



THE Turnaround ‘Turn-Master’

Dissertation:

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“Start with what they know. Build with what they have. The best of leaders when the job is done, when the task is accomplished, the people will say we have done it ourselves,” Lao Tzu.

“Management is doing things right; leadership is doing the right things,” Peter F. Drucker.

“The best executive is the one who has sense enough to pick good men to do what he wants done, and self-restraint to keep from meddling with them while they do it,” Theodore Roosevelt

It is not whether the results achieved are good enough or could have been better, but that it was done in a short time when recessionary conditions prevailed in the Indian market and there was no exuberant demand from the Indian buyers.

What also makes this case special is that at a time when the world was waking up to Michael Porter's 'Competitive Strategy' and 'Competitive Advantage', here was a company that has enacted it to reclaim its market leadership.

We saw here the simultaneous pursuit of 'differentiation' and 'low cost' to open up a new market space and create new demand. They created and captured uncontested market space, thereby making the competition irrelevant.

By uniquely redesigning the machines in modular configuration, they cleverly packaged specifications to cater to the high specification and feature demanding Europe while addressing the cost conscious bottom of the pyramid as well, with a common basket of parts like a mechano set.

So leadership was distinctly the hallmark as we saw in what we understand Mysore Kirloskar's Hubli factory to be the first in India to go the Japanese way becoming a comprehensive lean enterprise.

Although Turnmaster was the new series of machines developed by MKL, 'The Turnaround Turn-Master' is really a recognition to the visionary and charismatic leadership of Sanjeev Baitmangalkar, his conceptualization, strategy, risk taking ability, work ethics, commitment and perseverance that transformed a conventional organisation into India's first full comprehensive total lean enterprise!

– K. Thakur

KEY ISSUES

The numerous issues and questions that dogged Mysore Kirloskar (MKL):

- 1) Decrease in domestic market demand. Increasing onslaught of imported machines & its gaining share of market consumption.
- 2) Losing mature markets. Moving to a single market situation.
- 3) Delinked from the customers, no direct interaction and feedback.
- 4) Complacency of dealers under the changing technology situation in the market place.
- 5) Failure to implement the Business Development cells recommendations correctly.
- 6) Branches lacked ownership for all products, and focused only on high valued machines.
- 7) No focused pricing policy.
- 8) Negligence of domestic markets in the previous years had removed barriers for competitors.
- 9) Lack of focused strategy in developing Export markets after the recession of the 1980.
- 10) Absence of leadership and vision through the 80's.
- 11) Manufacturing Strategy did not focus on the customer.
- 12) Scattered factory layout.
- 13) Absence of a cohesive strategy in Quality improvement.
- 14) Supplier power was allowed to rule in critical cases.
- 15) Purchase ordering system was not demand focused. Resulted in imbalanced inventories.
- 16) Absence of employee involvement in improvements.
- 17) Not market driven. Wanting to dictate the markets.
- 18) Manufacturing focused, no value addition into services.
- 19) Understanding market sentiments and sensitivities not good enough.
- 20) Which generic strategy will drive higher sales?
- 21) Does the market have an option of alternate product or process?
- 22) How have we treated our customers?
- 23) Have we tried to rule the market rather than lead it?
- 24) What made MKL's products sell and stop?
- 25) What is the situation with customers and competitors?
- 26) Are we in the right segments or wrong ones?

- 27) Have competitors entered our segments?
- 28) Did MKL fail to erect barriers for lateral and vertical entrants?
- 29) Are there barriers in shifting segments?
- 30) Will there be a technology shift making existing products obsolete?
- 31) Where are the volume markets?
- 32) Has the buyer power reduced or increased?
- 33) What strategy is relevant today?
- 34) What is the competitor's response profile and behavioral pattern under these conditions?
- 35) Why have the orders dried up?
- 36) Who has entered MKL's segments and displaced them?
- 37) Why are they (MKL) not able to compete in the International markets?
- 38) Why had the factory to be closed down?
- 39) What processes went wrong?
- 40) No focus on acquisition of new markets, new products, new segments, greater market shares, product variety, & substitute products.
- 41) Very high lead times in manufacturing compared to global standards.
- 42) Excessive manpower.
- 43) No systems quality accreditation. Products bear TUV accreditation.
- 44) Outdated parts manufacturing setup.
- 45) Too many parts (15,000 SKU's) to be manufactured. Parts unique to each model. Not rationalised.
- 46) New product development had gone to sleep for 18 years.
- 47) Wastage's and rejections were at high levels.
- 48) Developmental lead times had to be drastically small.
- 49) Factory was closed. It had to be turned around from closure.
- 50) Organisational structure was hierarchical and not flat.
- 51) Lack of vision, and therefore strategy to counter the effects of the recessions of the 80's and the 90's.**

The Turnaround ‘Turn-Master’

INTRODUCTION

The Machine Tools Industry goes through the cyclical periods, of progression and recession. While in the progression phase the industry at large is busy executing its orders. While in recession phase most turn complacent and tend to loose strategic vision, blaming the general economic situation, rather than taking this situation as an opportunity to reassess their resources and competencies, segments of markets, threats and opportunities to redefine new business strategies.

This case study is an exemplar ‘turnaround’ of a Machine Tool manufacturing unit, from a low single digit market share to leadership position, commanding over 40 % market share. The figures in sales, turnover, surplus revenue generation at the unit and other key performance indicators show complementary quantum jumps. This case study narrates the strategic vision; strategic intent, leveraging of resources and competencies, breaking barriers, erecting barriers to entry moving into segmentation gaps, concurrent engineering, rapid prototyping, business process re-engineering, introduction of substitute products; downsizing and giving the business unit a protection from external and internal competition.

This case study has many facets to it; the unfolding developments will enumerate the process of this business being reengineered.

This case study is of relevance today and all times for what one can learn from it.

BACKDROP

Mysore Kirloskar Limited (MKL) started Machine Tool production in India in 1941 during the Second World War. A pioneer in the business it made its entry with a cone pulley lathe named Arrow. The company continued to adapt or develop a diverse product range in the years to come, in its endeavor to

keep up with the changing technology and market demands. The late 1950's to 1980's saw the addition of Capstan and Turret lathes., Copying Lathes, Auto Lathes, Cylindrical Grinders, Thread Rollers, High Speed Thread Cutting machines, Special Purpose Machines, CNC Lathes, Machining Centers etc. Various models of low speed lathes were developed during the early days; the 70's also saw the introduction of High speed all Geared Head Lathes. The advent of the 80's saw the removal of complete dealer dependency to start its own marketing network. The company had set up its branch factories at Hubli - to manufacture smaller size lathes and a foundry at Sattur to support the castings requirements of the Hubli factory, thus to create capacities for new technology acquisition at Harihar. The facilities at Harihar also included a well-established Foundry and Pattern Shop.

The product distribution between the two factories can be put into the following matrix.

		LOCATION	
		HARIHAR	HUBLI
VOLUME	High	Cone Pulley Lathes Capstan Lathes Turret Lathes	Lathes (Small & medium Sizes CNC Lathes
	Low	Large Size Lathes Copy Lathes High Speed Threaders Turret Lathes Cylindrical Grinders Internal Grinders SPMs CNC Machines	Capstan Lathes
		DOMESTIC	EXPORTS
MARKETS (FOCUS)			

The company employed about five thousand plus people, and at the end of 1980's had a sales volume of approximately seven hundred million. 1991, fifty years since its inception, the company had been through many difficult situations and recessions were not new to it. This recession was different from the earlier

ones, because it combined with the onslaught of increase in imported machines forming a greater part of market consumption, because of liberalisation, quality, reliability, service and **costs**. And these domestic players had to cope with not only the decrease in domestic demand but also the onslaught of imported machines.

MARKETING

Historically the company's distribution was dependent on dealers and had four major dealers upto mid 1980's each one to handle a family of products. They were all national distributors and handled product sales and distribution on an all India basis, through their various branch offices.

In the early 1980's the company decided to set up its own marketing network and get closer to customers, understand better the changing market needs and trends, to fulfill its growth plans and long range aspirations. Also there was a technology shift from conventional to Computer Numerical Controls, and the present network of dealers were neither equipped to handle this technology shift and provide complete solutions nor drive the company by forecasting future technology requirements and driving a change.

This path was one of treading with caution if not conservatively, by first establishing two branch offices one at Pune and another at Bangalore. The Bangalore office covered the four southern states of Karnataka, Andhra Pradesh, Tamil Nadu and Kerala; the Pune Branch office was left to cover the rest of India. These branches succeeded in fulfilling their objectives. The Pune Branch led the success story and almost single-handedly drove the company onto a platform where it could build further in Technology, Turnover and Profits. These results encouraged opening up of more branch offices in other potential industrial areas. The network of these branches was now expected to handle the marketing and order booking of Machine Tool products for both Harihar and Hubli factories.

The branches handled products at two ends of technology, the Computer Numerically Controlled machines at one end and conventional lathes at the other end. The price of the CNC Machine was many times over that of a conventional Lathe. The branches made their order booking and sales projections and had to achieve them. More often than not they compensated the loss of many Lathe orders by any one high valued machine. Although the marketing conferences tried to conduct analytical forecasts both by numbers and value, yet somewhere down the line the focus on value overtook the numbers and definitely



the CNC Machines rode priority over the Lathes. This started culminating in a much lesser marketing focus on the lathe business, which by now was surviving more by inertia and not by brand image or by the efforts of marketing.

Seeing this trend, the Business Development cell proposed – in Dec 90/Jan 91 setting up of ‘small dealer’ network across the country to sell the lathe products. The conception guidelines laid down by the Business Development cell was to appoint one dealer in a district (a district could be based on geographical descriptions or on industry density).

The marketing department took it over from this point and instructed all branch managers to select and appoint dealers in the areas covered by them. The guidelines on territory distribution, infrastructure, experience, capabilities, policies, targets lost focus. It appeared branches went on a rampage to record booking of dealers by numbers. The consequences were many; there was now a mixture of few good and others could be better dealers. There were dealers who had their own set ups or establishments to dealers operating out of their homes. Some even did not make their own quotes. Some cities were unmapped and yet some had as many as six to eight dealers. This created frequent fights among dealers to grab the same order and they often asked the company to umpire their disputes. This led to ineffectiveness, exploitation, and caused damage to the process and the company. The smart customer used one dealer against the other to bargain for a better deal.

The company many times took postures on prices and pricing that varied from being a certain percentage lower than its nearest competitor to considerations of a premium brand and status of orders on hand.

The lathe business from the Hubli factory was at one time a predominantly export business. At the best times during almost 85-90% of lathes produced were exported to USA, Germany, UK, Canada, Australia and other parts of the world. The first four took the bulk of those exported and were mature markets for MKL. The recession of the 1980 had a disastrous effect on most of the Machine Tool world. Some closed, some limped for a long time, few used the opportunity to turnaround and became success stories – Japan emerged to vie for leadership. This recession also saw many MKL dealers abroad close business or sell it away. In their shifting segments MKL lost most of its high performance dealers. The consequence was a sharp fall in exports – Only Germany lingered on. There was however a short spurts in exports to USSR and was gone later with its disintegration. Many efforts made to revive the dealer network fell short of strategies and success in achieving the objectives.

THE HUBLI FACTORY

The 1980's had seen five changes at the top position at Hubli factory. There was one more in 1990 with the induction of Vinay who came with a competent background and experience of the both machine design and manufacturing.

The three Vice Presidents, who headed the manufacturing activities at the Harihar and Hubli factories, plus the foundry at Harihar, were deputed to a seminar on *World Class Manufacturing* where Dr. Schonberger was the keynote speaker. Inspired by the seminar, it was decided to experiment changing over the Hubli factory from the conventional manufacturing to Just in Time (JIT) manufacturing.

Vinay began the initial training of his managers and workmen, conducting teaching sessions and workshops for people in the value chain, to build an understanding of the philosophy, concepts and fundamentals of *Just in Time (JIT)*. Vinay thus became the MKL's first guru in the JIT implementation and had initiated the change. Few months later, Vinay was assigned higher responsibilities and transferred to Harihar, from where he would oversee the overall manufacturing activity of the entire company.

The new person designated to take over the factory at Hubli was Sanjeev Baitmangalkar, he plays the pivotal role in this JIT implementation / lean transformation / Business Process Re-engineering (BPR) / Turnaround. Sanjeev had begun his career in designs, later moved to industrial engineering, export sales and customer service before being assigned the pivotal responsibility to commence MKL's own marketing efforts and build it into a network of marketing offices. Sanjeev is also the **change agent** in this JIT implementation. Having began his career in Hubli after a short stint at Harihar, now came back with many success stories behind him, the last of which was setting up of the Business Development cell and successfully marketing ideas that ensured inflow of good orders for CNC Machines for the next two to three years, from major segments such as Defense, Education and Auto components. He was chosen him to head the Hubli factory probably to bring in a greater customer focus and leverage the potential in his ideas and strategies.

Sanjeev continued from where Vinay had left on implementing JIT, and practiced it more objectively with his team of Workmen and Managers. Marketing continued to be centered at the corporate office in Bangalore. The dwindling orders received a shot in the arm by receiving bulk order from government of

India's Labour Ministry for Center Lathes and Capstan Lathes. Marketing made enormous efforts, schemes and packaged discounts. The effort yielded no results. The manufacturing process was now well into the JIT discipline, but the marketing was not aligned. Obviously all or any strategy if used was to push sales, missing out on what would cause an improvement on the pull from the customers.

JUST IN TIME / LEAN MANUFACTURING

During the first two years Sanjeev had led significant work on implementing JIT techniques. To understand the progressive changes made within the organisation: The layout was undergoing changes regularly, but there were atleast three major changes made to the layout. The two enclosed diagrams **Layout 1** and **Layout 2** depict the overall macro view. From a scattered and historical layout, the new organization was in a cellular layout based on the factory-in-factory concept (focused factory layout).

Some parts, which traveled over a kilometer to complete all their operations now, moved a very small fraction of those distances. The visibility that was lost earlier in tracking, tracing counting, stacking and supervising of parts was now brought under the eye ball control of the cell. The managers found it worked better, the workers were surprised and happy. Parts in the part manufacturing area were now visible and traceable. Imperfect flows were vastly improved. Manufacturing to forecasted plans which created inventory, had given way to manufacturing just what was ordered and sold. Heavy emphasis and focus was now on reducing wastes, defects, deviations and variability. The successive interactive sessions and workshops conducted with the workmen and Managers had laid a good foundation that could now be leveraged for improvements. The workmen were able to work using papers, pencils, pins and threads to redraw new and improved layouts and measure the improvement in flow.

Among the upfront early actions were: closing the Production Planning & Control (PPC) and Inspection departments. The concept of PPC planning for production (or inventory?) was completely replaced by a pull system from the customer. A simple algorithm was developed to calculate the weekly 'Sale Rate'. and 'Demand Rate'. As long as the demand rate was above the sale rate it was considered a good sign. But danger signals flashed when the demand rate started to fall below the sale rate, thus pulling down the sales. In the beginning the demand rate was met by superimposing the intrinsic factory capacity or the 'Line Capacity' over the demand rate to arrive at the 'Flow Rate'. The flow rate once keyed into the main frame, had connectivity with the Bill of Materials and Purchase ordering system, thus governing purchases

or authorising purchases linked to flow rates only. Thus if the order inflow slowed down, material inflow also slowed down.

Historically the inspection department had an aura of bureaucracy around it, judging the wrong but never or very rarely contributing to problem solving and eliminating bottlenecks. Inspectors typically liked to take credit for delivering the right quality in case of a satisfied customer but always had the production to blame for a quality debacle and a dissatisfied customer. This inspection department was now recast into two distinct parts, one was the Quality Assurance (QA) which focused on Audits and Certifications, besides being responsible for the Metrology lab, Standards and Calibration, this was a smaller group of just enough persons. The remaining part of the Inspection department was integrated with the manufacturing cells, but with roles redefined. They were now classified (called as) 'Process Controllers'. The inputs that go into good successful manufacturing are: validated drawing with the latest revision number, proper process, Route Card, Job Card, well maintained Machine, proper Jigs and Fixtures, appropriate Cutting Tools, the right Raw Material, trained operators, and correct work instructions for any special process. Using the principle that if everything at the input stage is correct, then what comes out of the line must be of good acceptable quality, if the right process is followed. Process Controllers job now was to certify the inputs into the line, audit during the process and at the end of the line, also blend with the cell in their problem solving teams besides reporting on the cells' quality. The process controller would report to the cell Manager.

The change from PPC to allowing the customer to plan and schedule the production via the Flow Rate had driven the production to be customer focused. Similarly restructuring the inspection had driven the factory, from, Quality reporting to Problem Solving, people involvement and quality improvement resulted in Quality consistency and improved customer satisfaction.

Sanjeev now used the Demand Rate as a predictability tool, to forecast market trends and behavior. He was able to foresee and predict a closure of the factory almost ten to twelve months before it happened. He tried to alert everyone on this scene, in an effort to push the marketing chaps to come up with a survival action plan, yet no definite or successful marketing strategy emerged to prop up or revive the order inflow.

Since Sanjeev had seen signs of such eventuality and not being able to do much about it then, as he did not control marketing resources - except make the facts know. He had however tightened up on the purchasing system, even the B & C category items were purchased at equal to consumption rate and if one

part was required then only one casting or forging was procured and manufactured. The other steps he had taken were to tighten up on debtors and reduce it to bare minimum. All these steps were taken to generate sufficient cash reserve and not to depend on external or internal borrowings in the eventuality of a closure. This objective was fulfilled completely. The New Year of 1993 had nothing much to celebrate and opened with almost no orders. The factory had already been working for part of the week – three days and single shift – for past four to five months ending with March 93. The year ending of March 93 had nothing to talk about at Hubli.

The flow rate had touched less than one, which meant there were no orders to execute, either from the domestic or export markets. By now there were almost no export dealers, while the scanty domestic network was riddled with problems and lack of strategies and policies. To understand the market sentiments from customers and develop a new product strategy, the workers were asked to stay home and not come to work, as Sanjeev wanted to carry out one of the most exhaustive market surveys in India and abroad covering over ten thousand end users of machines. The marketing was now integrated with manufacturing and Sanjeev was now asked to lead both Marketing and Manufacturing of Hubli Factory Products.

STRATEGY FOR REVIVAL

BUSINESS PROCESS RE-ENGINEERING / TURNAROUND / LEAN

To Sanjeev this additional responsibility was nothing new and he was able to take it in his stride very easily. He accepted to shoulder this responsibility and had a strategy for its revival. A significant attribute to its success was the unflinching support it received from both his EVP and MD. Sanjeev was now at the nodal point of doing a BPR at the Hubli Factory on the back of successful JIT implementation. The union were invited to a discussion and explained the reasons why the work in the factory had to be stopped, but the factory was open or it was not a lock out. An agreement was signed to pave the way forward.

Naturally the workmen and the union were concerned and worried whether this was a ploy for a permanent closure? (Since such talks were heard before). Were their jobs going to be taken away? Were they going to be asked to relocate? Which meant social inconveniences. How were they to know that the management would restart the factory? etc. Sanjeev had joined this factory as a Government Apprentice

Trainee in 1975 and had grown in the organisation to head it. He had rubbed shoulders with the workmen, worked with them on their machines, eaten with them in their canteen. The workmen trusted him and believed in his intentions. So when he took the Union President on a conducted tour of the factory to show him the empty assembly stations, the empty Kanban spaces and workmen sitting without any work, he reassured the workmen that intentions were honest and to get orders to be able to restart the factory. He also explained his strategy that he did not want to supervise them without work and spend administrative expenses. He said they would be free to walk in anytime and enquire the status or progress being made. They would be paid a maximum of 90% of their salary and could stay home until recalled. Also if the orders trickled in some of them would be recalled to either assemble a machine or manufacture components. The agreement was thus signed quickly.

Having released all his managers and engineers from the need to supervise the workmen, Sanjeev now acted to swing his turnaround strategy into action, which began with very extensive Market Research.

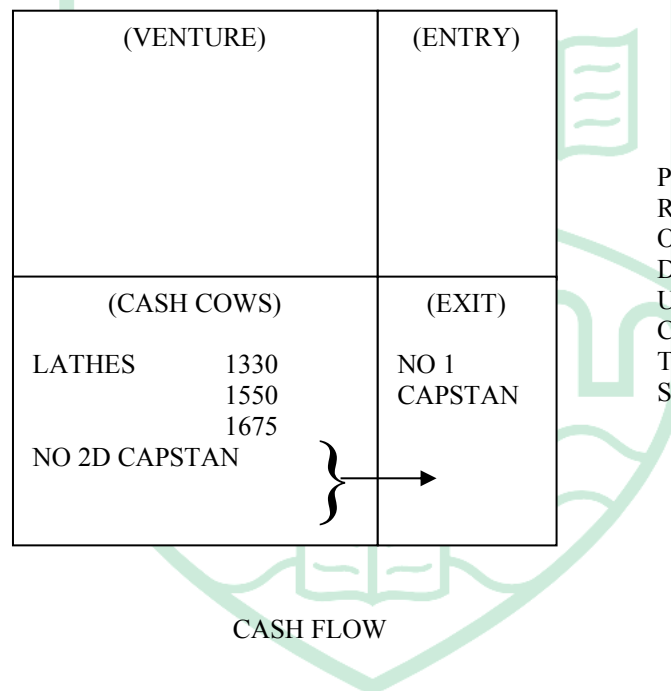
MARKET RESEARCH

The closure had many lessons to learn from it. Understand the shortfalls and organisational mistakes, correct them or learn and improvise. A recession however bad never ever brings the global sale of any commodity to zero. Yes the overall size of markets can shrink and competitors have to fight it out for market shares. Many known standard market logic's do not work at such times. The important thing to understand is that while some market does exist during any recession, are you positioned in that market? If not why not? Criticize internally and find fault with the incorrect posture to correct it.

Was MKL market driven? Or were they wanting to drive the market? Is it important to add value not only into manufacturing but also into services. At such critical times had they made efforts to correctly understand the market sentiments and its sensitivities? Which generic strategy will drive higher sales? Does the market have an Option of alternate product or process? Have they treated customers badly and are they retaliating now? Have they tried to objectively add value into marketing system and network or have tried to rule the network more by dictates? Were their products selling because they were best suited to the market or good in reliability, or whether the market had no better choice? What is the situation with their customers? What is the situation with their competitors? Are they in the wrong segments? Have there been new entrants in their segment? Did they fail to erect barriers for lateral and vertical

entrants? Are there barriers for MKL to shift segments? Is there a technology shift or will there be one, which has or will render their products obsolete? Where are the volume markets and are they present there? Has the buyer's power increased or reduced? What strategies have they used, is it now relevant? Have they analysed the competitors response profile to understand and predict his behavioral pattern under these conditions? Have they analyzed the markets they are absent in to find out why? Etc.

PRODUCT PORTFOLIO MATRIX BEFORE B P R



Therefore the important first step for Sanjeev was to understand from the customers and the markets as to why sales had gone down to zero. So he gathered about 30 of his Engineers and Managers, who were shop floor personnel, who had no direct exposure to a customer at all, let alone the art of making a sale call and opening discussions with the customers in an effort to close a sale. These gentlemen were bolstered with confidence and fully charged with the enthusiasm to play their new roles because it was something different, new, exciting and challenging, besides their immense faith, belief and confidence in the skills of their leader to successfully draw up strategies and marketing plans. There was a high electric charge in the conference room when this group gathered for their two hour orientation on marketing, how to approach a customer, whom to approach or meet, how to open a discussion, questions to ask and leads

to look for, dress to wear, where to stay, how to travel, eating habits, communication back with the factory, handling of leaflets and quotes, channeling market information, reporting and communication with the base camp (factory) and mobile camp (Sanjeev) etc.

The in-depth knowledge of having foot-slogged India's Industrial Estates and locations of customers helped Sanjeev in distributing India to these 30 gentlemen, based on the languages known, terrain and culture each one could handle. Each person was in short told to carpet bomb his allotted territory, by entering an industrial area and go door to door in series and sequence and not to exclude any tiny or small industry. They were to find out:

- List of Lathes installed with each Customer
- Customer Preferences
- Find out if he would buy an MKL machine
- If not Why?
- Find out strengths and weakness of MKL as perceived by Customers.
- Customer's perception about MKLs' feature and price matrix.
- If one was not an existing customer what did he want us to do to become one.
- Who was selling in this market?
- How and why was anybody successful in selling during a recession?
- MKLs' existing product specs Vs those required by the customers etc. etc.

Each Engineer was equipped with catalogues, questionnaire, and report sheets, emergency medicines and travel money. The factory doctor was invited to orient them and advise which medicines from their kit should be taken against relevant symptoms. So during early April 1993 this fully charged team was flagged off to their destinations. They were not to return until either they had booked enough orders for a restart of the factory or were called back.

Sanjeev was seeking answers to some very vital questions such as; "why have the orders dried up? Who has entered our segment and displaced us? Why are we not able to compete with the Taiwanese and Chinese in the International Market? From the position of a one-time market leader the factory had to close because of no orders! Why? Which processes went wrong? Did we have any strategy at all or did

we wait and hope that brand loyal customers drop by? Were we structured for a single market at all"? And many more.

So while his Engineers went out to carpet bomb the Industrial Estates, Sanjeev went out into South East Asia on a dual objective mission. To study this market, look for potential dealers and study the machines built in Taiwan and China, find out what factors were driving price competitiveness, and what product or service related features would drive differentiation. USA, Germany, UK and Canada were already mature markets for MKL. These markets had shrunk by approximately 85% or more for MKL after the recession of the eighties. The nineties recession had seen this also going away. During the last decade, the emerging markets were around the Pacific Rim and historically MKL had never seriously looked at these markets. This tour gave Sanjeev tremendous insights into various aspects of the competition. The design and construction of machines features and specifications, electricals, accuracy, certification, serviceability and maintenance of machines, selling prices and dealer support, exhibitions and promotion etc. Broadly his finding were:

Dealers: Not easily willing to touch Indian Products. Very few would show willingness to accept an agency. Not one would sell as the only product of its kind. Expect Japanese Quality and Chinese Prices.

Designs: Most machines produced in Taiwan, Korea or China were designs handed down from Japan or were copied. Very few were of old American versions. There was similarity in ancient machine architecture and poor modern ergonomics. Designs may not have changed over 40-50 years but quality had improved. For a given mechanical specification the machine power (in bigger range) appeared lower than what was built in the West.

Structure: Generally machines that were heavier in weight compared to equal mechanical specs of the West. Looks were robust. Some customers said they would place the machine on the ground and did not have to level it.

Handling: Only some machines handled very well. The gearboxes were extremely quiet and shifting of gears was easy. All machines of power 7.5 HP and above had power traverse on the saddle for X&Z axes as standard feature operated by a joystick.

Finish: Ground and painted surfaces in many machines were immaculate in their looks. Nameplates were impeccable.

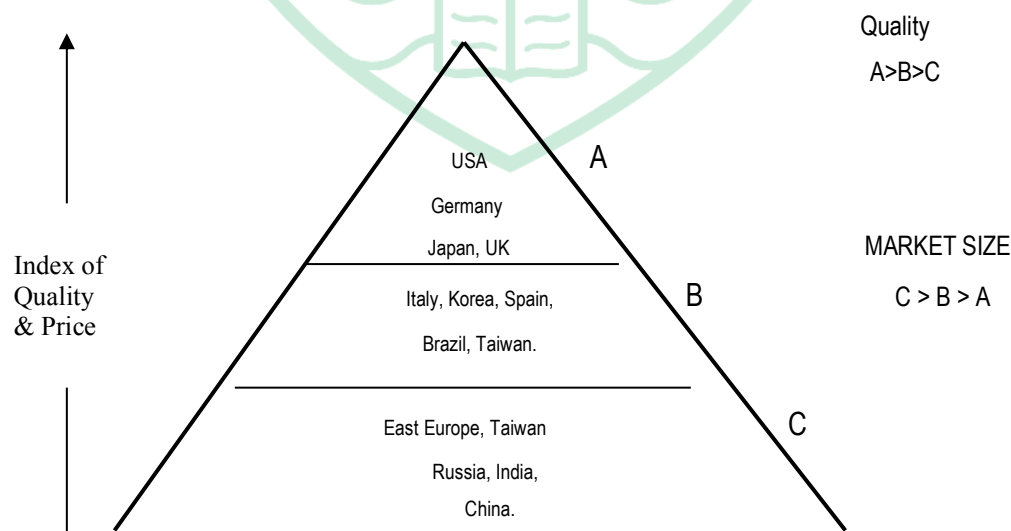
Electricals: Were ancient, some machines even used domestic fuses. No backup safety on electricals.

Certification: Almost none. The culture of obtaining a system or product certification was just catching up.

Accuracy: Few were good with spindles running less than 10 microns, but, mostly half thousandths of an inch appeared acceptable to them.

Prices: Unbelievable. A machine roughly to the mechanical specs of an Enterprise 2215 was sold at prices of Enterprise 1675, (two sizes smaller). Prices from China were lower than prices from Taiwan. Both these countries had their products accepted by their users (Price & Quality matrix) and hence had this entire market share to themselves. They used a cost based generic strategy and price as the entry barrier for any new entrant. The Chinese manufacturers also gave long credit to their dealers.

If we should look at a Quality, Market size & Position pyramid it would look as below:



ABC: Perceptions of price and quality.



So now the barriers for Sanjeev to break were low pricing, good product acceptability, loyal dealers and the markets unwillingness to test the unknown. The opening up of the economy in India would mean at ruling MKL prices there were no barriers for a new entrant or even if it were they were very weak.

Another of Sanjeev's' task now besides breaking external barriers was to erect new barriers for external entrants and consequent onslaught of foreign entry into India in the Lathe business, and give the factory a good price barrier protection for at least 5 to 7 years from 1993 closure. And also to gain entry into the South East Asian Markets besides reopening the American & European markets.

The Engineers were now doing their fieldwork. A few small orders trickled in, but the pull system had very little inventory to build machines. Hence a few workmen were called now and then to process the required parts. It was now the fourth month into closure by when much of the fieldwork was done and about a hundred & forty orders were collected. The decision was made to restart the factory. The boys had contacted approximately ten thousand plus Lathe users (the country has many more) at these places customers had old machines and newer ones, imported and Indian make.

From this cross section an arithmetical calculation of MKL's participation share showed at 4 to 5%. The other published data was used to compute the share for current year, which also was in single digits. During the 1960's and 1970's when the export demand was good, the factory focused very heavily on exports and almost rationed supplies in the domestic market. This did not mean entry barriers in the domestic market were weak, as MKL also had low cost cone pulley lathes being built in Harihar. The loss of American and part European markets in the 1980's had helped boost supplies in the domestic markets and improved the share position to a dominant one of over 33%. This was needed to be reinstated and improved upon.

By mid-July 1993 Sanjeev's' electrified team was back and each one had many tales and experiences to narrate. Their each encounter, everything that everyone said, spotting interested dealers, service rendered to customers as they visited them, spare parts sold etc. Each one showed excitement and satisfaction at their contribution to something different and new that was going to happen. To listen to each one's detailed stories of three months would have taken a long time. This time was simply not there. Hence Sanjeev framed 3 basic questions and asked all his team members to answer in brief. These were;



- a. What are the strengths and Weaknesses of MKL as perceived by the customers?
- b. What should we do in the perception of the customers will make them buy MKL Lathe?
- c. With your newfound knowledge what do you think should be the three most significant things we must do immediately that would win us customers?

In short everything was necessarily going to be customer driven. The organisational design, the products, their specifications and features, their looks, colours, prices et al. These questions were deemed too few but very significant. When answers were received from everybody, Sanjeev asked Shenoy to do a Pareto analysis of these answers to prioritize the customers' asking. The customers;

1. Wanted lower prices
2. Felt the machines were over specified for their requirements.
3. They had very little or no problems with machines.
4. Nobody had approached them before (penetration and reach).
5. Wanted totally different and simpler specifications.

Sanjeev's' strategic exploration work in South East Asia had yielded something similar. So the answer to this puzzle was **to begin developing new designs that would find a fit between customer specifications and market driven prices** on one hand, and yet cater to the wide expectations of customers from America to Far East and Scandinavia to Australia.

SWOT OF HUBLI FACTORY (BEFORE BPR)

(STRENGTHS) • WILLINGNESS TO CHANGE • GOOD ENGINEERING SKILLS • SKILLED MAN POWER • KNOWLEDGE OF MANUFACTURING PROCESSES • STRONG VISIONARY LEADER • JIT UNDER IMPLEMENTATION	(OPPORTUNITIES) • CAN DEVELOP NEW PRODUCTS • MARKET OPPORTUNITIES TO BRAND & TRADE PRODUCTS • VISIBLE WEAK SEGMENTS AND SEGMENT GAPS
(WEAKNESSES) • NO FOCUSED VENDOR BASE • LONG LEAD TIMES • NO CUSTOMER FOCUS • POOR MARKETING NETWORK • PRODUCTS HAD NOT CHANGED FOR 18 YEARS • TOO MANY PEOPLE • NO QUALITY CERTIFICATION	(THREATS) • LOOSING MARKET SHARE • NO BARRIERS TO ENTRY

Generally to change designs completely of all products or scrap all old and move to all new products is an uncommon event, and most people try and find a way around it. But Sanjeev saw a great opportunity in it. Designing new machines to suit customer requirements was not new to Sanjeev who had not only started his career that way; but when he came to take charge of the Hubli factory the scene which confronted him at first was the sight of many machines that were returned from Germany because of poor quality designs and manufacture. He had led the product reengineering to successfully modify and re-export not only these machines but also develop some new designs such as Enterprise Lathe Models 380, 400M, 425, 450, 500, 500V and the 380 Capstan.

The manufacturing facilities were very conventional and with no CNC machines at all, the focus was on improving jigs, fixtures, tooling, processes and achieving better process capability more through these being made reliable and failure proof. But to handle a bill of material listing of almost 15,000 part numbers was considered phenomenal that sometimes it was even a miracle. Sanjeev and Vinay constantly bounced

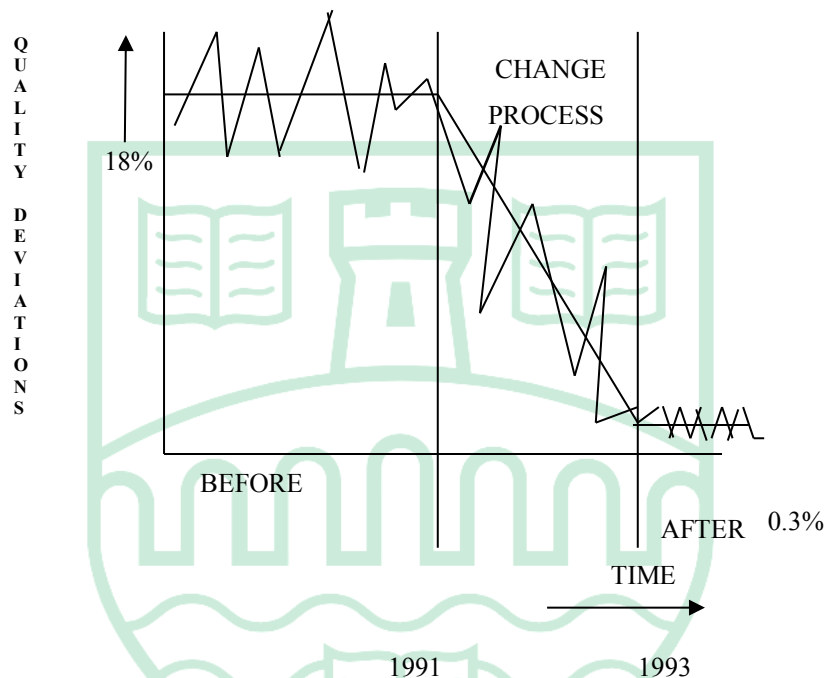
ideas and were looking at every different situation as an opportunity to change the processes at grass root levels.

Sanjeev was working on a design specification and price mixture, besides working on a strategy for the markets. He wanted to reduce the manufacturing variety and followed an example from the Xerox case study of having maximum possible common parts across a range of products. Sanjeev went back to the drawing board and laid down some design guidelines that “we must be able to assemble a lathe to any global specifications from a common basket of parts like a mechano set, and yet match any ratings of speed, torque, power, swing, stroke and center distance.”

A study of the competitive advantage, buyer and supplier power had revealed that there were more threats from two types of suppliers namely the Sheet Metal part supplier and Bearing suppliers. The former because of no in-house facilities and the later because of wrong purchase policies. Although the sheet metal parts supplier was located across the road, he generally held the company at ransom on quality, price and timely deliveries. The bearing dealers had a fluctuating price for many supplies and generally pushed poor quality bearings at times and bought them back at cheaper prices. Therefore these two components exerted more of an upward pull on material costs and purchasing them in existing form posed more threat to competitiveness than a competitor.

An analysis of the strengths and capabilities could describe the factories core competencies as strong in the areas of designs, manufacturing processes and skilled Labour. Leveraging these they developed modular designs for Lathes, and reducing the parts variety from something like 15,000 odd to approximately 800 nos. half of which were bought out store items. There were many common parts now across the models, which increased the batch sizes on pull, giving the effects of better economy of scale on purchasing, reducing number of set up changes on manufacturing. **In many cases the setup change times were not only reduced, but completely eliminated!** That means they were now changing over with zero setup change time, or had made it equal to just the unload and load time. This was a tremendous achievement in improving productivity. Leveraging their design competencies the part variety reduction was a tremendous achievement of standardization and rationalization leading to reducing material costs due to larger purchase quantities besides intensive gains from reduced setup changes and improved flow. The process of the pull system and constant layout changes had driven a high level of focus on reduction of defects and wastage's. The manufacturing process which once measured rejections and reported wastage's around 33% (rejects + reworks + AOD) was brought down through continuous improvements

to 0.3%. Rejections due to material defects, which once measured anywhere between 13-19% now, stood at about 1.62%. Some of the quality improvement and reduction in material costs were tangible and could be passed on to the customers as price reduction. The intangible benefits through process could be retained to expand capacity.



A crash **concurrent product development and production** program was put into action - now driven by customer requirements and teams assigned with the task of developing new models in record lead times. The new designs and specifications provided cost benefit to customers and therefore needed to be developed fast. During these couple of years they had changed over from push to pull production, and the organisation was now cellular, working in value stream concept and not in departmental setup. It was now a seamless organisation, and Sanjeev leveraged its advantages in conceptualising and developing new products at extremely high speed. From concept and ideas to product strategy to designs to design reviews to process and reviews to tools (patterns, forgings, jigs, fixture, special tools etc.) to prototypes to testing and trials, there was no line of demarcation anywhere in-between. It was one seamless flow of activities conducted by excellent processes in the hands of well-trained men working like a machine to produce unbeatable results. With their backs to the wall, racing against time, exhibiting synchronised machine like teamwork developed a set of new designs whose specifications could now build about thirty

different models of machines with a basket of just four hundred manufactured parts and about a similar number of store bought outs! All in less than one hundred days from drawing board to market, with no computer aid, but just the manual engineering drawing and drafting boards!

During October of 1993 the network of the domestic dealers were invited to assemble in the factory for a 'New product Launch'- the launch of a new Lathe series. They launched the new products with great expectations. The new series of machines were christened '**Turnmaster**', a simple name to capture a lot of capabilities, while they retained the brand name '**Enterprise**' to distinguish as the high specification machines for customers who demanded them. Both brands came out of the same basket of components. A new colour scheme was adopted to distinguish the change. This was also the first assembly of dealers at the factory.

Just in Time or Lean was the competitive strategy that MKL used to gain competitive advantage over their competitors. They had done an enormous amount of work on waste reduction, improved quality and value addition, and in the process reduced approximately sixty percent of their overall costs. They now had a golden arrow to shoot that would benefit their customers and distance their competitors. The new pricelist was now about thirty percent lower in price to the customer compared to before for a similar specification of a machine. The machines were repriced, they did not give a discount as some may imagine. In a nutshell they retained half the gains and shared the other half with their customers. Their customers were delighted, their competitors did not know what had hit them. The result was; during the recession of the 1990's when machine tool markets in India had contracted by half and their competitors had no orders or a scanty few to service, MKL Hubli was busy solving a new problem of 'how to execute so many orders!'

The new products developed had the cost advantage that were necessary to be the enabler for price competitiveness in the price sensitive low cost markets. The prices quality matrix on the Turnmaster Lathes were a dream in reality for buyers. The cost or price advantage passed on to the end user meant that now for the same mechanical specification a customer could now buy the machine at much lower price. The benefit was not driven by discounts but by strategies and productivity improvements. So the Dealers were delighted, the lower price meant they could shift segments and increase share, the workmen were excited with new hope, the managers were surprised at the accuracy and success of Sanjeev's strategies and reengineered business processes. The factory layouts were continuously reorganised based

on process needs and changes, Engineering focused on new product development and product upgradation, Purchase focused on leveraging their new 'buyer power' and working with Vendors to implement the JIT pull system with them, Quality Assurance focused on audits and resolving major bottlenecks and chronic problems, Manufacturing Engineering focused on process and systemic improvements, everyone including workmen focused on reduction of defects, wastage's, setup change times; and, improving flow and shortening lead times. MKL was now repositioned to meet both the customers and new challenges posed by the competition. It was from this launch pad that Sanjeev successfully gave the company: a protection from any threats of new entrants, environment, product redundancy etc. They entered other segments and began the process of reacquiring the lost market share, thus blue printing the path to growth, profitability and a turnaround. These steps ensured protection of MKL's markets and market share for the next seven to eight years at least from 1993.

Their success in implementing this JIT or Lean strategy also resulted in making their competition redundant. Their demand rate soared in a very short time with huge inflow of orders, even while the Indian industry was still reeling under the effects of a recession. Unlike in the batch production, the discipline in the JIT or lean production is that, material would flow into the value stream only at the rate of consumption. The speed with which the sale rate can be lifted up is proportional to the resilience in the value chain and the speed of adaptability to the change, including with the upstream suppliers. While this happened in incremental steps, Vikram had asked an external perceived manufacturing expert to see if mass-manufacturing concepts can be used to speed the process. This came as a bit of a shock to Sanjeev as it meant going back to 'push or batch' production from 'pull or JIT' production levels they had achieved. To carry out the instructions that would disrupt the JIT or Lean implementation process they did something that retained the focus on JIT efforts. New push charts (inventory stocks) were displayed and used for monitoring, but the real control on material procurement still remained with the purchase ordering system linked to a flow rate via the inhouse developed ERP system. In some time as their sale rate went up, they quietly discarded the additional inventory through consumption and retained the pull ordering system only.

They redefined their supply chain by addressing their make, buy and supply partner decisions. New vendor activities were organised in setting up supply partners for soft gears, tail stock assemblies, compound slides, some models of feed box and apron assemblies, ground soft round parts, flat milled components, levers, face plates, dog plates and back plates etc., The vendor population was reduced from

178 numbers before to just 33 focused partners focusing on competency and capability of the vendor, besides his willingness to being taught, learn align with the just in time philosophy, quality, lead times, on time delivery and cost. Underperforming vendors were replaced. Even supplies from a sister company were stopped, as were unwilling to reduce non-conformances or deviations in their supplies. Workmen and Managers were not only given the tools for improvements but also the authority and responsibility to stop any wasteful activity. The quality circle movement initiated contributed even further to employee involvement providing the workmen with a sense of achievement when they solved problems and felt a sense of great satisfaction. The nature and number of problems identified and solutions implemented were remarkable. As Sanjeev recollected in our discussions they must have solved many a thousands of problems in the process!

The marketing had a complete new look, with new processes in place governed by a set of nine written down and implemented operating policies. The value added strength in customer support was a fifty four strong network of domestic dealers. Another entry barrier erected by MKL. Sanjeev had told the dealers that they would get more products to sell as the company developed them. The operating policies helped systemising and automating the marketing processes.

The daily sale rate was having difficulty keeping pace with the daily demand rate. The export markets, which had almost become zero at one time, were reconstructed with a new network, the focus now being on the Pacific Rim. Soon almost forty percent of dispatches were being exported again to countries like Singapore, Malaysia, Indonesia, Thailand, UK, Norway, Sweden, Germany, Portugal, Canada, Panama, Australia, Kenya, Tanzania, South Africa, Saudi Arabia, Dubai, Bahrain, Muscat, Oman, etc. Sanjeev also set up an assembly line for lathes in Indonesia and sold his lathes to a global major lathe producer - the 600 Group (a part of the Colchester group).

SUBSTITUTE PRODUCTS

The threat of a substitute process or product had emerged in Sanjeev's analysis of his factory's weaknesses. He was therefore looking at various aspects; such as, the psychology and expectations of an Indian buyer, gaps in market segments, global trends, competencies available, developmental lead times, a generic strategy to leverage and to be armed with a substitute product. The picture that fitted the last puzzle was a straight bed CNC Lathe. This product was meant to fill in the segmental gap between a

conventional lathe and the high feature CNC Lathes that existed, it was also meant to help a Lathe user to graduate to a CNC platform. Since 1992 Sanjeev was examining how to expand the product variety. The extension to a Lathe was a CNC Lathe. For a long time this product in India was priced high and was beyond the reach of the smaller buyer. Sanjeev wanted to use his available base of Lathe users and help them graduate to CNC Lathes, he also wanted to manufacture the product at low cost and create a new CNC Lathe Segment. He had identified a gap that was non-availability of a **simple** CNC Lathe with minimal frills, which would do the job when put to work. He believed that in India, the buying engineers excelled in over-specifying the machine thereby making it more expensive. The lack of correct knowledge sometimes coupled with improper evaluation of features by the management resulted in higher budgeting to satisfy the whims & fancies of buying Engineers.

The thought of alternate products were incubating at MKL Hubli since the time they started to see in their crystal bowl that they were heading for a closure. Their strategy was to develop a series of alternate products to alleviate the threat of future closures or lack of orders situation. They got a go ahead to develop new designs of CNC Lathes. Again Sanjeev used the same product philosophy and strategy as was done for the new series of Lathes. He did a market survey to capture broad product specification. His strategic intent was to create a new segment for CNC Lathes and open up a bigger market. Being an aggressive marketing professional and backed by his strong team of dealers, he set his sights far and wide, yet very focused. He used the straight bed concept to leverage the product strategy, to provide familiarity to one graduating from a Lathe to CNC, negotiated on imports on replenishment of consumption basis with the suppliers and of volumes that suppliers had only dreamed of till then. Leveraging their buyer power coupled with modular designs they presented the new material cost, very competitive conversion and new selling prices. Everyone who saw it was wonder stuck in amazement because this was now at half the price of what was available in India! It was the result of another structured analysis and well thought of Sanjeev's strategy that focused on opening a new market segment. In spite of high import duties on the imports, the machine could now be priced at competitive international prices. Everything was not won yet, Sanjeev knew this (CNC) technology was new to the Hubli factory and that they would get little help from the other factories, hence he focused on developing and building competencies from within. Starting with recruiting Electronic Engineer Trainees and putting Umesh in-charge of Engineering. Umesh had a wide exposure in Engineering, Assembly & Marketing. Sanjeev believed Umesh was quick at understanding, clever, had good IQ and was best suited to convert his ideas into designs. He arranged for the Training Centre to conduct teaching sessions for these new comers and also to customers. He



arranged for Siemens to conduct product training and support. In his opinion Sanjeev says Siemens lent excellent support. Time was the essence and Sanjeev knew it, he was the market leader now but knew others would copy him soon. So he put into action a concurrent people and product development program, which did well under the prevailing circumstances to fulfill the strategic objectives of acquiring new markets and new market share. “The product would be designed in house, manufactured without addition of men or machines, fixed costs would be recovered essentially on existing product sales and all the value addition on the CNC lathes would be a clean bonus in addition to product margins, this would help them find gaps in segments, enter new and competitor segments, price competitively at International prices, target volumes and progress towards their long range plan goal of a billion Rupees in sales!

This CNC product was to be marketed through a select band of dealers from the existing network. The whole strategy about this substitute product was again an instant success and orders poured in rapidly even during recession times. It's success; acquired 11% of India's CNC Lathe market in the first year itself, and enhanced the company's overall share in CNC Turning from under 2% to 14%. This was now a new benchmark for new product introduction. They added models to expand the range, and even used the curiosity mode in advertising to generate enquiries. Creative visualising was Sanjeev's special area of interest, he called it a hobby and he indulged in visualising and creating his ads himself including copywriting and lithography. Although MKL manufactured CNC Lathes in two other factories of the company, they were very poor in their market share in their segments – slant bed CNC Lathes. Sanjeev led another market survey to determine what should be the most practical product specifications and features to acquire market acceptance and large share. The survey yielded three product specifications and they had successfully prototyped two models of slant bed CNC Lathes as we write their story.

CONTRACT MANUFACTURING OF OTHER PRODUCTS

Having set the ball rolling for the CNC Lathes, Sanjeev moved on to action rest of the product philosophy. The strategy was to address a factory or workshop requirements catering to a larger variety of their requirements. It meant adding a range of machines that MKL were currently not manufacturing. The initial types of machines that Sanjeev chose were Milling Machines, Radial Drilling Machines, Surface Grinding Machines, Large Machining Centers beyond the scope of what was manufactured in Harihar. The factory in Hubli did not have the physical capacity to take on these products. So, Sanjeev decided to go to Taiwan

and work with a few selected manufacturers to build the machines to design specifications of MKL. He took More with him to Taiwan. More was head of Accounts and Excise, also chaired the purchase price panel. Sanjeev felt that given the charge of imports and bonded warehouse he would handle it efficiently. Besides Sanjeev also needed his views on what he saw of how and why the Taiwanese were so price competitive. Overcoming the shocks of losing his passport, money and tickets on the first day of his overseas tour, Suresh settled down quickly to studying the Taiwanese competitiveness and negotiating for an advantage in the price and features of machines intended for purchase. He saw Sanjeev use his buyer power to negotiate for a leadership price on the low cost generic strategy. The outcome of the visit was contracting four products such as Milling Machines, Radial Drilling Machines, Surface Grinding Machine and Machining Centers with different manufacturers in Taiwan. These machines would come with the house brand 'Kirloskar' on them, and be sold as Kirloskar brand products.

Good all-round discipline had given MKL Hubli a good cash flow and surplus generation. Sanjeev now defined his imports would be funded from internal accruals and not depend on external funding. A stickler for good systems, Sanjeev prepared ordering formats with detailed specifications. More now controlled import prices and all he had to do was print the number of units and the price on the order format sign it and fax it. The trigger for him was an indent he would receive direct from marketing, defining models, accessories and quantity. Marketing was allowed to raise indents against orders or very strong indications.

The dealers were invited to the factory for the launch of these new products. Models, specifications and pricelists were released. The dealers were delight to having more variety of products to sell, very competitive prices and a better opportunity now to offer their clients a more complete Kirloskar range of machines. Sanjeev thus further strengthened the barriers to entry with this expanded product range.

The first introductory year saw a reasonable successful sale of about two hundred odd machines and Rs. Seventy Five plus million approx. in turnover and netting almost a quarter of it. Product range in offerings was now expanded without adding any capital in investment. Factory space released through implementation of JIT or Lean was used alongwith already inhouse manpower. Internally generated revenue was used for imports. While downsizing was done in area where people were chronic absentees, sick beyond repair or nonproductive, what Sanjeev basically focused on was 'shaping up' using available resource which he believed was a more positive approach to downsizing and it improved all key ratios such as ERE improved from 26% to 6% etc.

The new product portfolio now looked as below:

PRODUCT PORTFOLIO MATRIX

P R O D U C T S	(VENTURE)		(ENTRY)		AFTER B P R
	Enterprise	355 M	CNC 500		
	Enterprise	400 M	CHALLENGER		
	Enterprise	500 M	FIRST CHOICE		
	Milling Machines		LARGE SIZE		
	Surface Grinders		MACHINING CENTRES,		
	Radial Drills				
	(CASH COWS)		(DOGS)		
	TURNMASTER	35	ENTERPRISE	1675	
	TURNMASTER	40	ENTERPRISE	1550	
	TURNMASTER	45	ENTERPRISE	1330	
	TURNMASTER	50	NO 2D CAPSTAN		

CASH FLOW

“The leaders who work most effectively, it seems to me, never say “I.” And that’s not because they have trained themselves not to say “I.” They don’t think “I.” They think “we”; they think, “Team.” They understand their job to be to make the team function. They accept responsibility and don’t sidestep it, but “we” gets the credit.... This is what creates trust, what enables you to get the task done,” **Peter Drucker**

This is what we saw in Sanjeev, the man leading the change.

CONCLUSION

The recession in the Machine Tool market still prevailed in India and abroad, but MKL's Hubli unit was turned around from closure to a global success story, the unit had emerged out from recession situation to increased cash flow. The market driven Strategy, Just in Time implementation & Business Process Re-engineering helped MKL achieve over 43 % of the total domestic lathe market share and 95 % in straight bed CNC lathes (new segment was created). The outcomes of JIT implementation and lean thinking were numerous as MKL was capable to shift segments, identifying gaps and create new segment and serve them with the increased range of new products. They created barriers to entry by advantages gained in price through implementation of lean manufacturing process and also by the newly developed strong network of dealers. A related diversification was achieved by introduction of a new range of products to new global markets. The inventory turn ratio reached 17.5 - 18 while the Indian industry standard remained around 1.5. The Enterprise value went up more than ten times.

There was tremendous reduction in lead times, wastage's and quality deviations. The work force was motivated and the overall efficiency prevailed with cordial relations between management and union. The supply chain management improved and so also quality, which resulted in MKL becoming one of the firsts to be, certified for ISO 9000 Certification. Myths on CNC prices were broken, branding of Machine Tool products was established by globalising the supply chain.

This is how Sanjeev had a dream, and the vision to compete for his dreams, goals, markets and market share. The visionary management leadership of Sanjeev and the unflinching support he received from Vikram, Vinay, the staff and workforce caused the paradigm shift from uncertainty to certainty, push to pull, conventional or discrete to a fully transformed Lean Enterprise.



“The ultimate measure of a man is not where he stands in moments of comfort, but where he stands at times of challenge and controversy,” Martin Luther King, Jr.

‘Organisations don’t succeed, people do’.

‘Anybody can steer a Ship, it takes a Leader to chart the course’

“Do not follow where the path may lead. Go instead where there is no path and leave a trail”

PERFORMANCE MEASUREMENTS OVER THREE YEARS

S.NO.	PERFORMANCE INDEX	UNITS	BEFORE	AFTER
1	Throughput times	Days	30-45	2-3.5
2	Lead times of major components	Days	45-60	1-2
3	Cumulative quality index (Rejects + Reworks + Accepted on Deviations)	%	33	0.30
4	Customer satisfaction index	%	44	99
5	Inventory turns	Times	1.5	17.5
6	Product Offerings	Nos	4	13
7	Models offered (specifications catered to)	Nos	5	30+
8	Market reach (distribution outlets)	Nos	12	67
9	Manpower	Nos	850	640
10	Increase in Sales Turnover (from best before)	%	100	500
11	Surplus revenue generated	Times	X	>15X
12	Overall cost reduction	%	Nil	60
13	Enterprise Value	Times	X	>10X
14	ERE to Sales	%	26	6
15	Motivation		Low	Excellent
16	Lead times for New Product Development	Days	>180 for 1 model	100 for 30 models
17	Floor space saved	%	Nil	>33