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National Manufacturing Competitiveness Council

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Vigyan Bhavan Annexe, New Delhi
Dated the 22nd July 2011

To
The Members of Sub-group II(Manufacturing Management)
Of the Working Group *on HRD for the 12th Five Year Plan

Subject: Proposal for expansion of the Post Graduate Program for Executives for Visionary Leaders for Manufacturing (PGPEX-VLM) under the 12th Five Year Plan.

Sir / Madam

The National Manufacturing Competitiveness Council has been coordinating the Visionary Leaders for Manufacturing (VLFM) Programme which was launched in 2007 following the joint communiqué between Hon'ble Prime Minister of India and Prime Minister of Japan (JICA). The VLFM programme has been very successful in training Visionary Leaders for the Indian Manufacturing sector. The uniqueness of the Programme is that the IITs and IIM have combinedly designed the Programme and award a joint diploma at the end of the Programme.

A copy of the NMCC's proposal for expansion of the VLFM programme during the 12th Plan is enclosed for perusal and consideration of the Sub-group on Manufacturing Management.

Yours faithfully

R. Dharini 22/7/11
(R. Dharini)
Deputy Chief.

1. Shri. Rajeev Dubey
President – Group HR & Aftermarket Sector, Mahindra & Mahindra
Mahindra Towers
G M Bhosale Marg
Mumbai 400018

2. Shri R.P. Singh
Secretary
Department of Industrial Policy and Promotion
Udyog Bhavan
New Delhi

3. Smt. Vibha Puri Das
Secretary
Department of Higher Education
Shastri Bhavan
New Delhi

4. Shri S. Ramaswamy
Principal Secretary (Industries)
Government of Uttarakhand
Secretariat
4, Subhash Road
Dehradun – 248001

5. Shri B. Muthuraman
President
Confederation of Indian Industry(CII)
CII Headquarters,
Mantosh Sondhi Centre
23 Insitutional Area, Lodi Road
New Delhi – 110003

6. Shri Uday Kumar Varma
Secretary
Ministry of Micro, Small and Medium Enterprises
Udyog Bhawan
New Delhi

7. Dr Subhash D Awale
Director
National Institute of Industrial Engineering
NITIE Campus,
Near Vihar Lake, Mumbai 400087

8. Shri Anil Gupta
President
Indian Industries Association (IIA)
IIA Bhawan, Vibhuti Khand, Phase II,
Gomti Nagar, Lucknow – 226 010

9. Dr. Ashok K Mittal,
Industries & Management Engineering
IIT Kanpur
Kanpur – 208 016

Subject: **Proposal for ensuring sustainability with large scale expansion of flagship Post Graduate Program for Executives for Visionary Leaders for Manufacturing (PGPEX-VLM) under 12th Five Year Plan -Reg.**

1. INTRODUCTION

The visionary leaders for Manufacturing (VLFM) concept has been pioneered by the NMCC as one of the prerequisites for bringing paradigm shift in Indian manufacturing sector to achieve the goal of 12% growth rate of manufacturing sector for enabling 9-10% inclusive growth rate of Indian economy and for generating large scale employment. The VLFM concept received national level recognition and priority in the joint statement of Prime Ministers of India and Japan in December 2006 in Tokyo for its implementation in India through Japanese cooperation. Since then, the VLFM program comprising of four opportunities(i.e A, B, C, and D) is being implemented under the apex body headed by the Chairman NMCC and actively represented by the Ministry of HRD GOI, IITs, IIM and CII.

2. The Opportunity-B pertains to one year residential pilot program of Post Graduate Program for Executives in VLM (PGPEX-VLM) being successfully run since 2007 in IIT - K, IIT-M and IIM-C. In view of encouraging results of this pilot Program upto 2013 with Japanese cooperation and the dire need for its sustainability with large scale expansion for developing visionary leaders; the apex committee of VLFM has decided to propose inclusion of this program in a big way under 12th five year plan of Ministry of HRD GOI so that this flagship program of national importance is expanded on faster basis through the existing high educational infrastructure under administrative control of Ministry of HRD, GOI, to begin with in all IITs and IIMs and subsequently in Universities and standalone engineering institutes with managements stream having potential for running VLFM program. In essence the proposal envisages to develop around 11000 graduates of PGPEX-VLM with the estimated investment of Rs.110 crores during 12th Year Plan.

3. This proposal is structured in four parts. Part 1 gives introduction for the proposal-in-question. Part 2 elaborates on the background of VLFM program, HRD challenges in Indian manufacturing, international scenario, NMCC's emphasis on HRD in manufacturing the noble initiate of VLFM, stakeholders of VLFM, envisaged benefits and coverage of the VLFM program. Part 3 covers pilot PGPEX- VLFM program's outline and success. The part 4 constitutes profile of the proposal for large scale expansion of PG PEX-VLM program by Ministry of HRD GOI through 12th five year plan.

2. BACKGROUND OF VLFM AND ITS COMMENCEMNT IN INDIAN MANUFACTUIRNG

2.1 The Emerging Indian Manufacturing

4. The Indian manufacturing industry has been growing at a very high rate both due to domestic as well as foreign investments. It is also globalizing which is reflected in the international acquisitions. This scenario has forced the Indian manufacturing industry to look for engineering talent to transform itself from a "production" to a "Big M (manufacturing)" organization capable of innovation, product and technology development, efficient supply chain, etc.

5. The main concerns of Indian manufacturing sector are: Its low and Stagnating % share in GDP (i.e. 14 to 15 whereas in China it is 47%), its Growth rate is low (i.e. around 7% as against around 11% in China), and employment creation is below a required level of 10 million annually. The long-term solution lies in improving the competitiveness of Indian manufacturing sector while ensuring creation of adequate jobs. For this to happen, around 12% growth rate of manufacturing is required for ensuring inclusive growth rate of 9-10% growth of the Indian economy with increasingly high employment generation, reducing poverty and translating India into a modern develop nation. There are many reasons that contribute to this chasm. The current leadership in government, industry and academia after detailed deliberations attributed it to the mindset of people engaged in manufacturing.

6. To change perspective from production focus (small, m.) to a holistic approach to manufacturing that addresses all the elements concerned with manufacturing. The major elements are Research and Development (R&D), Design, Supply chain, Product and Process technologies, Resource efficiency, Quality Assurance, Ecologically Sustainable Industrial Development, Customer relations and societal changes through five Ms namely, Machine, Material, Money, Management Practices and Manpower. In which, the manpower is the only element which rules the other four elements of management of manufacturing as also it is the potential and the performance of the manpower decides the fate of any manufacturing unit in achieving the height of the success. This perspective change can be brought about only by the transformation in the manpower from raw leaders to visionary leaders - who has the knack of seeing invisible future.

2.2 HRD Challenges in Indian Manufacturing

7. The manufacturing sector in India is facing a crisis situation in terms of the shrinking manpower of appropriate skill level which is willing to work in this sector. This can be mainly attributed to the high growth in the service sector lead by information technology and information technology enabled services (IT/ITES) for the last twenty years which absorbed the engineering talent due to better salaries and growth opportunities. On the other hand, the available engineering talent pool is shrinking in terms of desired quality. The other forces responsible for the shrinking manufacturing manpower are:

I. **Migration due to lower pay package:** There is a decline in the mid-level leadership in manufacturing due to manpower migration to information and communication technology (ICT) jobs. This migration is primarily due to the high pay in this sector.

II. **Deficit of well-trained manpower:** There are a large number of manufacturing companies, both domestic and international that has started operations in India. This is primarily propelled by the increasing demand for new products and mass

customization, globally. Increase in number of manufacturing companies there is a deficit of well-trained manpower.

III. **Quality constraints**: Responding to the growing demand for engineers, a large number of engineering institutions were started. Owing to the sudden and rapid growth, quality of education in these institutions has been a suspect.

IV. **Career growth**: Career progression in manufacturing sector is quite slow as compared to the service industry.

V. **Working conditions**: The other competitive sectors like services provides better working conditions in terms of noise, pollution, other occupational hazards, field duties in remote places, etc. in comparison to manufacturing sector.

8. In order to overcome these HRD challenges associated to manufacturing sector on one hand and to promote the Indian manufacturing on the other hand, it is need of hour to develop Visionary Leaders for Manufacturing.

2.3 Review of International Scenario and the need for breakthrough management

9. In early 1950s and 1960s, United States had leadership both in product design and manufacturing processes. Further, US industries also commanded economies of scale due to its large consumer base in industries like automobiles, aircrafts, consumer durable, chemical and metallurgical process industries. The late 1960s and early 1970s witnessed the growth of Japan as a major manufacturing country having cost and quality as its strengths. This period also saw rapid changes taking place in product and process design due to the emergence of electronics and chap computing power. Japan became the leader in production of manufactured goods due to its focus on quality, incremental continuous improvement and Japanese way of management. This period also saw focus being shifted from quality control to total quality management with customer as a central figure. Japanese were able to develop systems and methodologies suited for this environment

which provided Japan a competitive edge. However, with increasing cost, manufacturing bases started shifting outside Japan to Southeast Asia and Korea and production started getting distributed. Japan still continued to have competitive edge due to its ability for product innovation and process improvement. During this period, Indian manufacturing industry was primarily involved in traditional manufacturing using technologies from the 1950s. The industries did not either concentrate on or evolve product and process capabilities to improve product design. With high growth rate, the labor wages in countries like Korea and South east Asia became high enough for China to emerge as a manufacturing base with low cost. China in itself was also a large market which fuelled both domestic demand as well as exports. The 1990s saw China emerging as a world leader in manufactured products. This period was also utilized by China to strengthen its technical education system possibly with a focus on manufacturing so that by year 2000 it had a competitive edge both in product design and manufacturing cost. Indian industry, meanwhile, was liberalized and started focusing on certain manufacturing sectors such as auto-ancillaries where it was thought that technology licenses and joint ventures could provide a means to manufacture products to meet requirement of the global customers. However, other sectors such as textile, fast moving consumer goods, electronics etc continued to focus on the domestic market using traditional technologies. With the emergence of China as a major product manufacturer in the global market, considerable attention is now being focused on India as an alternative manufacturing hub.

10. The rapid changes now going on in the world and the increasing pressure such changes put on management. In particular, the management paradigms of standardization and incremental improvement for efficient production that delivers high quality products that satisfy customers are no longer sufficient for many businesses. Now a third paradigm is required as the life cycle of one business begins to head into decline, a new business must be found and developed. Thus, a new kind of business leader is required- a visionary leader who is facile with standardization and incremental improvement but also has a knack of seeing into the invisible future. The leader needs an

eye to monitor management-for-control, or else the company will not meet the minimum contract between the company and society. The leader needs an eye to monitor management-for-incremental improvement, or else the company will not keep up with changing customer-requirements. And the leader needs the wisdom to see the path to future breakthrough, or else the company will have no tomorrow.

2.4 The NMCC and its emphasis on HRD

11. The National Manufacturing Competitiveness Council (NMCC) was formed by the Government of India in October, 2004 headed by Dr. V. Krishnamurthy as Chairman at the Union Cabinet Minister level. and comprises of 25 members comprising of Member (Industry), Planning Commission, Secretaries of various ministries, noted Industrialists, Economists and Representatives from apex industrial associations and the Member Secretary to energize and sustain the growth of the Indian manufacturing industry. One of the key objectives of NMCC, among others, is to serve as a policy forum for enhancing the competitiveness of the Indian manufacturing sector and thereby bringing about 12-14% growth in the next decade. This is expected to increase the share of manufacturing in national income to 25-35%.

12. To achieve these growth targets NMCC has drawn up a long term manufacturing strategy which includes strengthening education and training at various levels. One of the major initiatives of NMCC was **to set up the Visionary Leadership for Manufacturing (VLFM)** with participation from premier institutes of technology and management in India and address the three key challenges facing the Indian industry namely, **Development of quality higher education; Enabling the manufacturing industry to attract and retain the best talent; and Develop a critical mass of intellectual property through R&D initiatives.**

13. The National Strategy of Manufacturing (NSM) has therefore recommended development of leaders for the manufacturing industries:

"In India there is an urgent need for more leaders in manufacturing industries at this juncture. In order to enable development of leaders, special programs are conducted in the higher learning institutions abroad. It is necessary for Government to encourage some of the premier technical institutions like the Indian Institutes of Management and the Indian Institutes of Technology to collaborate with such institutions and conduct similar programs in India for developing leadership in the manufacturing industry. The programs could be designed as a public/private initiative".

2.5 The Noble initiative of VLFM

14. The VLFM program at national level at India was conceptualized in joint statement towards India-Japan strategic and global partnership signed by **Hon'ble Dr. Manmohan Singh, Prime Minister of India and His Excellency, Mr. Shinzo Abe, Prime Minister of Japan in December, 2006.** The relevant para 17 of the statement reads as **"Cooperation within the framework of Japan - assisted Visionary Leaders for Manufacturing (VLFM) Program, under which Japanese Manufacturing Management and Skills will be transferred to Senior Managers of Indian Manufacturing Industry".** The action was to be taken by the NMCC and Ministry of HRD with IITs and IIMs, etc. (A copy of the joint statement is enclosed at **Annexure-I).** This cooperation was for 2 years and 7 months and further extended for 2 years and 7 months, eventually ending in 2013.

2.6 Stakeholders of the Program

15. The Indian side has four entities cooperating for the implementation and sustenance of this program:

1.	Government of India		National Manufacturing Competitiveness Council
			Ministry of HRD
2.	Academia		Indian Institute of Technology, Kanpur
			Indian Institute of Management, Calcutta
			Indian Institute of Technology, Madras
3.	Confederation of Indian Industry (CII)		Manufacturing Innovation Mission
4.	Indian Industry		Representatives

16. Progam ownership - An apex committee by the Chairman NMCC and with appropriate membership of all the stakeholders is entrusted for taking all strategic decisions regarding the program.

From Japanese side, JICA is playing a key role in setting up a framework for implementing the project. Professor Shoji Shiba is a Member of the NMCC Apex Committee on VLFM, who is also JICA Advisor for the programme. NMCC is the overall coordinating agency for the entire VLFM.

2.7 Envisaged Benefits of the VLFM Program

17. The envisaged benefits of the VLFM Program are as under:

- Creating a critical mass of 300 visionary leaders who will transform the Indian manufacturing industry from traditional way to the most advanced way.
- Creating a strong partnership between industry and the academia, especially with the Indian Institutes of Technology and the Indian Institutes of Management through cutting edge research and development based on current urgent needs of the manufacturing industry in India.

- Providing an opportunity to learn directly from Japanese Experts
- Transferring 'Best Practices' from Japanese Manufacturing Industry to India
- Sensitizing the CEOs/MDs of Manufacturing Companies and MSME Entrepreneurs on the need for investing in their people.
- Assuring quality of the programme

2.8 Coverage of the VLFM Program and its take off

18. The beginning on the initial dialogue was made in NMCC in its 5th Meeting of the Council held on 5.4.2006, Prof. Shoji Shiba made a presentation to the members of the Council. Prof. Shiba and International Experts on breakthrough management and quality management have had a long-term association with the manufacturing sector form the Indian industry. Thereafter, a series of meeting were held at highest level of Chairman, NMCC as also in subgroups for formalizing the programme with further details of its 4 Opportunities. The 4 Opportunities A,B,C & D eventually launched on 13th April, 2007, 27th August, 2007, 23rd November, 2010 and 1st December, 2009. All 4 opportunities are concurrently in operation. The OPP A,C and D are being coordinated by the CII and OPP B is being implemented through IIT-K, IIT-M and IIM-C. The Opportunitywise targeted participants, duration of the program, their take off dates and nature of the program. It confirms that all Opportunities together covers the three layers of management of any manufacturing units. A conceptual diagram of the VLFM system indicating the 4 Opportunities in pyramid form is depicted in **Annexure-II** and another picture indicating the process of transforming effective measures to Visionary Leaders is depicted in **Annexure-III.**

Opportunity (category)	Targeted participants	Duration	Starting up of program	Program Coordinated by	Nature of Program
PGPEX-VLM (B)	Junior to Middle Level (5-10 yrs)	1 year	27th August, 2007	IIT-K, IIT-M and IIM-C	Residential
Visionary Corporate Leaders for Manufacturing (VCLM) (A)	Senior Manager Level	5 modules of 5 days each with intervening periods spent in company	30th Sept.2007	CII	Non Residential
Visionary Heads of Manufacturing (VHM) (C)	CEOs and COOs	3 days followed by 2 interventions of one day each in a year	7th Dec.2009	CII	
Visionary Small and Medium Enterprises (VSME) (D)	SMEs	12 modules of 2 days each every month for a year with intervening periods spent in company	1st Dec. 2009	CII	

19. All the programs have had excellent cooperation from Japan International Cooperation Agency throughout the last four years; starting from the initiation of the programme, building up areas of support, extension of support and now the continuation. As there is no precedent of implementing a programme such as the VLFM, new mechanisms for coordination and implementation had to be formed. Accordingly, two committees, the Apex Committee and the joint coordination Committee were formed to resolve issues through the process of consensus. A crucial element in designing and implementing this programme is the exceptional contribution of

Prof. Shoji Shiba. His dedication and the penchant for perfection transferred to the participants and has become the USP of the programme.

20. All these opportunities have brought about multiple breakthroughs both for the participants and the Indian manufacturing companies. In this paper we will focus on the breakthroughs brought about by PGPEX-VLM as it is a unique opportunity offered by leading Institutes of Technology and Management in India. This programme is also the first of its kind in the country in which a joint degree is offered by the leading Indian academic institutions. Unlike the traditional higher educational degrees such as MBA, MS or M.Tech, this opportunity is focused on integrating both technology and management necessary for "Big M."

3. PILOT PGPEX-VLM PROGRAM- ITS OUTLINE AND SUCCESS

3.1 PGPEX-VLM (opportunity-B) as part of four opportunities of the VLFM program

21. On the basis of the DPR prepared by NMCC, IIT, CII, JICA four opportunities of VLFM training where identified. One of the four opportunities is the opportunity B. It is referred as post graduate program for executives for visionary leaders for manufacturing (PGPEX-VLM) and it is geared towards middle level executives working in the manufacturing sectors. This is a residential program jointly conducted by the IIT-K&M and IIM-C. The structure of the Opportunity B is given in the **Annexure-IV.** This opportunity was launched on May 07, 2007 and it was formerly inaugurated on August 27, 2007. An at a glance information is provided in the Brochure of the Program at **Annexure-V.**

22. PGPEX-VLM (opportunity-B) program administration - VLFM coordination committee comprising of the program Director from IIT-K&M, IIM-C nominated by the respective Directors. The coordinating committee administers admission process, program, evaluation, faculty selection, coordination with Industry, etc. The

committee works under the guidance of the apex committee. The overall administration of the VLFM program is taken care by the participating institute by rotation.

3.2 Intake and Selection Process

23. The batch size for program was designed to be around 30. This limited class size was brought about owing to the physical constraints in terms of infrastructure. The first four batches had the intake near this bounding value. Starting from the fifth batch there is a plan to increase the intake by 33%.

24. Selection process is undertaken by an Admissions Committee constituted by the Apex Committee (formed by the three Institute Directors). Each Institute in a cyclic order of IIM Calcutta, IIT Kanpur & IIT Madras undertakes the responsibility of organizing Institute. The organizing Institute is responsible for in-charge of all administrative process of selection like screening, short listing and conduct of interview. Details of the selection process are described in **Annexure-VI.**

3.3 Diploma of PGPEX-VLM

25. The initial understanding among the three institutions was that the program will be floated as a certificate program. However, in March 2007, the Academic Council of IIM Calcutta noted that the proposed program showed a total of 960 contact hours at the three participating institutions put together and resolved that such a program merits the award of a Diploma. A flow chart indicating program activities of Opportunity B is given at **Annexure-VII.**

26. The IIT system had diploma programs earlier but none at that time of starting the program. The leadership of the two participating IITs resolved to revive the diploma program and gave the fullest support to fructify the program as designed by the faculty. A diploma program was revived along the guidelines framed for the earlier programs and the PGPEX-VLM was considered under this category. It was decided to have a joint Diploma of the

three Institutes signed by their respective Directors, Chairman Board of Governors of the organizing Institute of the batch, and Registrar of the organizing Institute of the batch (Faculty-in-charge in the case of IIM Calcutta).

3.4 Curriculum of PGPEX-VLM

27. The broad curriculum of the program was drafted in a modular mode with respective topics in each module. The number of instruction hours and leader of instruction on the expertise where distributed as under:

MODULE	HOURS	LOCATION
Environment of Manufacturing	60	IIM
Functional Knowledge	150	IIM
Manufacturing system & Technology	140	IIM
	390	IIT
Leadership and Decision making	135	IIM
	85	IIT

Note:

i. The equivalent credits based on IIT-M are shown in Annexure-VIII.
ii. The curriculum overview and objectives are given in Annexure-IX

3.5 Placement of PGPEX-VLM

28. The PGPEX-VLM begin in 2007-2008 and by now 3 batches have passed out with 92 students (10 sponsored and 82 self financed) and 28 students are in the fourth batch of 2010-11. The fifth batch of 40 is advertised for 2011-12. In the first three batch, 72 students received good placements with the average annual salary of Rs.1.1 million; which is nearly double the average salary of overall manufacturing sector. Therefore, it can be concluded that the graduates from PGPEX-VLM are well received in the job market.

3.6 Lessons derived from the Program

29. Robust growth of manufacturing sector cannot be achieved without the development of visionary leadership skills at all levels of Management in the manufacturing organizations. Culture of achieving breakthrough and innovations needs to be made a part and parcel of Training Curriculum at all levels of Management. This has been one clear lesson.

30. Secondly, it was seen that there is a need for continuous interaction between the Academia, Industry and Government to identify key areas and problems and undertake course corrections along the way. This has been an ongoing process.

31. In designing a program of this nature which is essentially for development of high quality human recourse in the manufacturing sector, the entire value-chain of that sector has to be covered. Interaction between Academia and Industry has been crucial to generate practical solutions to complex problems that arise throughout the value chain and this also is an ongoing exercise.

32. In order to ensure the sustainability of PGPEX-VLM it is desirable to setup VLM society that will build a community of practitioners of VLFM philosophy, to organize faculty learning convention to create skills for inventing innovative learning program and setup a think tank for brain storming.

3.7 Breakthrough in PGPEX - VLFM

33. PGPEX-VLM has three unique features for higher education systems in India. The first of this unique feature is the collaboration between Government, academia and industry. Even among the academic Institutes, three leading Institutes, IIM-C, IIT-K and IIT-M came together for the first time to teach a joint programme in teaching management and technology. Secondly, the teaching style adopted for training these participants included new innovative method to change the mindset and skill oriented course delivery which focuses on leadership development. Thirdly, there was a

breakthrough brought about in the learning environment. Participants had the unique opportunity to be resident in three different Institutes, which have traditionally acknowledged the importance of holistic education. The learning environment also exposed the candidates to have both theory and practice interspaced with each other. They also had the unique opportunity to observe and learn from different cultures in India and Japan.

3.8 Key success factors for Implementation

34. The PGPEX-VLM opportunity has completed three years. In this short period, there are many signs of success in the form of large number of applications for a limited number of seats, successful placement, etc. This duration is however not long enough to assess the direct impact of alumni from this program on the Indian manufacturing. However the process for implementation of the program has been unique and is discussed in detail in this section. The process for implementation starts with the societal environment that beckon the transformation, the real change leaders who worked to make a success of PGPEX-VLM and the external influence on these real change leaders to grasp this opportunity.

35. There are many breakthrough ideas that are developed in the discourse of public policy and nation building. However, most of such ideas seldom get to be acted upon and even fewer end up being successful. VLFM was planned to build a leadership pool who understood the value in creating the Big "M" of manufacturing. VLFM is a breakthrough idea that was nurtured by national leadership at the tipping point. This visualization of a breakthrough idea by the national leadership is an essential attribute for the success of any programme.

36. Being a nation with strong democratic tradition, the political leadership of India aspired to have an inclusive growth. Inclusive growth expects to have the largest proportion of the population employed thereby reducing the social divide. The growth in the India economy due to ICT was not inclusive and required a strong intervention from the Government of India. The political leadership

in India envisioned this growth to happen by job creation in the higher employment domains of manufacturing, agriculture, etc.

However if personal aspirations for individual growth is not addressed, the migration of labor to the high paying avenues can't be arrested. Hence it is imperative for the transformation process to try to address these latent desires of individuals in the programme design.

37. Katzenbach has described the importance of real change leaders (RCL) as one of the essential component to bring about any transformation and particularly breakthrough ideas (Katzenbach, 1995). This is also found to be true by Shiba during the implementation of breakthrough management in his diverse experience. In this case too, the importance of RCL is found to be true. The concept of RCL in this context is different from the description detailed by Katzenbach. Katzenbach had perceived RCL as an engine to transform a single organization. However in this transformation process multiple stakeholders collaborated to achieve a common goal. The execution body of PGPEX-VLM is three independent academic bodies, i.e., IIMC, IITK and IITM. Each Institute has its own independent Directors, academic senates and faculty councils who oversee the academic functioning of these Institutes. It is unique that these organizations collaborated to create a feasible breakthrough project within a year.

38. All RCL have a strong sense of contribution to national development and social improvement. They have mindset that can be described as noble mind and a strong commitment to contribute to critical national issues. One of such commitment is the promotion of manufacturing in India. This strong commitment is the driving force for success of the PGPEX-VLM.

4. PROFILE OF THE PROPOSAL FOR LARGE SCALE EXPANSION OF PGPEX-VLM BY MINISTRY OF HRD THROUGH 12TH FIVE YEAR PLAN.

39. In view of the background of PGPEX-VLM program, the successful ongoing implementation of the pilot PGPEX-VLM program and the dire need felt by all the stakeholders for large scale expansion of PGPEX-VLM by Ministry of HRD through 12th Five Year Plan, a self contained proposal is prepared and elaborated as under:

4.1 Objectives of PGPEX-VLM

40. The main objectives of the PGPEX-VLM are:

- To establish national framework for sustainability with large scale expansion of the PGPEX-VLM program to develop next generation of manufacturing visionary leaders through one year residential program.
- This critical mass of graduates will transforms Indian Manufacturing industry from business as usual to business by global objectives.

4.2 Long term national goals of PGPEX-VLM

41. The long-term national goals are:

- Primary - to develop large scale visionary leaders in manufacturing on faster basis through concurrent efforts.
- Development effects - to create 1.5 million technically skill people every year and enhance employability of the present workforce in the Indian manufacturing sector.

4.3 Eligibility for PGPEX-VLM

42. Critical mass of engineers from manufacturing background having minimum 5 years experience in manufacturing.

4.4 Process of PGPEX-VLM

43. A one year residential program having structural pedagogical approach of lecture and case discussion in an advance and innovative techno management system supported by academic-institute environment.

4.5 Areas to be covered in the program of PGPEX-VLM

44. The PGPEX-VLM Program covers the following modules and topics which are both technical and managerial centric. This demonstrates the holistic nature of the program.

MODULE	TOPICES
Environment of Manufacturing	Global Scenario, National and International Regulatory Framework, Strategic Analysis
Functional Knowledge	Managerial Economics, Financial Analysis, Organisational Structure and Design, HR and Labor Laws, Marketing.
Manufacturing system & Techonology	Manufacturing Strategy, Production Management, Supply Chain Management, Project Management, Technology Management, Information Technology, ERP, Product Design and Prototyping, New Product Development, Frontier Technologies for Manufacturing, Automation and Robotics, Computer Integrated Manufacturing Advanced Materials
Leadership and Decision making	Leadership and Change Management, Vision and Execution, Ethics and Values in Business, Communication and Inter-Personal skills, Entrepreneurship problem Formulation, Data Analysis, Decision Making Tools.

4.6 Roll out plan for large scale expansion of PGPEX-VLM

45. In order to built further over the overwhelming success of pilot PGPEX-VLM and more importantly in line with the need felt by all the stakeholders of the program on faster basis through concurrent efforts so that visionary leaders for manufacturing are developed for the fast emerging manufacturing sector. For this purpose, a systematic and synergetic efforts are essential for the faster outreach of this program. Towards this, it is proposed that the program may be expanded as under:

Phase 1

- To replicate the current pilot PGPEX-VLM in 2 or 3 institutes basis in all IITs (15) and IIMs (12) during 12th five year plan (i.e. 2012-2017) starting from 2012.

Phase 2

- To expand the program further to universities [Central (ex. DU), State (ex.Pune), Deemed (ex. BITs, Symbiosis) and private (ex. Amity) having potential engineering and management streams for running PGPEX-VLM program through an appropriate intervention of Ministry of HRD and UGC with the initial mentorship of IITs/IIMs in the learning curve period.

Phase 3

- In parallel explore all possibilities to expand further through Ministry of HRD's AICTE approved reputed engineering colleges having MBA streams and potential for running for PGPEX-VLM program with the mentorship of IITs/IIMs in the learning curve period.

4.7 Implementing Agencies for PGPEX-VLM

46. The entire academic PGPEX-VLM program as above is proposed to be rolled out through the HRD ministry with requisite funding wherever necessary, as also on self financing basis. The current pilot PGPEX-VLM Program in 2 IITs and 1 IIM is being run with the Japanese cooperation and the terms of the cooperation will be coming to an end in 2012-13. Thereafter, this program will have to

be migrated from Japanese aid to institutionalized Indian Government support. This migration has to be planned in advance for smooth switch over. The HRD ministry may therefore play a role of principal implementing agency.

47. In this regard, it is worth mentioning that the Ministry of HRD has been consistently supporting VLM as concept and then as program, in the same spirit, in line with the need for more meaningful and direct interface between academia and industry for taking up this real time program on large scale basis for the desired growth and the competitiveness of the Indian manufacturing sector by Ministry of HRD.

4.8 Budget provision for PGPEX-VLM

48. Budget for the PGPEX-VLM program can be segregated into three parts.

Part 1 Organizing Curriculum

49. The first part involves expenditure towards organizing the curriculum. This would be a recurring expenditure in the ball park of **Rupees 50 lakhs per institute.**

Part 2 Infrastructure Establishment

50. The second part involves infrastructure establishment. As the visionary leaders are trained both in technology and in management, it is essential to expose them to the state-of-art equipments and processes. Fortunately, IIT and IIM have been well equipped with state-of-art simulation and manufacturing equipments. Hence there wasn't explicit requirement to have high initial capital equipment requirement. However for any new Institute to start this program, it will be imperative to have a one time planned expenditure of about **Rupees 3 crores per institute.** This will help pay for some of the equipments that are required to give a hands on exposure to latest technology like, visualization, rapid prototyping, etc.

Part 3 Recurring Expenditure

51. The third part includes running expenditure. PGPEX-VLM is a self financed course in the three Institutes. The program by itself pays for its publicity, recruitment, faculty time, etc. The primary source of revenue generation is through tuition fees. Based on the various constraints among the partnering Institutes the tuition fee is fixed. The current rate of tuition fee is **Rupees Nine lakhs per participant.**

52. Candidates are intimated of the amount and schedule of payment along with the admission offers letter. There are in all five installments of payment to be paid when accepting/ reporting to the respective Institute through Demand Draft indicated in admission offer letter. Living and travel expenses are additional and directly incurred by the participants.

53. The Budget provision for the above mentioned three phases and their three parts may be divided into two categories, these are IITs & IIMs and others (Universities/Institutes).

A. IITs and IIMs

No. of IITs and IIMs	Total groups of IITs and IIMs	Initial setup cost of the PGPEX-VLM	Recurring cost per program per year	Total cost
-	A	B	C	D=[(A*B)+5*(A*C)]
15 IITs and 12 IIMs	12 (Min.)	Rs.3 cr.	Rs. 00.5 cr.	66 cr. (36+30)

B. Others (Universities/Institutes)

54. For the 44 Universities and AICTE approved Institutes having potential to run the PGPEX-VLM program, one time grant-in-aid of Rs. 1 crore may be provided as introductory promotional grant for establishment of PGPEX-VLM program and the Universities/Institutes may be advised to raise recurring cost through their fees with

specified norms and standards along with the monitoring and control mechanism.

55. The total amount of the budget provision may be kept at Rs. 110 crores (66 crores + 44 crores) for the 12th five year plan. This budget is expected to develop 2400 graduates (i.e. 12*40*5) of PGPEX-VLM from 12 groups of IITs and IIMs with a batch of 40 over the five academic years during the 12th five year plan. Also, if other category of university/institutes with 44 number is also covered, which would generate 8800 graduates (i.e. 44*40*5) of PGPEX-VLM program. The total expected number of such graduates of PGPEX-VLM would be 11200. In essence, a target of around 11000 graduates of PGPEX-VLM with the estimated expenditure of Rs.110 crores.

4.9 Cost-Benefit of Rs.110 crore investment in large scale of expansion of PGPEX-VLM program

56. The proposed Rs.110 crore cost for rolling out PGPEX-VLM program with the objective of developing around 11000 graduates of PGPEX-VLM program is marginal in terms of the tangible and intangible impacts of the program would have on manufacturing sector of India in cascaded form. The perceived benefits of having a new kind of visionary business leaders, who are facile with standardization and incremental improvement and also have knack of seeing into invisible future. The leaders needs an eye to monitor management- for - control, management-for-incremental improvement and to see the path to future breakthrough. This mass of transformed visionary leaders in thousands are expected to percolate the visionary leadership qualities at secondary and tertiary level. In net effect, the total visionary leadership in manufacturing would help in revitalizing Indian manufacturing to the world class level and in long term it would save countries avoidable losses and wastages of precious resources in manufacturing, make it more competitive and it would help in increased growth vis-à-vis enhanced employment.

4.10 Recommendation

57. In nutshell, the Ministry of HRD, Government of India is suggested to take-up this proposal in an appropriate form with the Planning Commission for soliciting the estimated Budget support of to Rs.110 crores for developing around 11000 graduates of PGPEX-VLFM for ensuring the sustainability with large scale expansion of PGPEX-VLM program as envisaged by the Ministry of HRD and the NMCC for larger and long-term benefit of the manufacturing and introduced in India with Indo-Japan cooperation on the noble initiative of the Hon'ble Prime Minister of India in December, 2006.