey for quite some time and rapid scale-up in industrial competitiveness is necessary to achieve the same. The journey post independence has been remarkable in several respects, but inadequate to meet growing needs of huge population India could not stabilize. Compared to its historical share of output, trade and other contributions to the world, recovery post-independence can be considered marginal. For instance, in the important dimension of industrial development—manufacturing—, India's share in the world was 24.5 % in 1750 and 2.4 % in 1938. India's share of world trade which was about 2.5 % at time of independence shrunk to less than 1 % and despite all trade policies, incentives and efforts, remains below 2 % with record deficit on trade front every year. For instance, as per RBI data, trade deficit was INR 293,758 crore (more than 50 % of exports of INR 574,917 crore) in 2006-07; too high despite many advantages. If India does not attempt a rapid scale-up in its competitiveness with the best of its youth force available, it will face a massive turmoil sooner or later. The opportunity to catch-up on production (e.g. a simple proxy say per capita GDP, see Table 1) is quite huge. Forget about levels of developed countries with low population density, many in India will aspire at least Rs. 2 lakh (about US \$ 5000) per capita GDP to have some basic needs met, when inflation can be high.

Efforts to lay foundations began quite early but progress on the competitiveness journey has been too slow, particularly on human factors. For instance, organizations such as Indian Space Research Organization (ISRO), Indian Airforce/Army/Navy, Gujarat Cooperative Milk Marketing Federation (GCMMF) and institutions such as IITs that started making impact are now in their 40s or 50s and may be ready for scale-up. Competitiveness research indicates that human factors play more important role in scale-up for the stage India currently is. India recently surpassed China to reach rank 1 in terms of unskilled workers (see Table 2), transforming them into quality skilled workers is a real challenge. Comparisons with select relevant countries, hint at big opportunities of scaling lie with stakeholders like entrepreneurs, aspiring intrapreneurs and professionals playing the most important role. Survey results hint that their education level and international experiences are relatively lower to tackle the massive challenges India is currently facing.

Table 2. Glimpse of positions of select countries on key human factors

<i>Country</i>	<i>NCR Aggregate Ranks on Human Factor</i>				
	<i>Workers</i>	<i>Politicians</i>	<i>Bureaucrats</i>	<i>Entrepreneurs</i>	<i>Professionals</i>
USA	27	19	17	8	14
Canada	11	9	5	2	11
Australia	20	8	6	9	13
Germany	33	17	22	26	25
Japan	21	27	20	38	24
Korea	47	50	43	18	16
China	2	15	25	31	36
India	1	33	31	36	31

Source: Developed based on data from National Competitiveness Research (2010)

Glimpse of context given above can give us some clues to elements of the new perspectives needed for industrial competitiveness. Urge to think differently about competitiveness and strategy (e.g. Hamel and Prahalad, 1994) and to evolve great focal firms has been there. They defined long term as a point of view about one's industry and how to shape it, not far distance returns. Some of India's international powerhouses have been trying to play with international majors and learn. Our ongoing research about competitiveness hints that some industrial houses in India seem to be adapting rapidly emerging context. While established industrial houses such as Birla and Tata have some interesting elements in their DNA, many other firms also provides some clues. Here are example of elements in new perspectives:

- Human-centric: human resource development, more balanced on dimensions such as ethics, equity
- Sustainable operations: processes, products, minimize resource wastages and carbon load
- Flexibility: strategic, organizational, operational,..

- Cooperative: from team to higher levels such as industry-academia and intra/inter firm and industry

Thus “the ability of a business or other organizations to adapt to low carbon operations as well as sustainable business practices will become a critical determinant of competitiveness.” We are trying to evolve explicit criteria for the sustainable practices e.g. under the facet competitiveness processes of the APP framework (Momaya, 2001), so that organizations keen on differentiating on sustainability can think actions. Countries that have nurtured strong implementation capabilities for competitiveness through innovation, engineering and technology such as Japan have been developing alternate innovations and scenarios of carbon reduction; e.g. 25 % from base level of 1990 by 2020 (Komiyama, 2010).

4. Exploring role of IITs

Educational institutions should play a key role, they being the places nurturing human factors. We will focus on case of IIT Bombay, where we have initiated an exploratory research on institutional competitiveness. Concern about enhancing institutional competitiveness has been felt at policy level and will magnify as the international players in education intensify competition and try to change ground rules. Public institutions need to be more concerned as they have lesser strategic flexibility compared to private players. With factual record of Indian firms losing market share to international MNC’s across many industries and several public sector firms reaching nadir despite booming markets (e.g. Air India, BSNL), public institutions should be more careful. Committee of some of the veterans on “Institutional Competitiveness,” constituted by AICTE (2004), have addressed several issues such as benchmarking, curricula, faculty excellence and governance. Unfortunately, very little research has been happening on such critical aspect of institutional competitiveness and many leaders rely excessively on magazine ranking that are less relevant.

IIT Bombay has several achievements and strategic intent to grow and contribute much more in the second half century of its journey. From focus on teaching undergraduates, post-graduate teaching and research are getting due attention. The institute is attracting best of talent the entrance tests permit: students (e.g. more than 60 of top 100 JEE rankers in 2011) and faculty in engineering. Research infrastructure and output is also improving. In next phase of journey, expectations about contribution to industrial competitiveness can rise significantly.

Yet, there are opportunities of improvement on about the structure of engineering R&D (e.g. Sohoni, 2011). The agenda and methodology of ‘world-class research’ was achieved by defining it to be measured by ‘papers in international journals.’ The contributions of IITs to dimensions such as industrial competitiveness of indigenous industries is more difficult to define and measure, and hence seem to have received less attention. Our research hopes to draw attention to this key dimension, I feel, of the purpose for which IITs were created.

5. Discussion and select implications

Nuclear capability, self-sufficiency in food production, an array of indigenous satellites and missiles, an unmanned Moon mission—India’s achievements in the scientific domain in recent years have been spectacular (Kalam and Rajan, 2010). But we have just begun. In a century that many experts predict can belong to India and China, the realization of the vision of better future for many will require a keen understanding of our needs and this can only be achieved by tailoring technology, research and development, design and engineering (RDDE) and innovations to the goal of national development. While institutions such as IITs and IISc have contributed their share in such achievements, efforts of Indian industry are yet to help the country achieve balances on trade front; product and technology fronts are much more challenging.

Our ongoing research has identified huge opportunities of scale-up in competitiveness for indigenous firms across industries from automotive (e.g. Sahoo, 2010; Momaya, 2001) and construction (Bhattacharya et al., 2009?), to telecom (Mittal et al., 2010), segments of nanotechnology (e.g. Momaya, 2011), software (Himanshu, 2001; Ajitabh and Momaya, 2004). The scale-up will demand flexibility on many fronts, the most important may perhaps be strategic flexibility on part of key stakeholders. Major shifts in strategic intent (e.g. mission, vision, values) and choices in strategy diamond (e.g. arenas, vehicles, differentiators) may become necessary, but balances of continuity & change (Sushil, 2005), should be strived for. We, volunteers at the labs such as Strategy and Competitiveness Lab, are happy to have contributed our fair share for research on topics related to competitiveness.

Giving pointers to young researchers committed to take next level challenges is an objective of this paper. “New business paradigm: Global, Virtual and Flexible” was proposed at the first global conference (Sushil et al., 2001). The first decade has been quite fruitful for India in many respects as also reflected in competitiveness gains (discussed near Table 1 above); it

also provided challenges for next stages. Here are focused implications for the researchers keen to pursue challenging careers in academia, industry or governments.

- Think deeply about directions the country and our institutions are heading under influence of multiple stakeholders and market forces. Assess if there is need for any major correction in light of the perspectives on competitiveness highlighted above.
- Among factors of competitiveness given in APP framework (e.g. human resources, strategy, innovation, technology, knowledge...), identify ones you are passionate about. Think about linkages for scale-up in overall competitiveness of the unit or organization you are focusing and evolve research agenda.
- Work with relevant firms or organizations for experimentation.

Based on our ongoing research in strategy, competitiveness, flexibility and related areas, highlighted above, here are some topics for exploration, often given as questions.

- Which industries can be growth engines for the scale-up of India?
- Which among them have higher sustainability for Indian context (e.g. significantly lower carbon intensities)?
- How can emerging models of sustainable enterprise (e.g. Star Model; Sushil, 2010) be adapted in such contexts?
- Some states in India have historically invested in industry or human capital (e.g. Kerala in basic education). Others seem to have been focusing on investment-driven phase for competitiveness. Some have been trying with elements of innovation-driven phase. Role of focal institutes to accelerate competitiveness journey of nearby states (e.g. IITB for Western states), particularly for innovation-driven phase, can provide rich research arena.

6. Concluding comments

The concept of competitiveness is context specific and has relevance across levels: firm and industry to country. Remarkable strides in macro-competitiveness for a populous country such as India hint at the potential to climb next difficult stage. India and progressive states need to scale-up to meet rising aspirations of masses and climb up the relevant stages such as cooperation-driven and innovation-driven (Momaya, 2011). Such stages demand higher levels of industrial competitiveness, where institutions such as IITs were expected to play a

lead role. Evolving case of IITB hints at significant contributions, yet bigger challenges as capabilities and expectations rise. Exploratory nature of this paper does not require conclusions, but few remarks based on ongoing research and context of this paper may be useful. New perspectives, only a glimpse of which be achieved in this paper, and the emerging paradigm should be considered opportunities for correction in directions our institutions are evolving. Major changes in elements of strategic intent, culture and environment, processes, systems and structure may need to be implemented effectively with sustained cooperation from key stakeholders. Strategic flexibility balancing continuity and change (e.g. Sushil, 2005) will be needed, if the great institutions that employees and leaders have nurtured over decades are to realize their true potential and play a bigger role. Younger, committed and energetic researchers can take bigger challenges and benefit.

Acknowledgements

Financial support from IIT Bombay, IRCC for the competitiveness research project is acknowledged. Cooperation from several colleagues at the DMS, IITD, particularly Prof. Sushil, Prof. S. S. Yadav and Prof. Sudhir K. Jain, was crucial in building and sustaining the “Strategy and Competitiveness Lab,” where we initiated several projects. Cooperation from several young coordinators and participants in the competitiveness survey done across India is gratefully acknowledged. Particularly, R. Mukundan at SJMSOM, Dr. R. Umamaheswari and other volunteers at the Strategy and Competitiveness Lab, DMS, IIT Delhi and Technology Strategy Lab, SJMSOM, IITB have been playing coordinating roles. This paper builds on research findings published in journals (e.g. Yadav and Momaya, 2010; Momaya, 2011) and presented at competitiveness seminars to get feedback. We thank participants who gave us feedback.

References

- AICTE, (2004), National Initiative on Institutional Competitiveness, Report, All India Council for Technical Education, New Delhi.
- Ajitabh and Momaya, (2004), Competitiveness of Firms: Review of Theory, Frameworks and Models, Singapore Management Review, First half, Vol.26, No.1, 45-61.
- Banwet, D.K., Momaya, K., and Shee, H.K., (2002), Competitiveness: Perceptions, Reflections and Directions, Management Update, IIMB Management Review, 14 (3), Sept., 105-116.
- CC, (1984), Report of the President’s Commission on Competitiveness, USA
- Hamel G. and Prahalad C. K., (1994), Competing for the Future, Harvard Business Press.

IPS, (Various Years), IPS National Competitiveness Research Report, The Institute for Industrial Policy Studies (IPS) and the Institute for Policy and Strategy on National Competitiveness (IPS-NaC), Seoul.

Kalam A. P. J. and Y.S. Rajan Y. S., (2010), in “The Scientific Indian: A Twenty-first Century Guide to the World Around us,” Penguin Viking, New Delhi.

Komiyama H., (2010), The Mission of Japan as a Forerunner for Addressing Emerging Problems in the World (in Japanese), Hitotsubashi Business Review, 58 (1), p. 8-21.

Momaya K., (1998), Evaluating International Competitiveness at the Industry Level, Vikalpa, IIM Ahmedabad, April-June, Vol. 23, No. 2, pp. 39-46.

Momaya K., (2001), International Competitiveness: Evaluation and Enhancement, Hindustan Publishing Corporation, New Delhi;

Momaya K. (2011), Cooperation for Competitiveness of Emerging Countries: Learning from a Case of Nanotechnology, Competitiveness Review: An International Business Journal incorporating Journal of Global Competitiveness, Vol. 21, Issue 2, 152-170.

Porter M. E. (1990), The Competitive Advantage of Nations, The Free Press, New York.

Sohoni M. (2011), The Structure of Engineering R&D at IIT Bombay, Perspective, Raintree, Anniversary Issue, 12-13, June-August, p. 1-5.

Sushil, Momaya K. and Sharma O. P. (eds.) (2010), New Business Paradigm: Global Virtual and Flexible, Proc. of the First Global Conference on Flexible Systems Management (GLOGIFT 2000), Dec. 17-20, Global Institute of Flexible Systems Management, New Delhi and Thomson Learning, Singapore.

Sushil (2005), A Flexible Strategy Framework for Managing Continuity and Change, International Journal of Global Business and Competitiveness (IJGBC), vol. 1, 22-32, last accessed on Sept. 10, 2011 at <http://www.giftsociety.org/global-business-and-competitiveness.html?Itemid=118>

Sushil (2010), Star Model of Sustainable Enterprise, Editorial, Global Journal of Flexible Systems Management, Vol. 11, No. 4, p. iii.

Yadav S. S. and Momaya K. (2010), Reflecting on trends in country competitiveness and journey of IJGBC, Editorial, International Journal of Global Business and Competitiveness (IJGBC), vol. 5, iii-v, last accessed on Sept. 10, 2011 at <http://www.giftsociety.org/global-business-and-competitiveness.html?Itemid=118>

Yonekura S. (2010), Green Innovation (in Japanese), Hitotsubashi Business Review, 58 (1), p. 4-7.