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Vision:
To emerge as the cradle of management thinkers and thought leaders

Mission:
To help nurture management thinking and research among the management professionals and academicians

Objectives:
- To offer a platform for research publications of the emerging management intellectuals
- To help and nurture research talent among management teachers and professionals

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- Prof. P Bala Bhaskaran, Head Research & Publications Cell, Oakbrook Business School, Ahmedabad.
Editorial

We present the first issue of this journal with 'fervent hope in our hearts and prayers on our lips' that OBR shall emerge as a world class journal in a short span of time. We have been audacious in setting our targets high. Our vision is to make OBR an arena where contemporary management thinkers and practitioners would interact. We want to make OBR a vehicle to nurture emerging management professionals and scholars and help express themselves in a manner befitting thoroughbred academicians. We have set ourselves a target that any manuscript reaching OBR should be screened and processed in less than four weeks. Today we are launching OBR as a half-yearly publication; but we are determined that from the second year onwards we want to make it a quarterly journal. We are aware these targets are steep; but these are the challenges with which we would like to discipline our pace.

We propose to have four sections in each issue: 'Research papers' will be the dominant section with three or four papers, followed by an invited article in the 'Perspective' section, one or two innovative case studies in the 'Case' section and one or two book-reviews in the 'Book-review' section. The present issue is also structured in this format.

Sandeep Naik and Prabir Bandyopdhyay, in their paper, have explored the experience of Lean Six Sigma implementation among pharmaceutical firms in India. The paper on infrastructure financing puts forth an alternative approach to mitigate the complexities and risks inherent in the extra-long duration debts. Pankaj Madhani explores the interface between supply-chain-management and marketing strategy and comes up with suggestions to minimize the strained relationships and thereby enhance the overall system performance. Mayank Patel explores the hitherto un-explored arena of forex carry funds and brings into focus significant insights that are relevant to the practitioners.

Denis Leonard, an authority in the area of Business Excellence models and their application to corporate entities, gives valuable insights about the concept of business excellence models in the global context. This concept is yet to make significant headway in the Indian context; we do hope Leonard's article would prompt Indian management professionals to look in this direcon with a lot more focus.

Gopalkrishnan captures the history of the Kidney Hospital at Nadiad, from the dreams of a young medical student to its evolution into a world-class-health-care system thereby telling us that it is possible to create globally competitive health-care-care system anywhere if you have patience, dedication and tenacity to pursue the goal with single-minded-focus.

In the book-review section we have Rajshekar Narasimhan reviewing Rita Gunther McGrath's book 'The End of Competitive Advantage: How to keep Your Strategy Moving as fast as Your Business.'

Bala Bhaskaran
Managing Editor
Abstract

The most significant drivers of Business Excellence today are the various Criteria and Models of Business Excellence driven by organizations around the world. These support and drive change at a personal, professional, organizational, National and regional level. They have created an International community driven by a passion to create Excellence in every aspect of our lives. The key challenge is to expand their implementation. The key obstacle to this is their undermining by those seeking to sell various Quality tools and techniques as 'the only solutions' as they seek to corner markets. This undermining is contrary to the very foundation of the Models themselves and can only hurt Business Excellence as a whole. Working together we can have a unique impact on improving lives around the world. One of the emerging concepts to help us create such a focus is the application of Servant Leadership both as individual leaders, in regard to Business Excellence Models and in eliminating our greatest obstacle.

One example of such a social media community is the ASQ, Quality Management Divisions, Organizational Excellence Technical Committee (OETC) which has its own LinkedIn Group. The OETC focuses on all types of Excellence Models and Criteria around the world, and has members from over 80 countries.

For those that are involved at any level with these models they engender a passion for excellence, a passion to contribute, to give back. They provide both professional and personal development for the individual and a represent a game changing model at the business level.

The factual evidence has been in for years and keeps being repeated. The use of such Business Excellence Models leads to improved business performance in a range of financial and non-financial metrics.

There are a wide range of studies proving this. Here are just a few of the studies supporting the impact of Business Excellence Models. Perhaps the most recent,
A rigorous and respected paper is ‘Is it a Good Investment Strategy to Invest in Malcolm Baldrige Award Winners? An Update’ by Thomas M Krueger and Mark A Wrolstad (Krueger and Wrolstad, 2013). This is an update to their 1997 paper studying the impact of Baldrige Award winners in which they found that they were outperforming comparable businesses. This update supports and builds on that earlier work.

“Equally weighted MBNQA winners had positive unadjusted returns that were significantly different from zero both before and after winning the awards. The award winners also had positive returns that were significantly different from zero when adjustment was made for the percentage of the firm winning the award. Whole firm award winners were found to have significantly higher returns over the post award five year period. When looking at risk adjusted market excess returns, the all firms, weighted firms and whole firm portfolios showed significantly better performance in the five year period after winning the award.

Winning the MBNQA is well publicized evidence of successful efforts taken to enhance the quality of the management process with the recipient firm. Share price performance of MBNQA winners rises after award announcement. In fact, in over half of the observed portfolios studied significant raw or risk adjusted market excess returns were present. Therefore, it appears as though investors positively reacted to the superior managerial skills and efforts of the MBNQA winners.” (Krueger & Wrolstad, 2013).

The application and impact of Business Excellence Models, therefore, has been proven in every sector around the world from manufacturing, service, healthcare, education, public sector and small...
business. It also impacts such issues as sustainability and corporate social responsibility. Individually these have powerful potential, but to combine these is quite amazing. The aim of Business Excellence advocates around the world is to expand the awareness of such models and increase their application in all industries to improve businesses, industries, economies, nations and the quality of life.

This expansion has been successful in many ways. For example in the USA the National Housing Quality Award has adapted the Baldrige Criteria for the home building industry and has been running for over 20 years. The International Project Management Association based in Europe, created a Project Excellence Model and Award based on the EFQM® Excellence Model. This focuses on Business Excellence on a project basis. Advocates around the world, those passionate about Business Excellence Models usually say the same thing, with all this success, why aren’t more people embracing Business Excellence Models?

While one answer is that the existing models and programs need changes, to be made more accessible, costs reduced, made less complex, to have more levels of on-boarding. There is always a need for constructive change within these models their criteria and programs, they need constant tending to be relevant and challenging. Many of the suggestions I have cited are used in various International, National and Regional Award Programs. The real issue is considering to what extent are the models are known about, understood and applied.

Changes have and will continue to be rolled out. For example the Baldrige Performance Excellence Program has created added awards for each of the Categories, a Baldrige Executive Fellows Program (a one year nationally ranked leadership development experience) and the Baldrige Collaborative Assessment. The Collaborative Assessment involves a 4.5 day site visit by a team of experienced national Baldrige examiners (which is provided against a specified fee) that work collaboratively with the leadership of a company to identify key strengths and opportunities.

There is also the recently released Baldrige Excellence Builder which is a summarized version of the Baldrige Excellence Framework and its Criteria and its Criteria for Performance Excellence. The idea is to make the process of learning about the Criteria and using is to assess an organization more accessible.

Performance Excellence Program in helping organizations in every sector make improvements and achieve long-term success through application of the Baldrige framework for excellence, which is developed and distributed by the Baldrige Program.

These are just some of the changes being made in the Baldrige Program. This will be an ongoing process as it will be for other Models and Criteria around the world. Indeed, no one has ever stated that any of the Models or their implementation represents perfection or a silver bullet. The same is true for those organizations that have applied them successfully such as Boeing; these are well described in 'The Making of a World Class Organization' by Sponge and Collard (Sponge and Collard, 2008).

However, one of the most significant problems is the increased awareness and application of such an inclusive concept, is ironically the very tools and techniques it supports. For as each tool, technique and aspect of Quality tries to position itself into a position of strength, it can hurt the Business Excellence Models and indeed the profession as a whole when it is implied in an aggressive marketing stance, that ‘they’ are the only solutions that should be considered. This relates to Lean, Six Sigma, Lean Six Sigma and many others. Business Excellence Models view each of these as a set of tools/techniques/approaches which are available to be selected by each organization based on their strategic needs and in turn the tactical and operational requirements that flow from it. Therefore, an organization using such Models could also be using ISO9001, ISO14001, OHSAS18001, Lean, Six Sigma, Kaizen, 5S and others leveraged in the best possible way, aligned and integrated.

However, when selling one tool exclusively what occurs is placing and promoting that one as the primary or only solution. The others are overshadowed or simply undermined. In such cases what is being undermined is Business Excellence as a whole. This damages its perception and fractures the efforts of expanding the use and impact of Business Excellence. Ironically this becomes one of Deming’s Deadly Diseases, the focus on ‘the short term’. The result is a hampering of the awareness and application of Business Excellence. If each of these elements were supportive of each other and especially Business Excellence Models, the promotion and understanding of Business Excellence would be dramatically improved and the wider adoption of these tools and techniques actually increased.
The Future
The foundation of these Models includes systems theory and a non-prescriptive approach, meaning that they are inclusive by their very nature, with the power of aligning all Quality related tools and techniques. However, the problem is that this attitude is not reciprocated. That needs to change.

Business Excellence holds so many opportunities and the key for its successful future is for Business Excellence Models to be seen as the core of the community, as the hub for supporting and nourishing the use of a wide range of tools and techniques and by doing so creating a consistent voice to the world as to how it can contribute in a world changing way. If we do not take this stance we lose a huge opportunity that has been over 25 years in the making and instead fragment and dissipate.

The term and concept Total Quality Management (TQM) originated by the works of Dr Feigenbaum has fallen out of fashion but its meaning still holds value. Indeed in the spirit of what it meant is something that we need to return to. Total; meant applying Excellence to all aspects of an organization and using all of the tools and techniques at our disposal, not just a few in a limited disjointed manner.

There are other opportunities at our doorstep that show that we are still learning about Business Excellence and how we can best leverage it. For example there is still a huge potential in how we use Business Excellence at the Strategic level, continue the concept of integration and in providing a key role in the development of Corporate Social Responsibility something that again has many of its roots in the teachings of the Quality Gurus.

While Transformational Leadership has been studied and strongly linked to leaders who successfully implement Excellence Models, research is showing that the role of Servant Leadership has as much or more of an impact. Its use is as yet still untapped. (Latham, 2013, 2014)

Interestingly, Servant Leadership and its selfless approach is also needed in a more broader sense. That we as leaders of Business Excellence around the world need to embrace to ensure its future.

References


Dr Denis Leonard has a degree in Construction Engineering, an M.B.A., and a Ph.D. in Quality

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Denis has served on the Baldrige National Quality Award Board of Examiners, the Wisconsin Forward Award and the Northern Ireland Quality Award (aligned to the European Quality Award). He is a member of several boards including the ASQ's Quality Management Forum, and Quality Press Review Board. He has also co-authored The Executive Guide to Understanding and Implementing the Baldrige Criteria. Denis is a member of the ASQ Quality Management Division, Organizational Excellence Technical Committee.

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Case

Muljibhai Patel Urological Hospital
Build a World-class Institution for Comprehensive Kidney Care

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Abstract

The case traces the history and evolution of a healthcare system from the dreams of an undergraduate medical student, who perceived the inadequacy of medical facilities in his home town, to a world-class healthcare system handling all aspects of urology and nephrology through sheer dedication and visionary leadership. Dr Virendra Desai, a young man after completing FRCS from UK came back to his home town, in the early 1970s to initiate healthcare facilities for the treatment of kidney, where he observed the incidence of kidney problems were acute while modern treatment facilities were non-existent. For resources he approached Jayaramdas Patel, an industrialist of the region. Jayaramdas Patel agreed to fund the project on one condition: that Dr Virendra Desai commits himself to build only world-class facilities. Thus began the saga of self-less dedication of a team of people led by Dr Virendra Desai and Jayaramdas Patel, which in three decades gave them a place in the sun. By the early years of the millennium, the Muljibhai Patel Urological Hospital has emerged as a world-class hospital for all aspects of urology and nephrology that attracted patients from all over India and many developing countries, a center of high profile research in urology and nephrology, a center for education and training in super specialty areas as also a center for international conferences. The case illustrates that world-class capabilities in healthcare system does not primarily depend on abundance of resources, but it emanates from dedication, alignment of values, vision, strategic thinking and leadership.

Keywords: World-class Healthcare system; Dedication; Visionary Leadership; Institution Building.

Nadiad, a sleepy rural town, 45 km from Ahmedabad, in Western India is an unlikely place, in public perception, to be the centre for super-specialty treatment of urological and nephrological diseases. Muljibhai Patel Urological Hospital, Nadiad (MPUH), generally known as the Nadiad Kidney Hospital, is the chosen destination for patients with urological problems from all over western India and to some extent from abroad. The hospital receives student doctors as well as practitioners for specialized training programmes conducted by the hospital's training wing, Jayaramdas Patel Academic Centre (JPAC).
Dr Virendra Desai, one of the founders of the hospital, who hailed from the region had chosen to specialize in urology in the early 1970s, primarily because he had observed the relatively high incidence of kidney stones among the populace of Nadiad and the surrounding areas. After completing his medical education and specialization in urology (FRCS) from UK, he returned to India with the dream of setting up a hospital exclusively for treating kidney stones. Dr. Desai approached industrialist-philanthropist Jayaramdas Patel, for financial support. Mr Patel agreed on one condition that it should be a world-class hospital. The common vision of Dr. Desai and Jayaramdas Patel led to setting up the hospital, which was named Muljibhai Patel Urological Hospital to perpetuate the memory of Jayaramdas Patel's late father. The hospital, with 25 beds, was inaugurated in 1978 by the Hon'ble President of India, Dr. Neelam Sanjeeva Reddy.

Unfortunately Dr. Virendra Desai did not live long to see the growth of the hospital. He had, however, the forethought to induct very eminent doctors like Dr. Mahesh Desai and Dr. Mohan Rajapurkar. Dr. Mahesh Desai was an eminent urologist then practicing in Ahmedabad and had obtained his MBBS and M.S. degrees from B.J. Medical College, Pune. Subsequently he received fellowship from the Royal College of Surgeons of London and Edinburgh in 1973 and received specialized training in urology. After returning to India, he started his practice in Ahmedabad. However, realizing the importance of institutionalized treatment for kidney diseases, he very soon joined hands with Dr. Virendra Desai. Dr. Mohan Rajapurkar, MD, Chief of Nephrology and Medical Director, has been associated with the hospital from its initial stage in 1979. Dr. Rajapurkar was responsible for setting up the first live donor kidney transplantation and maintenance dialysis programme in Gujarat. He was also instrumental in offering a post-graduate teaching programme in nephrology, which is recognized by the National Board of Examinations. He is a member of Credentials and Scientific Committee of the Indian Society of Nephrology. He is also convener of the Chronic Kidney Disease Registry of the Indian Society of Nephrology. He received the prestigious Dr. B.C. Roy Award for his contributions to the field of nephrology.

Philosophy
According to MPUH, it tries to live up to its philosophy that 'every person deserves world class care.' The hospital further emphasizes that 'when we say every life, we mean it'. It never turns away any patient. In addition to excellent medical care, MPUH also 'provides the ever so important and often neglected human touch (exhibit 1) and continuous support to the patients and their family members to help minimize the trauma that is inherent in the wake of the discovery of a kidney ailment'.

MPUH'S mission is:

- To provide world class care to all kidney patients irrespective of their socio-economic background: from psychological comfort through counseling, education and openness in communication, to physical treatment and relief to enable them to live life to the full, as before.' The hospital firmly believes that “every life deserves to be lived in full”.

- ‘To provide comprehensive kidney care from simple surgical removal of kidney stones and treatment for enlarged prostates, to kidney transplants with minimal intrusion and rejection to providing effective solutions for uro-oncological patients.

- ‘To become the single enlightened centre for advanced study, research and training in urology and nephrology’.

The hospital firmly believed in providing holistic care: healing, teaching and research.

MPUH is specialized in the routine removal of kidney stones, prostrate surgeries, dialysis, and kidney transplants to highly complex uro-oncology cases, and female and pediatric urology. Today, MPUH is recognized as a centre of excellence for healing, teaching, and research by the medical fraternity and
governments across the world. (See Exhibit 2 for milestones)

Infrastructure
There were six most modern operation theatres well equipped for open, endoscopic, and robotic-assisted surgeries. Operation Theatre-1 (OT-1), designed and built by Karl Storz, was for laparoscopic surgeries and has a high definition screen and on-table connections which can be used to transmit live surgeries through ISDN lines. It also has facilities for live recording during the surgery. OT-2 (also designed and built by Karl Storz) was for endourology and stone surgeries. OT-3 was for endourology. All surgeries in urology (stone, laparoscopy, etc.) could be performed there. OT-4 was for endoscopic surgeries. OT-5 was exclusively for donor nephrectomy, whereas OT-6 was for renal recipient surgeries. All these theatres were connected to a 100-seat auditorium, which had international transmission facilities.

Technology
The hospital had always been in the forefront in having the state-of-the-art technology. Some of these were:
- da Vinci Si robot for laparoscopic surgery
- Ablatherm (France) robotic assisted high intensity focused ultrasound (hifu) for cancer of prostate
- Donier Compact Delta Lithotripsy Machine (Germany). This was the state of art lithotripsy machine from Dornier who was the pioneers in Lithotripsy. The shock wave lithotripter performs remote controlled operations with an integrated and iso-centric ultrasound and x-ray.
- Mini and micro PCNL facilities
- Autoclave and plasma sterilization
- Prostate histo-scanning equipment (for the first time in India)
- 15 dialysis machines.

The da Vinci robot assisted surgical system, which costed Rs.10 crore in 2013 (plus a yearly maintenance cost of Rs.40 lakh per year), helped the surgeon carry out most ‘delicate and highly complex’ surgeries through a few tiny incisions on the body. The first generation robot which was introduced in 1999 had four interactive robot arms. The surgeon could see the entire area to be operated on a 3 D screen. In addition, the system allowed the surgeon sitting in front of a console to operate a patient. Intuitive Surgical, Inc. the manufacturer subsequently launched the latest addition to the line of robots called da Vinci Si with enhanced features. Da Vinci Si had five interactive arms, enhanced 3-D (HD) vision, and highly magnified image, in addition to other advanced features, according to Intuitive Surgical.

According to The Economist Intuitive Surgical played a very dominant role in the market for robotic instruments. Over 2000 robots have been supplied by Intuitive Surgical to hospitals all over the world so far, which supported about 200,000 robot-assisted surgeries every year. Hospitals in India which have installed the robot for surgery include Medanta, AIIMS, Escorts, Chettinad Health City, Rajiv Gandhi Cancer Institute, and Asian Heart Institute, according to a report in the Times of India Muljibhai Patel Hospital installed the da Vinci Si in 2010 and had so far carried out about 124 robot-assisted surgeries. According to the Times of India report, there are only 14 surgeons in India who can do robot-assisted surgeries.

Other Facilities

Computer Networking
The hospital had implemented extensive computer net working among various departments. For example, the Registration Counter, Outpatient Department, Laboratory, Billing Counter, Stores and Purchase, Finance, Consultation rooms, and the enquiry counter are all connected through networking.

Similarly operation theatres were networked with the surgeons’ cabins. Hospital statistics and operative videos were easily accessible and are made available to all the doctors for research and preparation of scientific
Library
A centrally air conditioned library with a collection of over 4500 books and academic journals was started in 1990 to enable research. In addition, there was a library for patients maintained by the Social Work Department of the hospital.

Sterilization
The hospital had installed advanced sterilization facilities for sterilization of clinical tools and equipment. Even the plates and utensils used in the cafeteria were sterilized everyday.

Cafeteria
An automated cafeteria prepared quality food for patients and their relatives. The cafeteria provided food of the region to the patients.

The hospital had a modern laundry and pharmacy open 24 hours. The hospital's laboratory had all modern equipment for testing facilities. Own laboratory and pharmacy help in bringing down the overall costs to the patients. (See Annexure 1 for various categories of rooms.)

Human Resources
The hospital had 47 doctors (specialists and super specialists) on its rolls. While the doctors were highly committed and service oriented one of the noteworthy features of the hospital was the high service orientation among employees at all levels. According to the hospital sources, 'MPUH believed every life deserves world-class care, which is possible not only through state of the art equipment and skillful techniques but also through the care, compassion and concern. The hospital practices charity, but not at the cost of quality'. The hospital not only employed the best technology and skills, it has also ensured delivery of the highest service quality which was comparable with international service quality, according to the Statistician of the Hospital.

The hospital treated over 5000 new patients every year. It had 15 dialysis machines working round the clock performing 900-1000 dialysis every month. About 70 per cent of these patients were on maintenance while 30 per cent of the patients were awaiting kidney transplant. The hospital performed over 100 kidney transplants every year. If more kidneys were available, the hospital could do more transplants, feels Dr. Mahesh Desai. One of the major problems related to availability of kidneys for transplant was Indian laws which prevented acquisition of donor kidneys from anyone other than immediate blood relatives. The hospital strictly followed the law.

The hospital performed over 3000 surgeries every year. Recently, for the first time in India, a three-month infant underwent robot-assisted pyeloplasty surgery at the hospital. While the hospital had conducted 196 laparoscopy pyeloplasty surgeries on adults and grown up children, it was for the first time that a surgery of this type was done on a three month old child. A consultant urologist Dr. Craig A Peters, Chief of Division of Surgical Innovation, Sheikh Zayed Institute of Pediatric Surgical Innovation in Washington DC conducted the successful surgery with the help of a team of doctors from MPUH.

The hospital was the first in Gujarat to acquire a da Vinci Si robot for robotic surgery. According to the hospital sources, within a short period since its introduction, 124 robot-assisted surgeries (including 55 radical prostatectomy) have been performed which included some highly complex surgeries.

Pricing Policy
The hospital charged differential rates depending on the category of room a patient opted for stay during hospitalization. However, the treatment was same for all despite the category of room chosen. Differential charges for different category of patients are done with the idea of using the surplus generated from high income group patients to cross-subsidize economically weak patients. The hospital also scouted, when necessary, and accepted donations to meet the cost of treating economically weak patients. The hospital also did not pass on some of the fixed costs to the poor patients while costing was done. The donation route was used also for acquiring the latest technology. More
than 200,000 patients were beneficiaries of the munificence of donors (Exhibit 4). The hospital not only took special care of poor patients, but also made efforts to find accommodation for relatives in the nearby Shri Santram Ashram, a religious trust.

**Muljibhai Patel Society for Research in Nephro-Urology (MPSRNU)**

The Society for Research in Nephro-Urology was formally inaugurated in 1989 by the then Vice-President of India, Dr. Shankar Dayal Sharma. The society was set up with the idea of innovation. ‘Having already adopted world class technology and techniques in kidney care at the hospital, the Muljibhai Patel Society for Research in Nephro-Urology was set up to actively work at and catalyze the development of new, improved and innovative solutions in urology and nephrology more suited to indigenous condition’. The society has been actively participating along with other leading research societies in contributing to achievements in kidney care. Journals, books, and papers from across the world are available to researchers at the society’s library.

**Education, Research and Training**

The hospital has been a recognized centre for the three-year super specialization programme leading to DNB’s by the National Board of Examinations, New Delhi. Every year, it admits nine students (four in urology, three in nephrology, and two in anesthesia) who have Master’s degree in surgery or in medicine for the super-specialization programme. In 2013 the hospital was in the process of introducing DNB teaching programme in pediatric urology.

**Jayaramdas Patel Academic Centre (JPAC)**

The Jayaramdas Patel Academic Centre, an initiative of the Muljibhai Patel Society for Research in Nephro-Urology, was set up in 2007 with the aim of creating ‘a world class centre of academic excellence for urology and nephrology, a repository and exchange of medical information and data where knowledge will be imparted and shared, skills developed and honed through instruction, discussions, hands-on practicals and protective interaction in order to alleviate pain and help one live as it is meant to be’ (Exhibit 9). JPAC’s vision was ‘to encourage and facilitate the setting up of similar knowledge centres across the globe in order to make available the best medical expertise and capability locally.’ Its motto was ‘Enter to Learn; Exit to Serve.’

The hospital sources stated that ‘while well known hospitals like MPUH have acquired the latest technology, equipment, and superior skills, others in the sub-continent do not have them to deliver the best practices.’ Through teaching, training, and hands-on practicals, the centre tries to close this gap.

JPAC has conducted several training programmes in nephrology with participants drawn from India and abroad. JPAC had modern class rooms with interactive facilities, a dry laboratory and wet laboratory, library with access to online libraries, an auditorium, and an equipment museum (Exhibit 5). Specialist doctors from all over the world were invited to conduct workshops at JPAC (Exhibit 6). Besides lectures and interactive observation of live surgeries, there were hands-on training sessions first in the dry laboratory on machines and simulators, followed by sessions in the wet laboratory.

**Education of Patients and Relatives**

The hospital gives a great deal of importance to educate patients and their relatives, especially in the case of patients suffering from end-state renal disease (ESRD). It believed that this special patient education programme enabled patients to know about the disease and ways to deal with its treatment course.

Lectures by experts were also arranged every month. The hospital had been very active in the field of community education. It recently organized an epidemiological survey for prostatic diseases among the ageing male population in Kheda-Charotar districts.

The hospital has published a number of booklets on kidney stones and treatment, kidney transplant, and dietary guidelines for the benefit of patients and their
relatives.

International Conference

MPUH hosted the 12th Video Urology World Congress at Goa in 2000 and also the Millennium International Urology Congress at Delhi.

Hosted the First World Summit on Radical Prostatectomy in 2002 and the First World Summit on Kidney Surgery.

In 2004, recognizing the contributions and capabilities of MPUH, the Endourological Society of USA entrusted MPUH with the task of hosting the 22nd World Congress of Endourology on behalf of India.

The hospital conducted Asian Robotic Urology Symposium in 2011 in which multi-institutional live surgery transmission was done by experts in the field of Robotic Surgery.

The hospital had organized in March 2012 an international “Laparo-robotic symposium “Cutting-edge Technology,” wherein over 100 delegates from India, Germany, USA, Japan, Netherlands and Nigeria participated.

Recognitions

MPUH has been recognized by the international community.

Societe International d’Urologie has accredited the Hospital as an official SIU Training Institute. The Endourological Society of the International Society of Nephrology has approved MPUH for fellowship training. The Cleveland Clinic Foundation (Glickman Urological Institute) had established collaborative ties with MPUH. It includes joint collaborative research projects, and exchange programme for exposure to endo-urologic surgery. The Endo Urological Society, New York, and the International Society for Nephrology have recognized the hospital for fellowship training and the Cincinnati Children Hospital has recognized the hospital for pediatric urology. The Department of Nephrology was selected as ‘Sister Renal Centre’ by the Department of Nephrology of Arkansas University.

MPUH has been accorded the ISO 9001: 2000 certification by Bureau Veritas Quality International (BVQI) for ‘design, development and delivery of clinical services for urology and nephrology including kidney transplantation’. Bureau Veritas offered certification in quality, health and safety, social responsibility, and environment.

Awards

Muljibhai Patel Hospital won the prestigious Ramakrishna Bajaj National Quality Award Trophy instituted by the Indian Merchant’s Chamber in 2011. It was the first hospital in Gujarat to win this award.

Awards for the Doctors of MPUH

The doctors at MPUH were known for their contributions in the area of medicine and social work not only in India but abroad also Dr. Mohan Rajapurkar was a recipient of Dr. B.C. Roy Award for his contributions in the area of Nephrology.

Mrs. Sujata Rajapurkar, Medical Social Worker and Transplant Coordinator, MPUH Nadiad, received the prestigious Council of Nephrology Social Workers International Social Worker Award, 2010 on April 27, 2011 from the National Kidney Foundation, USA.

Recently, during the World Council of Endo-urology, 2011 at Kyoto, Japan, according to a report, MPUH doctor Dr. Shashikant Mishra won two prizes for his paper and presentations.

Leadership

Dr. Mahesh Desai joined hands with Dr. Virendra Desai who had established the Muljibhai Patel Hospital right from the beginning, though he was doing private practice in Ahmedabad. Dr. Desai now was the Managing Trustee of MPUH and was the Medical Director of the Hospital. He was also the Honorary Managing Director of Muljibhai Patel Society for Research in Nephro-Urology and Director of the Jayaramdas Patel Academic Centre.
Dr. Desai was a renowned urologist, has done MS in General Surgery, and had received fellowship (FRCS) from Royal College of Surgeons of London and Edinburgh. He had also received specialized training in urology. He has held many national and international positions in the field of Urology, some of which were:

- President, Urological Society of India (2006-2007).
- Chairman, Scientific Committee, Endourology Society Inc. (2007-present)
- Chairman, Endourology Education Training Site Committee of Endourology Society Inc. (2008-present).
- President-Elect, Society International d’Urologie (SIU) (November 2009-present).

Dr. Mahesh Desai was visiting professor to a number of institutions; some of the prominent among these were:

- Duke University, USA
- Stanford University, USA
- Cleveland Clinic, USA
- University of Vienna
- University of Southern California, USA
- Singapore University, Singapore Hamad Medical Corporation, Qatar
- Jikei University School of Medicine, Tokyo, Japan
- Bangabandhu Sheikh Mujib Medical University, Dhaka
- Tribhuvan University, Institute of Medicine, Kathmandu, Nepal
- Wochardt Kidney Hospital Hospital, Calcutta

He was also on the advisory board of various committees. For example, Dr. Desai was a member, Specialty Advisory Board in Urology, National Board of Examination, New Delhi and Member, Expert Committee for Development of Standard Treatment Guidelines, Ministry of Health & Family Welfare, Government of India.

Dr. Desai, according to the hospital sources, has mastered the most modern treatment for stone disease and developed innovative techniques in Percutaenous Nephrolithotrispy (PCNL), Ureteroscopy, and ESWL\(^7\). So far, he had done more than 12,000 PCNL, probably the largest number in the world. He also expanded the use of ultrasound in Urology.

He did the first kidney transplant in Gujarat in 1980. Till 2013, the hospital has done over 2070 kidney transplants.

Dr. Desai has conducted 93 workshops. He has published 110 scientific papers in national and international journals, which had helped in putting the Muljibhai Patel Urological Hospital as one of the premier institutes in urology not only in India but also internationally.

As stated earlier, Dr. Mahesh Desai had received a number of national and international awards. The doctors at MPUH are known for their contributions in the area of medicine and social work not only in India but abroad also. Dr. Mahesh Desai, the medical director of the Hospital was a recipient of Dr. B.C. Roy Award in “recognition of the best talents in encouraging the development of specialties in different branches of medicine” from the President of India. He had also received a number of other prestigious national and international awards. For example, he had received President's Gold medal of Urological Society of India, President's Gold Medal for West Zone Chapter of USI, the United Nation's international award for medical scientific group in the field of urology and 'late Dr. Piyush V Patel Award for excellence' in medical field at the 105th Annual celebration of Ahmedabad Medical Association.

Recently, he was selected for the prestigious 2012 American Urological Association Presidential Citation and also received the prestigious 'St. Paul's Medal, 2012' instituted by the British Association of Urological Surgeons.
Future Challenges
Simply put, the hospital stated that: 'more with better health and care.' The hospital would like to increase the number of kidney transplantations, as there was a large number of patients waiting. Dr. Mahesh Desai felt that the challenge was to cadaver transplantation to meet the increasing demand for kidneys. A special-interest group of professional social workers headed by Dr. (Mrs.) Sujata Rajapurkar, Chairperson, Association of Renal Social Worker and Transplant Coordinators, was working on education and awareness creation programmes.

Dr. Mahesh Desai felt that medical research was undertaken in a big way only in the Western World. He felt that the incidence and pattern of diseases in countries like India were vastly different from the west. Additionally, the priorities assigned by the western world would not necessarily reflect the requirements of the developing world. This gave greater scope for good quality research. With the idea of accelerating quality research, the hospital has acquired to land adjacent to the hospital to build a modern research facility.

Another dream of Dr. Desai is related to the general ward. The general ward in hospitals in India was meant for poor patients who could not afford to pay room charges. To keep the charges low, hospitals in India pack a large number of patients in the general ward. At Muljibhai Patel Hospital, a general ward accommodated 15 patients. Dr. Desai felt that this arrangement was demeaning to the patients, as there was very little privacy for patients as well as the relatives attending the patients. He, therefore, wanted to build rooms with three beds each with separators to maintain privacy in place of the general ward.

Yet another concern of Dr. Desai has been the haphazard growth in the infrastructure, especially in the area of physical infrastructure. As the hospital grew from a small facility to treat mainly problems of kidney stone among patients in the western region to a hospital with international reputation in kidney care and urological diseases, it kept on adding facilities from time to time depending upon the immediate needs resulting in indiscriminate growth in the physical structure of the hospital.

End Notes
1. Nadiad is a sleepy rural town, 45 kilometers south of Ahmedabad, a prominent city in the state of Gujarat, India. Nadiad is the headquarters of Kheda district administration and is a major station on the Ahmedabad-Mumbai railway line. In 1971 the town had a population of 108,269; by 2011 the population had grown to 196,793.

2 Muljibhai Patel Urological Hospital, Every Life deserves to be lived in Full, Nadiad

3. Urology is the branch of medicine that focuses on the surgical and medical diseases of the male and female urinary tract system and the male reproductive organs. Nephrology is the branch of medical science that concerns with the study of normal kidney function, kidney problems, its treatment etc. Dialysis is the medical terminology referring to the process for removing waste and excess water from the blood, and is used primarily as an artificial replacement for lost kidney function in people with renal failure.

4. Muljibhai Patel Urological Hospital, Every Life deserves to be lived in Full, Nadiad

5. Ibid.

6. Oncology is the branch of medical science that deals with tumours. Treatment of cancer comes under this branch of medical science.

7. Muljibhai Patel Urological Hospital, Every Life deserves to be lived in Full, Nadiad

8. Ibid


10. Endoscopic surgery uses scopes going through small incisions or natural body openings in order to diagnose and treat the disease. Another popular term is minimally invasive surgery (MIS), which emphasizes that diagnosis and treatments can be done with reduced body cavity invasion. Robotic surgery is a method of perform surgery
using very small tools attached to a robotic arm. The surgeon controls the robotic arm with a computer.

11. The da Vinci Surgical System is a robotic surgical system made by the American company Intuitive Surgical. Approved by the Food and Drug Administration (FDA) in 2000, it is designed to facilitate complex surgery using a minimally invasive approach, and is controlled by a surgeon from a console. The system is commonly used for prostatectomy (relating to prostate gland), and increasingly for cardiac valve repair and gynecologic surgical procedures. The manufacturer chose to call the system 'da Vinci System', because it is Leonardo da Vinci's study of human anatomy that eventually led to the design of the first known robot in history. Da Vinci robots are in operation in hospitals across the globe, most commonly for hysterectomy (removal of ovary in the female reproductive system) and removal prostate glands. The "Si" version of the da Vinci system was priced at about US$2 million, in addition to several hundred thousand dollars of annual maintenance fees. Medical professionals were looking for a more economical system.

12. Ablatherm Integrated Imaging High Intensity Focused Ultrasound (HIFU), as a technology has been in use for almost 15 years for treating cancer of the prostate. USA has been slow in approving its usage.

13. Lithotripsy is a medical procedure involving the physical destruction of hardened masses like kidney stones.

14. PCNL is the acronym for Percutaneous Nephrolithotomy; it is a surgical procedure to remove stones from the kidney by a small puncture wound (up to about 1 cm) through the skin. It is most suitable to remove stones of more than 2 cm in size and which are present near the pelvic region. It is usually done under general anesthesia or spinal anesthesia.

15. Plasma medicine is an innovative and emerging field combining plasma physics, life sciences and clinical medicine to use physical plasma for therapeutic applications. Initial experiments confirm that plasma can be effective in \textit{in vivo} antiseptics without affecting surrounding tissue and, moreover, stimulating tissue regeneration. Based on sophisticated basic research on plasma-tissue interaction, first therapeutic applications in wound-healing, dermatology and dentistry will be opened. Plasma, described as the fourth state of matter, comprises charged species, active molecules and atoms and is also a source of UV-photons. These plasma-generated active species are useful for several biomedic applications such as sterilization of implants and surgical instruments as well as modifying bio-material surface properties. Sensitive applications of plasma, like subjecting human body or internal organs to plasma treatment for medical purposes, are also possible. ‘Plasma medicine’ is an emerging area and is the subject of inter-disciplinary research at leading research labs.

16. HistoScanning is a process that shows the tissue alterations in the prostate accurately and at an early stage thus helping in the diagnosis and treatment of the cancer of the prostate. \url{www.intuitivesurgical.com}

17. \textit{Ibid}

18. \url{www.mpuh.org/about-us/infrastructure}


21. \textit{Ibid}

22. \url{www.mpuh.org/about-us/infrastructure, op. cit.}

23. \textit{Ibid}

24. \url{www.mpuh.org/about-us/our-culture-performance}

25. \url{www.mpuh.org/about-us/our-quality-policy-states}

26. Muljibhai Patel Urological Hospital, \textit{Every Life…, op. cit.}

27. \textit{The Indian Express}, \textit{“In a first, 3-month-old undergoes robot-aided surgery in Nadiad, January 15, 2012} (\url{www.indianxpress.com/story-print/899649}.

28. Pyeloplasty is a surgical process to repair the kidney, specifically, it repairs a part of the kidney called the renal pelvis which has a funnel-like structure that connects the kidney to a tube called the urethra. Laparoscopy is a type of surgical procedure in which a small incision is made, usually in the navel, through which a viewing tube (laparoscope) is inserted with the purpose of visual examination of the inside of the abdomen by means of a laparoscope as also surgical operation (as tubal ligation
or gallbladder removal) involving laparoscopy.


30. www.mpuh.org/health-care-services/department of urology

31. Muljibhai Patel Urological Hospital, Every Life.... op. cit.

32. Ibid

33. Diplomate of National Board (DNB) is the title awarded by the National Board of Examinations (NBE), an autonomous academic body under the Ministry of Health and Family Welfare, Government of India to candidates who successfully complete their postgraduate or postdoctoral medical education under it.

34. www.mpuh.org/about-us/recognised

35. Muljibhai Patel Urological Hospital, Jayaramdas Patel Academic Centre, Enter to Learn; Exit to Serve, Nadiad.

36. Ibid.

37. Ibid.


40. www.mpuh.org/about-us/milestones

41. www.mpuh.org/about-us/recognized

42. www.mpuh.org/about-us/milestones

43. www.mpuh.org/…/

44. www.mpuh.org/about-us/recognized

45. www.indiaheartbeat.com

46. www.mpuh/about-us/board-trustees

47. Extracorporeal shock wave lithotripsy (ESWL) uses shock waves to break a kidney stone into small pieces that can more easily travel through the urinary tract and pass from the body.

48. Cadaver is the medical and legal terminology denoting a deceased human body meant for dissection.

Exhibit-1

The MPUF Edifice

Built on the firm foundation of the vision of its founders

the commitment and ethics of its management and administration

the faith of its patients;

standing firm and growing

due to the dedication of its doctors and residents

who create new synergies everyday with their expertise

together with the world class technology,

infrastructure and equipments available to them,

MPUH is a temple of healing
confident and assured
of the support of its well-wishers.

Source: “Every Life Deserves to be Lived in Full”, Muljibhai Patel Urological Hospital, Nadiad

Exhibit-2: Muljibhai Patel Urological Hospital, Nadiad     MILESTONES

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>First Live Donor Kidney Transplant Operation in Gujarat performed.</td>
</tr>
<tr>
<td>1981</td>
<td>Urodynamics Laboratory started functioning.</td>
</tr>
<tr>
<td>1984</td>
<td>Muljibhai Patel Society for Research in Nephro-Urology (MPSRNU) was formed, approved by the Department of Scientific and Industrial Research, Government of India.</td>
</tr>
<tr>
<td>1985</td>
<td>Started Department of Endourology for treating kidney stones through Endoscopic Procedures for the first time in the country.</td>
</tr>
<tr>
<td>1989</td>
<td>Dr. Shankar Dayal Sharma, Hon. Vice President of India, inaugurated the new</td>
</tr>
<tr>
<td>1989</td>
<td>Introduced Ureteroscopy for the first time in the country.</td>
</tr>
<tr>
<td>Year</td>
<td>Event</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>1991</td>
<td>New Urodynamic Laboratory installed.</td>
</tr>
<tr>
<td>1992</td>
<td>Government of Gujarat recognized the institution by granting reimbursement to its employees for treatment received at the hospital.</td>
</tr>
<tr>
<td>1993</td>
<td>Received approval from the National Board of Examination, New Delhi, for conducting DNB Teaching Programme in Urology and Nephrology.</td>
</tr>
<tr>
<td>1994</td>
<td>24 hours Medical Store started functioning.</td>
</tr>
<tr>
<td>1995</td>
<td>Acquired state-of-the-art equipment for the treatment of prostate known as Transurethral Needle Ablation (TUNA) of Prostate.</td>
</tr>
<tr>
<td>1997</td>
<td>The department of Nephrology was selected as “Sister Renal Centre” by the Department of Nephrology of Arkansas University, U.S.A.</td>
</tr>
<tr>
<td>1998</td>
<td>Department of Pediatric Urology started functioning.</td>
</tr>
<tr>
<td>1999</td>
<td>Laparoscopic Donor Nephrectomy was performed in this institute for the first time.</td>
</tr>
<tr>
<td>2000</td>
<td>Ranbaxy “Centre of Excellence” inaugurated.</td>
</tr>
<tr>
<td></td>
<td>Crossed 1000 Live Donor Kidney Transplantation Operations.</td>
</tr>
<tr>
<td></td>
<td>Hosted the Millennium International Urology Congress at Delhi.</td>
</tr>
<tr>
<td></td>
<td>Fellowship Exchange Program with Cleveland Clinic Foundation, USA.</td>
</tr>
<tr>
<td>2002</td>
<td>Recertified for ISO 9001:2000 by BVQI.</td>
</tr>
<tr>
<td></td>
<td>Hosted the 1st World Summit on Radical Prostatectomy.</td>
</tr>
<tr>
<td>2003</td>
<td>Hosted 1st World Summit on Kidney Surgery.</td>
</tr>
<tr>
<td></td>
<td>Got the first prize from World Endourology Society for our clinical assay, first time in Asia.</td>
</tr>
<tr>
<td>2004</td>
<td>Installed O.R.-1 (Major Operation Theatre) System. First Installation in India; equipment from Karl Storz Germany.</td>
</tr>
<tr>
<td></td>
<td>Installed Riwo-net Operation Theatre System. First Installation in India; equipment from Richard Wolf Germany.</td>
</tr>
<tr>
<td></td>
<td>Hosted 22nd World Congress on Endourology (WCE’2004) at Mumbai.</td>
</tr>
<tr>
<td>2005</td>
<td>Re-certified 2nd time as per ISO 9001:2000 by BVQI.</td>
</tr>
<tr>
<td></td>
<td>Crossed 1500 Renal Transplant Operations.</td>
</tr>
<tr>
<td>2006</td>
<td>Awarded CRISIL Healthcare Grading “A” to the institution – 1st Charitable Hospital in India recognized as Grade “A”.</td>
</tr>
<tr>
<td></td>
<td>Implemented Excelicare Software – a full fledged Hospital Information System for hospital.</td>
</tr>
<tr>
<td></td>
<td>Tied up with Cincinnati Children's Hospital Medical Centre (CCHMC) for developing advanced pediatric service, training and research in the field of pediatric urology and its allied branches.</td>
</tr>
<tr>
<td></td>
<td>Acquired Digitised X-ray (Agfa CR25), modern technique in radiology.</td>
</tr>
<tr>
<td></td>
<td>Installed CORE-Richard Wolf (Major O.T.), an unique operation theatre in India having combination of OR-1 and CORE-O.T.</td>
</tr>
<tr>
<td></td>
<td>Established the central office for Chronic Kidney Disease (CKD) Registry of India; a project of Indian Society of Nephrology.</td>
</tr>
<tr>
<td>Year</td>
<td>Event</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Received approval from the National Board of Examination, New Delhi, to conduct DNB Teaching Programme in Anesthesia.</td>
</tr>
<tr>
<td>2008</td>
<td>Inaugurated High-speed 16-Slice MDCT Scan Centre.</td>
</tr>
<tr>
<td></td>
<td>Inaugurated Veeda Clinical Research's CPU (Clinical Pharmacology Unit) – India's 1st Clinical Pharmacology Unit for Renal impaired patients.</td>
</tr>
<tr>
<td></td>
<td>Re-certified 3rd time as per ISO 9001:2000 by BVCI.</td>
</tr>
<tr>
<td></td>
<td>Upgraded our Urodynamic laboratory with Duct Logic G-2.</td>
</tr>
<tr>
<td></td>
<td>Microbiology section of Laboratory updated with Microbial Detection System.</td>
</tr>
<tr>
<td></td>
<td>Modified Karl Storz OR-1 and HD.</td>
</tr>
<tr>
<td></td>
<td>Acquired Robotic HIFU – EDAP TMS for the least invasive treatment of Prostate Cancer without surgery first time in India.</td>
</tr>
<tr>
<td>2009</td>
<td>The quality management system upgraded to ISO 9001:2008 by BVCI.</td>
</tr>
<tr>
<td>2010</td>
<td>Inaugurated Rohit J Patel Department of</td>
</tr>
<tr>
<td></td>
<td>Acquired state-of-the-art da Vinci Si Robotic Surgical System, MPUH became the first charitable hospital in India to install a robot for urological surgery.</td>
</tr>
<tr>
<td>2011</td>
<td>The quality management system at MPUH re-certified for the 2nd time to ISO 9001:2008 by BVCI.</td>
</tr>
<tr>
<td></td>
<td>Crossed 2000 Live Donor Kidney Transplantations.</td>
</tr>
<tr>
<td></td>
<td>MPUH becomes the first hospital in India to install the “Prostate scanning”.</td>
</tr>
<tr>
<td></td>
<td>Crossed 2000 Laparoscopic operations consists more than 800 Donor Nephrectomy.</td>
</tr>
<tr>
<td></td>
<td>Performed 125 Robotic surgeries within one year.</td>
</tr>
<tr>
<td></td>
<td>Installed, for the first time in India, Prostate Histoscaning.</td>
</tr>
<tr>
<td></td>
<td>MPUH declared the winner of the prestigious IMC Ramkrishna Bajaj National Quality Award Trophy-2011 - the first hospital in Gujarat to win this Award.</td>
</tr>
</tbody>
</table>

Source: Muljibhai Patel Urological Hospital

C. Gopalkrishnan is Professor Emeritus, Pandit Deendayal Petroleum University, Gandhinagar, Gujarat and Advisor, Oakbrook Business School, Ahmedabad. The case is prepared on the basis of extensive discussions, published information, and participant observation.
Abstract

With more and more patented drugs are coming under the gambit of generic drug manufacturers, pharmaceutical manufacturers are under pressure to reduce cost of production without compromising on quality. This research focuses on the question: How Lean Six Sigma (LSS) is perceived and implemented among Indian pharmaceutical firms under regulatory environment, mainly current Good Manufacturing Practice (cGMP)? Based on case study based research method this research explores how LSS have been instrumental in improving key performance indicators (like product quality, price reduction and shorter delivery time-to-market etc.) given the highly regulated Indian pharmaceutical environment. What learning does this offer to other players in this sector? The study investigates the main research question by designing five key research issues which it tests through qualitative research.

Key words: Pharmaceutical industry, cGMP, PAT, Lean Six Sigma, case study, TQM
Research Objective
The primary objective of this research is to explore the experience of pharmaceutical firms who have implemented LSS. How LSS have been instrumental in improving key performance indicators (like product quality, price reduction and shorter delivery time-to-market etc.) given the highly regulated Indian pharmaceutical environment. What learning does this offer to other players in this sector? Knowing the obstacles and the manner of overcoming them in the light of the key research areas would be significant addition to the body of knowledge of sustaining the pharmaceutical industry and LSS implementation.

Investigating Research Issues
Five key research issues are identified for investigations.

1. Meaning of LSS as understood and interpreted by the top-management of the pharmaceutical industry
2. How critical are leadership and commitment to the success of LSS among the pharmaceutical firms?
3. Whether the pharmaceutical firms can use the experiences of other industries as a benchmark to formulate applications of LSS?
4. Whether LSS is an appropriate strategic method for pharmaceutical firms to enhance customer benefits by reducing lead time and cost yet maintaining the cGMP?
5. To what extent LSS has been accepted by pharmaceutical industry as a strategic method for continuous improvement vis-a-vis Quality Circles and TQM?

Methodology
This research is based on case-study method. Since there are very few Indian pharmaceutical firms who have implemented the LSS, the number of cases available is small. However the literature on case-research supports validity of studies based on limited number of cases also (Willis, 2014). The method adopted is to understand the context of the case, understand perceived concept of LSS and its implantation process and finally gather data on the key performance areas – both before and after the LSS implementation. The interviews were carried out following a predetermined protocol that was presented in a questionnaire. The questionnaire was divided into 3 sections:

1. Company background
2. Usage of Lean Six Sigma
3. Key Performance Indicators

All firms of the sample have implemented LSS; at the time of study the LSS implementations in these organizations were at different stages of maturity. The data were analyzed in the context of the five key research issues.

Research design
A research design is “the logic that links the data to be collected (and the conclusion to be drawn) to the initial questions of study” (Yin, 2003). For a research project, its “logic” is the paradigm that has been used to understand the social phenomenon (Cresswell, 1994). The research aimed to capture the experience of the practising executives in the implementation of LSS and use the insight towards development of a theoretical framework. For this purpose qualitative research method has been considered most appropriate. Qualitative research involves close observations and in-depth interviews (Lapan, 2011). Case study method is appropriate to seek insight into the contextual factors of ‘how’ and ‘why’ (Hunt, 2015). The sources of data include responses to interviews and filled-in questionnaire. The conclusion drawn from the interviews and the data collected through questionnaire was compared with the existing body of knowledge from the literature wherever relevant. The organizations were selected from the sector specific information and personal contact. The questionnaire was sent out to the participants before the interviews with fair amount of written explanation on the objective. The interviews were conducted directly where feasible; otherwise through telephones.

Analysis and Results
Data from each of the firms have been gathered through structured questionnaire as also through in-depth interview of key persons. Annexure-1 is a brief write-up on each of the firms that have been studied for this research. Annexure -2 gives basic data gathered from each of them relating to the usage of LSS. Annexure-3 presents the summary of Key performance Indicators of each of the firms.

The interview proceedings are documented and analyzed to arrive at the relevant features relating to the key research issues. Through a careful analysis of the interview documents vis-a-vis the key research issues has yielded the summary table shown in Annexure-4.
General Observations from the Study

a. There is a direct correlation between time span of LSS implementation in the organization and its level of penetration across the organization. This signifies that as LSS starts delivering results in a given pilot area, the organizations become confident to replicate it in other parts of the organizations and over a period of time entire organization embraces LSS leading to a cultural change.

   o Pro Life Science Ltd has had LSS in its organization for six years at the time of study; the firm has already taken LSS to every part of the organization.

   o Universal Pharma Ltd has had LSS for two years at the time of the study; LSS was implemented only in the manufacturing and quality departments.

b. Pharmaceutical firms are leveraging the experience of LSS in other sectors with lot of customization.

c. Pharmaceutical firms are embracing LSS as a strategic asset (just like firms in other sectors) and are driven by the top management.

d. LSS is helping the firms in improving quality, price and deliveries to a great extent (Annexure-3: Performance Indicators). All these are achieved due to the comprehensive and structured approach of LSS and the development of a culture of improvement across the organization.

Observations on the Key Research Findings

a. With respect to Key Research Issue-1: In the absence of a standard definition of LSS, the perception of each firm about LSS is significant. PSL perceives LSS as a methodology that tried to identify the critical areas and talents, focused on them until the initiative generated competitive advantage to the firm. UPL perceived LSS as a methodology that focused on the problem areas, worked on them to find resolutions and developed a culture of root-cause analysis. RLL perceived LSS as an organization wide culture that envisaged a practice of reducing efforts and improving performance, benchmarking with the best in the world, a means to achieve daily targets faster and in an easier manner etc.

   b. With respect to Key Research Issue-2: PSL perceived the role leadership in educating the organization about the need to change and the urgency involved in it. UPL echoed this perception. It emphasized the need for commitment from the top leadership of the firm. It felt that the leadership should anticipate the implications of the LSS initiative and it should manage the attitude of the entire organization. It also feels that shared decision making would yield better results. RLL while sharing these perceptions also indicated that the top management should strive to remove the fear and anxiety among the employees of the organization to ensure successful implementation of LSS.

c. With respect to Key Research Issue-3: Pharma industry is highly regulated and hence PSL feels that benchmarking with the experience of non-pharma industries needs significant customization. UPL perceived that LSS brought in focus on financial deliverables. It also felt that hiring persons from non-pharma industries had helped in implementation and increase in productivity.

d. With respect to Key Research Issue-4: PSL observed that LSS minimized documents. Through careful modification of SOPs it has been possible to monitor targets closely without compromising technical targets. UPL observed that conflicts of interest that prevailed among departments in terms of objectives and responsibilities were resolved substantially. LSS ensured equal importance to quality and cycle-time of production. On the whole UPL felt that LSS brought down the grey zones of responsibility. RLL perceived that through LSS flow of operations got standardized leading to better learning process and economy.

e. With respect to Key Research Issues-5: UPL perceived that LSS brought cohesive and comprehensive approach to problem solving. It brought disciplined approach to measurement and customer focus. LSS requires extensive education and training and hence engagement of full-time specialists is considered a good option. RLL perceived that LSS was result oriented and to get full results the LSS initiative must be sustained. It also perceived that LSS approach must be structured and comprehensive with full-time specialists.

The focus on financial and business results is to some extent unique in Six sigma. Deming (Deming, 1986) warned against focusing on results and instead preferred a process focus. On the other hand, the Baldrige Award and related quality awards around the world which focuses on TQM have focused on process and results too. The difference is that Six
Sigma usually requires financial returns from most projects and from each full-time Six Sigma specialist.

Thus the financial focus is at the project level, in contrast to being on the organizational level in TQM and the Baldrige award. In addition, results are tracked on a pre-project and post-project audit basis by the financial department of respective organization.

**Impact of LSS Structure, penetration and Culture on results**

Table 1 presents the salient features of the organization structure of the firms that have gone through LSS implementation.

<table>
<thead>
<tr>
<th>Company</th>
<th>Universal Pharmaceutical Ltd (UPL)</th>
<th>Royal Laboratories Ltd (RLL)</th>
<th>Pro Life Science Ltd (PSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Using LSS Since</strong></td>
<td>2 years</td>
<td>4 years</td>
<td>6 years</td>
</tr>
<tr>
<td><strong>Structure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Black Belt</td>
<td></td>
<td>2 Black Belts</td>
<td>6 Black Belts</td>
</tr>
<tr>
<td>2 Green Belts</td>
<td></td>
<td>5 Green Belts</td>
<td>12 Green Belts</td>
</tr>
<tr>
<td><strong>LSS Penetration</strong></td>
<td>Manufacturing, Quality assurance</td>
<td>Manufacturing, Quality Assurance / Control</td>
<td>Manufacturing, Quality Assurance / Control, R&amp;D, Sales and Marketing</td>
</tr>
<tr>
<td><strong>Culture</strong></td>
<td>Breaking the old mind set</td>
<td>Mid-level alignment</td>
<td>Companywide LSS alignment</td>
</tr>
</tbody>
</table>

LSS has a tendency to bring about an evolution in the organization structure; this can be observed in the above table. The Universal Pharmaceuticals Ltd(UPL) is at the beginning stage of the LSS evolution and has a small team driving the system limited to manufacturing and quality. This team consists of a Business Excellence Manager who is the Black Belt and the main driver of the LSS initiative. The two Green Belts assist him in this task. This is the scenario in companies that launch LSS and those who are at the beginning stage.

The LSS processes are first applied in a small area and checked for its acceptability, success and sustenance. As the LSS acceptability increases within the organization, the team size and structure change to suit the need of the evolving processes around LSS.

The Royal Laboratories Ltd(RLL) has a comparatively bigger structure of its LSS drive consisting of 2 Black Belts, 5 Green Belts and 5 Functional Black Belts. Functional Black Belts are area leaders with deep knowledge of LSS processes. This leads to culture building within the different departments of the
organization as leaders drive the processes in line with LSS methodology. Going further ProLifeScience Ltd (PSL) has evolved to such a level of LSS that they have deployed a business excellence model based on LSS.

The results obtained by the firms lead to further conclusions about the impact of LSS working structures. The history (time span) of LSS implementation has direct impact on the quality levels achieved by the firm. PSL with 4 years of LSS implementation indicated exceptional quality levels; UPL with 2 years of LSS implementation showed only moderate quality levels. RLL and PSL have deeper penetration in LSS as compared to UPL. Similar results are evident from price of product and time to market i.e. delivery. PSL is way above compared to RLL and UPL.

**Research summary**

**Key Research Issue-1**: What is the meaning of Lean Six Sigma as understood and interpreted by the leaders and management of the pharmaceutical industry.

From a practitioner’s perspective different definitions may be pertinent, depending on the firm’s prior experience, strategic outlook and application. The evolution of Lean Six Sigma in the organization will also play a major role in the level of understanding and interpretation of Six Sigma. Lean Six Sigma should be used in different levels and dimensions as the organizations grow along with it. In the initial stage LSS may be seen as a metric for the improvement of the basic Key Performance Indicators (KPIs). As the concept become more stronger with LSS penetration and time, LSS can acquire significance as one or more of the following:

1. a goal setting tool within the organization
2. a benchmarking tool with outside world.
3. a locomotive tool to drive the growth of the organization.
4. a way of life for the entire organization
5. a culture to be strongly embedded in the organization.

**Key Research Issue-2**: Leadership and commitment is critical to the success of Lean Six Sigma in the pharmaceutical manufacturing.

Commitment from leadership is critical for the success of Six Sigma in the pharmaceutical industry like any other industries (Snee, 2004; O’Rourke, 2005). Top management need to be aware of the implications of the LSS implementation. For example in UPL a major difficulty was that even though their management was very supportive and committed to the Six Sigma implementation, they did not have the adequate knowledge to fully support it. This sent out mixed signals into the organization about the relevance of Six Sigma and its utility. PSL has stated that its successful implementation was due to awareness and understanding from the management on the importance of commitment at all levels in the organization. It is clear; without commitment and understanding at the management level, Six Sigma implementation and use will face major problems and obstacles. It is desirable to create few dedicated positions to enhance the success of LSS implementation.

**Key Research Issue-3**: The pharmaceutical manufacturing can use the experiences of other industries as a benchmark to formulate applications of Lean Six Sigma.

The interviews clearly show that experiences from other industries were used as a benchmark during the formulation of their Six Sigma strategies. Several of the people participating in the interview also had experiences of Six Sigma from other companies and such knowledge was a main success-factor in the LSS implementation. Benchmarking is very important to get the right understanding of the Six Sigma strategy itself and also the best ways of making sure the implementation is successful. It is equally important that the needs of the individual company are being investigated thoroughly to be able to tailor-make the strategy to the company's needs. There are therefore no shortcuts to a successful implementation of Six Sigma in any business or company. Involvement of experienced consultants will expedite the process of implementation and help buy-in the concept across the organization.

**Key Research Issue-4**: Whether Lean Six Sigma is a suitable strategic method for pharmaceutical manufacturing to enhance customer benefits by reducing lead time and cost yet maintaining the cGMP?

GMP has evolved gradually, representing a complex system of rigorous rules and institutionalized tradition of drug manufacturing in order to ensure the safety, reliability and quality. While cGMP focuses on manufacturing as a means to produce safe and effective products for the patient, lean focuses on manufacturing as a location for improvement and value creation from a customer’s perspective. In a lean pharma manufacturing environment, cGMP and lean must be equal partners. The cGMP standards together with lean principles must be embedded into the culture of an organization and the business strategy must reflect this.
This challenge is less problematic because of recent changes in regulatory thinking like introduction of PAT (Process Analytical Technology) by Federal Drug Administration which aims to removal of real and perceived barriers to bring improvement in pharmaceutical manufacturing efficiency and quality (FDA (2011)).

**Research Question 5**: Lean Six Sigma processes have been accepted by pharmaceutical industry as a proven strategic method for continuous improvement as compared to other processes like Quality Circles and TQM.

Although Lean Six Sigma builds on prior quality management practices and principles, it offers a new structure for improvement. The structured and comprehensive approach of LSS promotes better control and exploration in improvement efforts. Its strong emphasis on results has motivated the management to go for LSS with more sustained enthusiasm.

**Limitations of the Research**
The study is restricted to three firms which have implemented LSS and depth interviews of key executives involved in the implementation. Limitations of case study research remain valid in this study also (Willis, 2014). Depth interviews supported largely by data; they are used to generalize into learning relevant to pharmaceutical firms implementing LSS. Attempts have been made to verify the opinions expressed by the executives; however it has not been possible to verify all aspects since many are based on perceptions. The authors do not rule out the possibility of existence of other latent factors responsible for the improvements observed in the firms studied. Despite these limitations, the authors feel that the study has yielded good insights on the relevance of LSS to pharmaceutical firms and the key success-factors of implementation.

**Conclusion**
The main research question is: How Lean Six Sigma (LSS) is perceived and implemented among Indian pharmaceutical firms under the present regulatory environment and current Good Manufacturing Practice (cGMP)? The research concludes that Indian pharmaceutical firms have started taking advantage of the frame-work of Process Analytical Technology under cGMP and have initiated LSS implementation. These firms have reaped benefits in terms of manufacturing efficiency and product quality improvement. It is also noteworthy that LSS is being seen as a platform for goal setting, benchmarking and setting a culture of continuous improvement.

**References**


Accessed on December 30, 2014


Accessed on 10th November 2014


Accessed on 2nd Feb. 2015
Annexure-1: A brief write-up on the firms under study

Universal Pharmaceutical Ltd
Universal Pharmaceutical Ltd (UPL) is a topical formulation manufacturing company. It has a state-of-the-art facility in its plant at Goa; it is the largest single site topical manufacturing facility in the world. The facility has 700 employees and has been in operation since 1990. The company has started Business Excellence journey two years back with a full-time Black Belt and 2 Green Belts. They are currently working on improving manufacturing processes. The head of Business Excellence department participated in the interview. The firm’s overall goal is to achieve excellence in manufacturing processes through continuous improvement. It is targeting the Six Sigma level in all its processes. Lean manufacturing is now the focus of the company.

Royal Laboratories Ltd.
Royal Laboratories Ltd (RLL) is a major active ingredient producer of India with presence across the world. The facility under study is located in Telangana and has employee strength of 450. RLL is practicing operational excellence since 4 years across all its operations. RLL has a full-time Operation Excellence department which has 2 Black Belts and 5 Green Belts. Other than this there are 5 Black Belts which do not work full-time on Lean Six Sigma but are functional experts and have specific projects under them. The interview was conducted over phone with one of the Black Belts from the Operation Excellence department.

Pro Life Science Ltd.
Pro Life Science Ltd (PSL) is a MNC and a leading bio pharma company, manufacturing Vaccines and other lifesaving drugs. PSL has a huge manufacturing facility in Goa with employee strength of 650. PSL is practicing Lean Six Sigma for last 6 years under a process excellence system called PSL Model for Business Excellence. This model has various levels and a detailed execution methodology. PSL has 1 Master Black Belt, 6 Black Belts and 12 Green Belts in its manufacturing plant. The interview was conducted with two Black Belts.

Annexure-2: Data Summary showing Usage of LSS

<table>
<thead>
<tr>
<th>Questions on Usage of Lean Six Sigma</th>
<th>Universal Pharmaceutical Ltd</th>
<th>Royal Laboratories Ltd</th>
<th>Pro Life Science Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of years Lean Six Sigma have been used in your company</td>
<td>2 years</td>
<td>&gt; 4 years</td>
<td>&gt; 6 years</td>
</tr>
<tr>
<td>Is Lean Six Sigma implemented throughout the entire organization ?</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Please indicate the business areas that utilize lean Six Sigma</td>
<td>Manufacturing Quality assurance</td>
<td>Manufacturing Quality Assurance / Control</td>
<td>Manufacturing Quality Assurance / Control R&amp;D, Sales and Marketing</td>
</tr>
<tr>
<td>Did the organization use information from other companies with Lean Six Sigma before the implementation?</td>
<td>Limited to companies in the vicinity</td>
<td>Used consultants from different field to benchmark processes and matrix</td>
<td>Yes, used vast knowledge of other sectors and experts</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Did any of the Lean Six Sigma facilitators have any Six Sigma experience from other industries?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Does the organization view Lean Six Sigma as a business strategy?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Does the organization use Lean Six Sigma as a tool to fulfill the vision of the company?</td>
<td>Not Yet</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Is Lean Six Sigma driven by Senior Management?</td>
<td>Mid Level</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>&gt; Staff understand the Six Sigma concept</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>&gt; Staff receive Six Sigma training</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>&gt; Staff have the necessary LSS support</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>&gt; Staff have the necessary resources for Six Sigma</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>&gt; Management has the right level of competency in LSS</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>&gt; Management take great interest in the LSS work</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>What are some of the other continuous improvement tools used in the past before switching over to Lean Six Sigma.</td>
<td>NA</td>
<td>Quality Code</td>
<td>TQM</td>
</tr>
<tr>
<td>Are the old tools still in use? If not how and why is Lean Six Sigma considered better over them?</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>What is your understanding of Lean Six Sigma</td>
<td>Metric</td>
<td>Growth Driver</td>
<td>Culture</td>
</tr>
<tr>
<td>Structure</td>
<td>1 Black Belt &amp; 2 Green Belts</td>
<td>2 Black Belts, 5 Green Belts and 5 Functional Black belts</td>
<td>1 Master Black Belt, 6 Black Belts and 12 Green Belts Model for Business Excellence</td>
</tr>
<tr>
<td>Culture</td>
<td>Breaking the old mind set</td>
<td>Mid-Level alignment</td>
<td>Companywide LSS alignment</td>
</tr>
</tbody>
</table>
## Annexure-3 : Key Performance Indicators

<table>
<thead>
<tr>
<th>Key Performance indicators</th>
<th>Universal Pharmaceutical Ltd</th>
<th>Royal Laboratories Ltd</th>
<th>Pro Life Science Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment of Impact on Quality of Product</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has Six Sigma improved the overall quality of product / products ?</td>
<td>Moderate Impact</td>
<td>Exceptionally</td>
<td>Exceptionally</td>
</tr>
<tr>
<td>Has Six Sigma improved the way the overall quality of products is measured ?</td>
<td>Moderate Impact</td>
<td>Great Impact</td>
<td>Exceptionally</td>
</tr>
<tr>
<td>Has Six Sigma provided a long term change from the old practices affecting product quality ?</td>
<td>Moderate Impact</td>
<td>Great Impact</td>
<td>Exceptionally</td>
</tr>
<tr>
<td>How large impact do you think Six Sigma will have on the overall quality of products in the future ?</td>
<td>Great Impact</td>
<td>Great Impact</td>
<td>Exceptionally</td>
</tr>
<tr>
<td><strong>Assessment of Impact on Price of Product</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has Six Sigma influenced the pricing of product / products ?</td>
<td>Moderate Impact</td>
<td>Great Impact</td>
<td>Exceptionally</td>
</tr>
<tr>
<td>Has Six Sigma influenced how the pricing of product / products is measured ?</td>
<td>Moderate Impact</td>
<td>Great Impact</td>
<td>Exceptionally</td>
</tr>
<tr>
<td>Has Six Sigma provided a long term change from the old practices affecting product quality ?</td>
<td>Moderate Impact</td>
<td>Great Impact</td>
<td>Exceptionally</td>
</tr>
<tr>
<td>How large impact do you think Six Sigma will have on the pricing of products in the future ?</td>
<td>Moderate Impact</td>
<td>Great Impact</td>
<td>Exceptionally</td>
</tr>
<tr>
<td><strong>Assessment of Impact on Time to market of Product</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has Six Sigma improved the overall delivery times to markets ?</td>
<td>Great Impact</td>
<td>Exceptionally</td>
<td>Exceptionally</td>
</tr>
<tr>
<td>Has Sigma influenced how the overall delivery times to markets is measured ?</td>
<td>Moderate Impact</td>
<td>Great Impact</td>
<td>Exceptionally</td>
</tr>
<tr>
<td>Has Six Sigma provided a long term change from the old practices affecting the delivery time to market ?</td>
<td>Moderate Impact</td>
<td>Great Impact</td>
<td>Exceptionally</td>
</tr>
<tr>
<td>How large impact do you think Six Sigma will have on the delivery time to market in the future ?</td>
<td>Great Impact</td>
<td>Exceptionally</td>
<td>Exceptionally</td>
</tr>
</tbody>
</table>
### Key Research Issue-1: Meaning of LSS as understood and interpreted by the top-management of the pharmaceutical industry

<table>
<thead>
<tr>
<th>Response from Pro Life Science</th>
<th>Response from Universal Pharma</th>
<th>Response from Royal Pharma</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSS facilitates the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identificatation of critical areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification of potential talent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus to enhance the capabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhance competitive advantage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSS means:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify the problem areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture of root-cause driven approach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSS Implies:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice of reducing efforts and improving performance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bench marking with the best in the world. Method of achieving daily target faster and easier.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It develops a productivity culture</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Key Research Issue-2: How critical are leadership and commitment to the success of LSS among the pharmaceutical firms?

| Leadership is about educating the target audience about the need for change. Educating about urgency |
| Leadership needs to be committed to the implementation. It should have knowledge on the impact of implementation of LSS. Need to bring about change in the attitude and willingness of the entire team for improvement. Shared decision making; Helps increase production not work. |
| Maximum emphasis from top management. Dispel the fears of dislocation as a result of the LSS implementation Taking all employees into confidence |

### Key Research Issue-3: Weather the pharmaceutical firms can use the experiences of other industries as a benchmark to formulate applications of LSS?

| Challenges of implementing LSS: Pharma is highly regulated sector. Hence cautious approach & customizing on the experience of other industries are relevant. |
| LSS focuses on financial deliverables Hiring talent from non-pharma to lead implementation: proved that diversity improves productivity. |
| No Response |

### Key Research Issue-4: Weather LSS is an appropriate strategic method for pharmaceutical firms to enhance customer benefits by reducing lead time and cost yet maintaining the cGMP?

| LSS has been used to minimize the documents. Careful blend of the SOPs to ensure that targets are monitored without compromising technical standards. |
| LSS enables: Resolutions of conflict of interest among departments in terms of objectives and responsibilities. Giving equal importance to quality and cycle-time of productions. Reduces the grey zones of responsibility. |
| Flow of operations gets standardized ensuring better learning process and economy. |

### Key Research Issue-5: To what extent LSS has been accepted by pharmaceutical industry as a strategic method for continuous improvement vis-a-vis Quality Circles and TQM?

| No Response |
| LSS Brings in very cohesive & comprehensive approach to problem solving. Disciplined approach to measurement. Customer Focus Extensive education and training required. Hence firms are not averse to engaging full-time specialists for improvements. |
| It is result oriented. LSS Program must be made sustainable; it would produce results. The approach must be structured, comprehensive with training of full-time specialists. |

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Infrastructure Financing: An Alternative Approach

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Oakbrook Business School, Ahmedabad

Abstract

Infrastructure projects are characterized by complexities and risks. The complexities emanate from the size of the project, technical and execution parameters, the long period of implementation, the long gestation period, the long life-cycle of the project and complexities of financing. For a lender to the infrastructure project, the long repayment period is a matter of serious concern. The delays and defaults of the initial period tend to cascade into significant amounts over the long repayment period. This makes funding of infrastructure very risk to the lender. Banks, with sources of funds that are medium to long term, tend to shy away from participating in the extra-long-term needs of infrastructure projects. This paper is an exploration whether the long repayment period of the infrastructure loans can be broken into smaller durations with sufficient safeguards to protect the interests of the lender and the borrower. The paper concludes that it is possible to design funding structures that would enable participation of banks to periods shorter than the life-cycle of the projects with fair amount of safeguards thereby enhancing wider and better financial closure of infrastructure projects.

Key words: Infrastructure Financing. Risk Minimization. Financial Closure.

Introduction

Infrastructure projects in the developing countries are generally found to be complex and risky; a set of elements make them so. Most of these elements emanate from few basic factors: the huge quantum of resources consumed by the project, the environmental impacts, the complexity and long duration of execution, the long life-cycle of the project and the consequent uncertainty about cash-flows. The long life-cycle of the project has significant implications to the lenders. Infrastructure lending is provided by specialized infrastructure financiers and to some extent banks. Since the number of infrastructure financing agencies is relatively small, especially in emerging economics, it is desirable to attract more banks into the arena of infrastructure to improve the supply situation of finance for infrastructure projects.

Banks are less inclined to participating in infrastructure financing for a variety of reasons. First, banks find it difficult to match the extra-long-term fund deployment with the medium-to-long-term sources that they are endowed with. Second, banks are not comfortable with their funds and interest-rates getting locked in for the extra-long-horizons. Third, delays or defaults of the infra-projects get cascaded over the extra-long horizon; this only adds to the woes of the banks. This paper explores how the situation could be made attractive to
banks without jeopardizing the interests of the stakeholders of the projects.

**Review of Literature**

Mattar has described the various risks inherent in infrastructure financing (Mattar, 1998). He groups the risks in three clusters: Political, Financial and Performance risks. He goes on to explore the incidence of these risks in a global context and examines the risk mitigation opportunities. In a paper more relevant to Indian situation Lall and Anand have stated that significant private financing of the infrastructure has happened in recent years due to the active participation of banks. They also point out that banks are constrained by the ALM mis-match in funding infrastructure. The paper argues that in the absence of a vibrant bond market catering to the extra-long-term funding, government or its agencies need to play the role of a catalyst to ensure continued funding support to infrastructure projects (Lall & Anand, 2009). Michael Grant (Grant, 1997) has made a very critical analysis of the Eurotunnel experience in project financing. He argues that Eurotunnel has been an engineering marvel in design and construction while it has been a financial nightmare both for investors and lenders alike. Costs were underestimated, the construction work never kept the estimated time-schedules resulting in delays and overruns. There was enormous delay in financial closure of the second round of financing. The project was very ambitious in terms of its complexity and size; it offers critical lessons in financial structuring and closure. Almost identical views are expressed by Andreas Schueler also (Schueler, 2007). In a masterly work Matsukawa and Habeck have examined the various risk mitigation instruments engaged, primarily by multi-lateral agencies, in managing the risks inherent in infrastructure projects at all stages (Matsukawa & Habeck, 2007). However, none of these papers have listed any attempt in slicing down the term-structure of the debt-instruments into smaller segments.

**Critical Concerns**

The major concerns of the extra-long-term lender to an infrastructure project can be summarized as below:

- **Duration mismatch:** The sources of funds for the lender are predominantly of medium to long term duration. When such funds are used to fund extra-long-term projects obviously there would be mismatch and consequent problems. This would mean that the lender has to source extra-long-term funds just to finance the infrastructure projects. This makes it difficult for many lenders to participate in infrastructure financing.

- **Locking in of funds for extra-long periods and the consequent inflexibility:** The funds given out as loans to infrastructure projects would take a long time to come back; the lender has no option but to wait till the end of the repayment period to recover the advances in full. Since the quanta of funds given as loans to infrastructure projects are generally large, the risks associated with such loans are compounded. This places severe constraints on the operational flexibility of the lender.

- **Inability to predict the future benefit stream and the resulting cash-flows:** The long duration of the project cycle makes it difficult to predict the future benefit streams accurately. This makes the cash-flows very uncertain resulting in the high risk levels of the project.

- **Defaults and their consequences:** Generally defaults are more likely to happen in the earlier part of the project either due to delay in implementation of the project or because the benefit streams are slower in reaching the expected levels. The lender would have to carry such defaults till the end of the repayment period. Even when the default amount is small percentage of the total project cost, it would be significant in terms of absolute value. This would place extra financial burden and risk on the lender.

- **Interest-rates get frozen for long period:** When an extra-long-term loan is given the interest rate would be – even in variable interest-rate
structure – frozen within certain limits or bands. When the repayment period is 30 or 40 years this places severe restrictions on the profitability of the lender.

- **Changing economic and market scenarios over a long horizon**: The lender is subject to the vagaries of the changes happening in the economic environment. Even small impacts when cascaded over a long horizon would have significant and perhaps crippling impacts on the lender.

### Table-1: Challenges of Infrastructure financing

<table>
<thead>
<tr>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long period of project execution arising out of</td>
</tr>
<tr>
<td>- Prolonged process of land acquisition</td>
</tr>
<tr>
<td>- Process of getting clearances</td>
</tr>
<tr>
<td>- Financial closure</td>
</tr>
<tr>
<td>- Award of contracts through global bidding</td>
</tr>
<tr>
<td>Relatively low rate of return and long life of the project.</td>
</tr>
<tr>
<td>High risk arising out of</td>
</tr>
<tr>
<td>- Socio-economic factors impacting the revenue-streams</td>
</tr>
<tr>
<td>- Unanticipated delays in executions</td>
</tr>
<tr>
<td>- Interest rate variation over the long horizon</td>
</tr>
<tr>
<td>- Relatively larger amounts as investment and loans</td>
</tr>
<tr>
<td>- Managerial challenges are compounded with longer horizon</td>
</tr>
<tr>
<td>- Political factors</td>
</tr>
</tbody>
</table>

**Lender specific issues**

- Amount of loans are large; any negative impact like delay, slow take-off, default, or failure will have significant impact on the lender
- Long horizon increases the uncertainty
  - Interest rate variation over the horizon
  - Higher interest rates are warranted for longer period loans

If we are able to address these concerns of the lender, more banks would be willing to come forward and participate in the financing of infrastructure projects. This could bring vibrancy to the market for financing of infrastructure projects.

### The Stage-Coach Model

The suggestion would consist of the following:

- **a.** break the total duration of the infrastructure project into a number of smaller but manageable stages with each stage having duration of not more than 8 to 10 years.
- **b.** prepare a separate consortium of lenders to finance each stage.
- **c.** enter into iron-clad agreements, as part of the financial closure of the project, among the consortium of lenders and their respective lead managers to ensure commitment and seamless transition from one consortium to another.

Since each consortium of lenders have to be concerned about only the one stage where it is participating as a financier, most of the concerns listed above gets taken care of automatically. However there will be new concerns: How do we ensure smooth transition from one consortium of lenders to the next consortium of lenders as the project enters the next stage? How do we handle the defaults and overruns? How do we ensure that the interest-rate structure remains tuned to the prevailing market interest-rate-structure from time to time? How do we incentivize the management of the project for better financial (and debt-serving) performance during a stage?

- **Before the financial closure of the project**
  - A consortium of lenders and a lead manager should be identified for each stage. It is desirable to have an overall lead manager for the project as a whole also.
  - The schedule of repayment is worked out specifying the quanta of repayment taking place in each of the stages. This
would spell out the quantum of loan each consortium would take up at the beginning of the stage as also the quantum of loan the consortium would pass on to the consortium of the next stage.

- It is not possible to pre-decide interest rate of each stage. It is desirable to specify the interest-rate-structure linked to certain market indicators like LIBOR etc. For instance interest-rate for the nth-stage may be defined as “LIBOR + x_n,” where x_n is the premium for the nth stage. At the financial closure of the project, ‘x’ Should reflect the future premium of interest-rate for the stage n, if such a forecast of the future rate is possible; however the precise value of ‘x’ shall be decided, just before the commencement of the nth stage, through an assessment of the risk profile of the project carried out by one or more rating agencies and considering the prevailing interest-rate-structure.

- There has to be an iron-clad agreement covering all the participating institutions, the management of the company and government to ensure that all the commitments of the financial package are honored with severe penalties for failure. This should ensure smooth transition from one stage to another.

- Sovereign guarantee for the overall financial package is highly desirable; more so in the initial stages such packages are worked out. Once the market and the participants are used to such packages and their successful completion, the need for sovereign guarantee may come down.

- Overrun is likely to happen in the first stage due to delay in the execution of the project. Default can happen in any stage. Overrun or default happening in any stage would be funded out of a fresh loan which would attract higher rates of interest than the one committed in the original agreement. Before the financial closure, as part of the financial package, a separate consortium of lenders is identified to underwrite the excess loans arising out of overrun and/or defaults, for each stage. The financial package would specify the guidelines for fixing a higher premium on the interest-rates for such excess loans. The package would also specify nature of charge to be shared among the existing consortium and the consortium taking up the excess loans as also the repayment schedule of the excess loans.

- At the end of each stage
  - A rating agency (or more than one) would assess the risk profile of the project and the outstanding loans; this together with the prevailing interest-rate-structure shall be the basis for deciding the interest-rate structure of the ensuing stage.
  - If the repayment record of the previous stage has been good, the confidence of the lenders is bound to increase and this should be translated into lower rates of interest to the loans of the ensuing stage. The premium ’x,’’ should be lowered; similarly if the repayment record has not been good, it will result in lowering the confidence level of the lenders resulting in suitable increase in the premium ’x.’ These would be taken care through the risk profile assessment by the rating agencies.
  - The ground rules for such variations in the value of ‘x,’ should be spelt out in the iron-clad agreement entered into at the beginning of the project.
  - When the repayment record is good, the management of the company should have an option to bring in a new consortium with lower interest-rate-structure than the one forecasted/suggested as per the original agreement.
  - At the end of the last stage, the defaults, if any, should be absorbed by the government who has participated in the package as a guarantor. This would ensure that the consortium of the last stage also makes full recovery of its loans. Government may resort to debt-restructuring in a manner appropriate to the situation.
Analysis and Discussion
The Stage-Coach Model addresses the concerns of the lenders and offers solution to most of them. Most of the concerns had emanated from the extra-long-duration of the loans. By splitting the horizon into manageable stages the concerns have been successfully tackled.

- The duration of each stage is decided looking into duration of the fund-sources of the participating banks. Hence there is no scope of duration mis-match at any stage. Each bank has its funds blocked only to the extent of the duration of the stage and hence there is no question of funds being blocked for long durations.
- Defaults are tackled separately and no participating bank has to wait till the end of the horizon to get back its dues.
- Interest-rates are fairly linked to the market and the risk-profile of the project.
- An element of competition is brought into the system. Any bank can enter the consortium at any stage by acquiring the loans from any participating bank. Similarly any participating bank can exit the system by selling its loans to any other bank. Trading of the loans becomes a vibrant possibility.
- Interest-rate tends to reflect the asset quality as it is based on the ratings at regular intervals and the market reality.
- With government taking over the outstanding loans, if any, of the last stage, all participating institutions recover their financial dues fully and finally. The maximum burden that the government is called upon to bear is equivalent to the outstanding loan of the last stage plus the carried forward defaults. In all probability the residual loans at the end of the last stage will be a small fraction of the quantum of original loans with which the projected commenced operation. In the conventional system of infrastructure financing situations of defaults have to be absorbed by the participating banks and institutions, resulting in crippling impacts on them. In the stage-coach model the burden is systematically reduced through the stages like a filtering mechanism and the residue is absorbed the government as the lender of the last resort. Government has the option to recover it, at least some part of it, over a period through restructuring the residual assets of the project.

In the final analysis the stage-coach model brings in the following features:

- Market forces are brought into the process of the loan amortization program.
- The management of the company will be under pressure to ensure that the debt-servicing takes place as planned; otherwise the penalties could be severe.
- Each lender is assured that its loans are serviced in full at the end of the stage in which its participation is stipulated.
- When the project performs well its riskiness comes down and this gets translated into reduction in interest-rate structure. When the project performs poorly, its riskiness goes up and this results in proportionate increase in the interest-rate-structure.
- When the project performs well, it could attract more financiers and consequent reduction in the interest-rates through a competitive process.
- The infrastructure loans become tradable financial products in the bond market. The market for infrastructure bonds becomes live and vibrant.

| Table-2: Stake-holders concerns and how they are addressed by the stage-coach Model |
| --- | --- | --- |
| Players | Concern/s | How the concerns are addressed |
| 1. All Participating banks | Would prefer lending for duration of 8-10 years. | The total duration of the infra-project is broken into a number of stages, none of them exceeding 10 years. |
| 2. Owners and Management of the project | Want to ensure funding of the project though its life | Each phase to have a Consortium of leaders. Each Consortium to have a Lead Manager. Iron-clad agreement among Lead managers, Consortium members and the Project to ensure seamless transition of funding responsibilities. |
3. Consortium responsible for Phase-1

- At the end of phase-1, it should get back all the loans it had advanced irrespective of the performance of the project not.
- Iron-clad agreement
- Govt. guarantee

4. Consortium responsible for Phase-2 and subsequent phases

- The quantum of debts that it would be acquiring at the beginning of phase-2 is pre-fixed. It is not responsible for the overrun / default if any.
- Same rule applies in subsequent stages also.
- The schedule of repayment shall be prefixed so that the debt outstanding at the beginning of each phase is pre-fixed.
- Overrun, default, delay etc would be converted into additional loan. This additional loan shall be taken up by a separate consortium who would have underwritten such an act as per the iron-clad agreement signed before the financial closure of the project.
- Such additional loan requirements are most likely to happen at the end of phase-1.
- The interest rate for the additional loan will be negotiated at market rates.
- The Lead Managers, company and Govt would pre-decide on the nature of charge to be ceded. This would be part of the iron-clad agreement.
- The consortium members should not lose on interest-rate in case the market interest-rate has gone up.
- The interest-rate shall be prefixed at the beginning of the project as LIBOR + x, % for each phase-n
- The variable interest-rate structure takes care of the variations in the interest-rate.
- There would be pre-decided terms to alter the interest-rate vis-a-vis the performance of the project.
  - Decline in the interest-rate for better performance of the project
  - Increase in the interest-rate for poorer performance of the project
- If the performance of the project is better than projected, the management of the project / company has the option to bring in a new consortium with lower interest rates or re-negotiate the interest rate with the existing consortium.

The successful practice of this model demands the following pre-conditions:
- **A stable and mature political system** is a pre-condition for successful management of infrastructure project through and through. The political system and the bureaucracy should inculcate the maturity to manage the administrative processes associated with the financing of infrastructure projects with certain level of equanimity beyond the shades of the changing political regimes. Experience of Dabhol Power Company in Maharashtra, in the early years of liberalization has proved this point beyond doubts (Allison, 2001; Inkpen, 2008). This is essential in the conventional method of infrastructure financing also. In the stage-coach model, such mature handling of administrative matters would facilitate the high level of discipline required among the participants in the infrastructure project.
- **A vibrant and matured market with high level of self-discipline** among the players is a key...
ingredient to ensure (a) there are sufficient players to participate in the various aspects of infrastructure financing with competitive spirit (b) the tight discipline envisaged in the stage-coach-model is adhered to and (c) there is a competitive market for financial products created out of the financial package.

- **Proactive regulators; competent institutions and independent judiciary**: These facilitate the evolution of an environment conducive for cooperation, collaboration and sharing of risks. The unique ability of the stage-coach model in minimizing the risks lies in this collaborative process.

**Conclusion**

This conceptual model – Stage-Coach approach to Infrastructure financing – is an attempt to take away the apprehensions of the participating financial institution by splitting the horizon into manageable ranges, bringing safeguards to ensure smooth transition and to link the entire process to the market. It offers the participating banks a definite and manageable horizon, definiteness of the quantum of commitment, market-linkage of the interest-rate, definiteness of closure and perhaps an option to participate at later stages. To the infrastructure company (the SPV) the model offers a vibrant market for finance, more number banks ready to participate, market-linkage of the interest-rate and incentives for better debt-servicing. The net impact is in substantial reduction of the risks exposure of the participants. On the down side the model expects a mature financial market, proactive players and robust regulatory system. This is a desirable stage towards which developing countries can move in gradually.

**End Notes**

1. **Underwriting of Excess Loans**: Since the participating institutions need to be immunized from the burden of defaults it is essential to identify a consortium of lenders, for each stage, **ab initio** to take the contingent liability of the excess loans of that stage. For undertaking such an eventuality the consortium and its participants would enter into underwriting agreements, as part of the iron-clad agreement, before the financial closure; the consortium would be allowed to charge an underwriting commission.

2. **Charge on the assets**: In any lending the lenders would take first charge on the primary assets of the project through the mechanism of mortgage and/or hypothecation. Legally this entitles them to claim first right on the proceeds of the assets in the eventuality of failure of the project and consequent liquidation. When more than one lender is involved their rights shall be in proportion to the initial lending (legally known as sharing the charge on **pari passu** basis). At the end of Stage-1, if excess loans are present and the consortium that had undertaken the excess loans begins to carry the loan, the consortium also would expect some charge on the assets of the project. One option is to ensure **pari passu** charge to this consortium also. In that case the rights of the consortium carrying the primary loans get diluted marginally since the quantum of assets have not increased; hence they may be reluctant to cede **pari passu** charge. The second option is to offer second charge on the assets to the new consortium taking up the excess loans. This aspect needs to be decided right in the beginning before the financial closure of the project. Similarly repayment schedule of the excess loans, transfer of such loans to the subsequent stage etc also need to be spelt out in the underwriting agreement and the iron-clad agreement.

3. **Dabhol Power Company and its power project near Ratnagiri, Maharashtra, India suffered due to political instability, lack of maturity in handling the project at political and bureaucratic levels and also the less-than-professional manner of handling by the institutions** (Allison, 2001), (Inkpen, 2008).

**Bibliography**

http://www.atimes.com/reports/C1A3A01.html.


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Annexure-1: Stage-Coach Model, An Illustration:

Golden Gate Bridge across a major river, with 4 lanes of traffic to each side, is planned to be constructed. The estimated cost is US$ 100 million. The project will be handled by an SPV created exclusively from among a group of national and international investors and construction companies. The execution of the project is awarded to an international construction company selected through global bidding. The time of construction is estimated to be 3 years.

The funding will be provided by national and international funding agencies and banks. They have decided that the group of construction companies promoting the project would take equity to the extent of US$25 million and the balance US$ 75 million will be raised as long term loans from the funding agencies and banks. They have also decided that the SPV will be given a moratorium of 2 years after the construction period. This would mean that the repayment of the loans would commence 5 years from the commencement of the project. The loan of US$ 75 million would be recovered in 50 equal half yearly installments (25 years).

Interest for the loans has been worked out at LIBOR + 4 % per annum. The interest of the construction period of 3 years is already built into the project cost and hence it would be recovered from the loan-disbursals. Hence there should be no uncertainty of the recovery of interest during the construction period. The interest payment by the SPV during the next 2 years of moratorium will depend on the successful operation of the project. In case the project is delayed, then the interest payment may be adversely affected. To this extent there is an element of uncertainty (and hence risk) to the lenders.

The funding agencies and the promoters have clarified that escalation in the project cost to the extent of 10 % is already built into the cost. In case of any further delay and/or overrun, the additional cost will be raised through a mix of equity from the promoters and loan from a new consortium of lenders on terms more stringent than those entered already.

Separate consortium of financiers has been identified to finance each stage of the project (C1, C2 and C3). An iron-clad agreement has been concluded among the Golden Gate Bridge Company Ltd (the Special Purpose Vehicle – SPV) each of the banks participating in each of the consortia and the Government. This agreement covered the roles, responsibilities, obligations and rights of every member in as much detail as possible to ensure smooth progress, transition and completion of the project. The Government has also agreed to cover the entire funding through a Sovereign Guarantee.

Stage-Coach approach

- The horizon of 30 years [3 + 2 + 25] is split into 3 stages of 10 years each (S1, S2 and S3).
  - Stage-1
    - Consortium-1 (C-1) would provide US$ 75 million for Stage-1 of 10 years. At the end of Stage-1 the loan outstanding would have come down to US$ 60 million assuming all payments are paid regularly.
    - Stage-2
      - Consortium-2 (C-2) would take over the outstanding loan of US$ 60 million at this stage by paying out US$ 60 million to C-1.
      - Any overrun or default would be treated as a separate loan; this would be assigned to a new consortium (C-21) on terms prevailing in the market for the risk class the project finds itself in at that point of time.
      - C-21 would take-over the additional loan by paying out the amount to C-1. With this C-1 would have received all its dues and C-1 goes out of the system.
      - In case of default and/or overrun, the risk profile of the project would increase and hence C-2 will have the right to increase the interest-rate. A general rule mentioned in the original agreement is: For every 1 % increase in the loan outstanding the rate of interest shall be increased by 10 basis points.
      - In case of prompt or faster repayment of the loan during stage-1, the risk profile of the project/SPV would be lower and hence, the SPV can claim lower rate of interest with C-2.
        - General rule mentioned in the original agreement is reduction of 10 basis points in the interest-rate for every 1 % extra-reduction in the quantum of loan.
        - SPV can also explore the market to find an alternate consortium that can offer competitively better rate of interest than C-2.
  - Stage-3:
    - The events of the first transition should not affect the commitment of C-3 for funding Stage-3. C-3 would take-over the loans by paying out US$ 30 million to C-2.
    - The rate of interest shall be governed by the original agreement and the risk-profile of the project/SPV as assessed by rating agencies.
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pay the outstanding amount to C-3 so that C-3 can go out of the system fully relieved and satisfied. Govt. may use the residual assets of the project in appropriate manner and minimize its losses.

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Supply Chain Management and Marketing Integration: A Major Source of Competitive Differentiation

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Abstract

The goal of Supply Chain Management (SCM) and marketing integration is to create unique competitive advantages by linking together customer values with a more effective flow of products and goods. This paper supports the emerging view that SCM strategy and marketing strategy are highly connected. Understanding barriers of SCM and marketing integration is crucial for firms in achieving competitive advantages. This research works in this direction and provides conceptual frameworks as well as models for integration of supply chain and marketing functions. It also emphasizes role of supply chain and marketing integration in delivering the right product-in the right quantity, at the right location, and at the right price.

Key words: Supply Chain Management, Marketing, Integration, Collaboration, Customer Value Proposition

Introduction

Many organizations while focusing on developing sophisticated supply chains had become myopic and lost sight of their markets and customers. The customers, failing to realize their expectations, in turn, had switched their loyalties. It is highly essential to understand the marketing perspective also while focusing on supply chain decisions (Walters, 2006). Marketing combined with dynamic supply chain management provides greater flexibility to satisfy customer demand based on the needs of individual customers and their value to a company.

Supply Chain Management (SCM) refers to all of the processes, technologies, and strategies that together form the basis for working with internal as well as external sources of supply. SCM is the collaborative design and management of seamless value-added processes to meet the real needs of the end customer (Fawcett and Magnan, 2004). While, marketing management refers to all of the processes, technologies, and strategies that companies use to generate and sustain demand. Marketing is primarily concerned with identifying and satisfying customer needs and wants which clearly involves directing the flow of goods and services from producers to end customers.

Conflict between SCM and Marketing: Major Areas

Conflicts arise in the organization between SCM and marketing departments due to differences in their perspectives and focuses on the deliverables. Marketing stresses on the revenue maximization while SCM works on cost minimization. The main areas of conflict between SCM and marketing are summarized below:

2. Availability of Data and Information: Limited data availability restricts better control, hinders decision-making capability and ultimately results in increased level of conflicts.
4. Crisis Handling: Crisis situations and event handling roles remains undefined.
5. Failure Handling: Responsibility and ownership in case of under achievement of targets and failure.

Table 1, below contains a list of often-heard and complementary issues from SCM and marketing managers.

<table>
<thead>
<tr>
<th>Marketing Issues</th>
<th>SCM Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inadequate production capacity</td>
<td>1. Inaccurate long-range sales forecasts</td>
</tr>
<tr>
<td>2. Very high production and distribution lead time</td>
<td>2. Imprecise short-range sales forecasts</td>
</tr>
<tr>
<td>3. Insufficient inventory of finished products</td>
<td>3. Excessive inventory of finished products</td>
</tr>
<tr>
<td>4. Insufficient product assortment</td>
<td>4. Too large a range of product availability calling for small, and uneconomical production runs</td>
</tr>
<tr>
<td>5. Very high supply chain and field service costs</td>
<td>5. Unrealistic requirements for customer service, product delivery time and quality standard</td>
</tr>
<tr>
<td>6. Resistance to and even insufficient execution of product customization process that enhance market competitiveness</td>
<td>6. Unnecessary and / or costly product customizations and design changes</td>
</tr>
</tbody>
</table>

(Source : Developed by Author)

Rational analysis can play an important role in resolving these conflicts by allowing managers on both sides of an argument to objectively evaluate and reconcile their differences.

**SCM and Marketing Issues: A Major Cause of Sub-Optimal Performance**

The deleterious results of not integrating the SCM and the marketing efforts are becoming increasingly evident. SCM operations chronically underperform if they fail to analyze and respond to the needs of end customers. A company can't reach its full potential in terms of developing, refining, supporting, or delivering products and services without using marketing insights to shape and refine the SCM. The company may achieve economies of scale in production, but it may lose opportunities for product refinement, enhancement and breakthrough performance. Specifically, divergence of SCM and marketing results in:

1. **Sub-optimal product development as consistent and timely information on customer needs doesn't flow across the supply chain partners.**
2. **A lack of product and service differentiation as customer information doesn't flow to supply chain functions, leading to commoditization and relentless pressure to consistently reduce cost from supply chain processes.**
3. **Inefficiencies as companies can't provide the necessary back-office supply chain resources to customers according to their value to the company.**

It's impossible to execute a marketing strategy that meets the unique needs of individual customers – cost, quality, variety, delivery, service – if the underlying support capabilities of SCM can't deliver. SCM and marketing that is not effectively tied to each other results in:

1. **Under delivering:** Front office marketing strategies and processes will increase customer interactions and customer expectations. But if the back office SCM process can't deliver on front end promises, customer satisfaction decreases.
2. **Over delivering:** Marketing processes and strategies that don't provide information sharing on cost transparency with SCM may result in delivering products or services that are unprofitable.
3. **Lost share of customer opportunities:** Without SCM and marketing integration, the supply chain can't capitalize on the customer needs information that marketing uncovers, and marketing can't implement new product development strategy that profitably increase the scope of its offerings.
The failure of SCM and marketing integration is a significant barrier to identifying and responding to customer demand, optimizing inventories and production runs, exploiting sales and product development opportunities, and servicing the customer base (Madhani, 2012). It also leads to either excessive inventories or out-of-stock situations. Poor collaboration leads to this situation internally, as well as up and down the external supply and marketing channels (Madhani, 2011).

The formation of SCM and marketing efforts that tend to be linear and sequential causes the inability for an individual firm to excel at more than one discipline at a time. At the same time data and information can’t be effectively shared among supply chain partners, customer-driven insight cannot be utilized in the system, operational inefficiencies can increase manifold, and opportunities for value creation can be lost permanently. SCM and marketing decisions in many companies are made in a sequential and uncoordinated manner, as shown in Fig. 1.

SCM and Marketing Functional Issues: Major Learnings
Following are well known examples of divergence of SCM and marketing activities. These examples are from different sectors viz. Auto, Computer, Consumer and Retail and companies discussed are Volvo, HP, Campbell’s (Lee, 2001) and K-Mart (Madhani, 2010) respectively.

Volvo
In the mid-1990s, The Volvo Group - a Swedish producer of commercial and passenger vehicles (The company sold its car division to Ford Motor Company in 1999) found it had an excessive inventory of green cars at mid year. In order to reduce the inventory of green cars, the sales and marketing department began offering a host of promotional incentives through discounts, deals, and rebates on green cars to distributors. Because of great promotional efforts, sales of green cars soon picked up. However, the company’s supply chain department was not aware of the promotional campaign and erroneously concluded that customer demand for green cars was the impetus behind the demand spike. As sales increased, the SCM group decided to produce even more green cars to meet perceived customer demand. At year’s end, Volvo had a substantial inventory of green cars due to divergence between its SCM and marketing.

Hewlett-Packard (HP)
In 1995, Hewlett-Packard (HP) also learned a hard lesson from the lack of coordination between SCM and marketing when it first introduced the Pavilion (its home personal computer) in the market. When demand for the Pavilion started to fall due to aggressive price cuts by its competitors viz. Compaq and Packard Bell, the SCM group of HP decided to curb production of the Pavilion, only to discover later that their sales and marketing department had decided to match the competition’s price cuts. The end result was that HP faced crippling stock-outs of the Pavilion during Christmas season.
Campbell's Soup's

Campbell's Soup's promoted the chicken noodle soup product heavily around the winter season, when demand usually remains very high. The end result was that an even greater spike of product demand occurred in the winter season. In order to meet this sharp increase in demand of chicken noodle soup, Campbell's had to prepare the chicken well in advance in large quantities in the spring period, using excessive storage capacity for the chicken and other ingredients of chicken noodle soup, and deploy full production capacities during the winter season for large scale production of soup. In fact, production facilities were used at peak level round-the-clock during the winter season. In order to make enough room for such huge production capacities in the winter, Campbell's had to manufacture other products in advance, leading to high inventory of such products and subsequently more storage needs. The overall result was that the increase in revenue due to the increased demand of chicken noodle soup stimulated through promotion scheme was weighed down by the huge production costs incurred to produce the product. The lack of detailed cost analysis of the real production cost of chicken noodle soup in pricing and promotion decisions led to considerable strain on operating and financial performance, what Fortune Magazine termed “the Dumbest Marketing Ploy Ever” (Sellers, 1992).

K-Mart

A core theme of K-Mart's marketing communication (MARCOM) strategy was to issue promotional pamphlets and circulars for promoting sale items. The mailers increased store traffic and invariably increased retailer SCM is focused on the supply chain; marketing is focused on the demand chain. But when viewed as a whole, these two strategies combine to form the overall value chain. This is a basic premise of SCM and marketing integration. While SCM deals with the buy-side of the enterprise, marketing management addresses the sell-side of the enterprise. Tackling one independently of the other, leads to sub-optimal solutions. SCM has traditionally sales. However, the marketing efforts were not tied into SCM operations. As a result, there were frequent shortages of promoted sale items. Customers came in to buy the promoted ‘sale’ item, were frustrated that it wasn’t in stock, and left the K-Mart store with disappointment.

K-Mart's repeated out of stock item notices were major cause of customers' grievances. After several such repeated experiences, customers began ignoring the K-Mart's promotional flyers altogether. Furthermore, after finding out that promotional flyers and pamphlets did not work well, K-Mart announced a new retailing strategy in 2001. According to new marketing strategy K-Mart decided to stop the weekly flyers and tried to lure customers by cutting prices on thousands of store items. But as customers were not informed of the price cut, this resulted in sales drop for K-Mart. Lack of coordination between SCM and marketing generated a brand nightmare and failure of K-Mart's marketing strategy (Madhani, 2010).

SCM and Marketing Integration: Key Strategy for Competitive Advantages

Integration of SCM and marketing decisions should be a prime concern of any profit maximizing firm. Firms that have linked their SCM and marketing management capabilities helps SCM and marketing managers reconcile the issues (mentioned earlier in Table 1) between opportunity losses due to insufficient capacity for meeting unexpectedly high demand and real losses due to excess capacity for meeting forecasted demand that is not realized. If SCM and marketing integration is achieved, it results in bringing often conflicting objectives more closely together. The congruence between the objectives of the marketing concept (to mobilize total organizational effort to satisfy customers and generate a profit) and the concept of SCM (to link organizational and inter-organizational units to improve levels of service and reduce costs) is key concept of SCM and marketing integration as explained in Fig. 2.

The major goal is both to reduce or if possible eliminate buffers of inventory in the supply chain and at the same time deliver what the customer demand.

considered that the customer demand pattern is exogenous. Hence, the market demand for products or services is viewed as the key input to SCM. But in fact, demand is never truly exogenous. Another important side of the organization, i.e. marketing, also uses its own instruments to influence demand for product under consideration as well as related products. These instruments include pricing, promotions (discounts,
rebates etc.), product mix or assortment, shelf management, order lead-time, and other special deals (terms and conditions, price protection, return policies etc.). A common pitfall of SCM is that either the people who manage the supply chain fail to recognize that demand was actually influenced by the enterprise’s marketing department or, conversely, the marketing department fails to use the appropriate instruments that truly maximize value of the organization. As explained earlier several organizations paid dearly for not addressing this disconnect.

SCM and marketing must work together in order to achieve organization goals. SCM and marketing integration is increasingly being recognized by business firms as a key driver for improving financial and operating performance. As this recognition emerges, SCM is becoming much more closely linked with sales and marketing and leading edge companies are making SCM a competitive edge by integrating marketing efforts of demand creation activity with supply chain capability. With SCM and marketing integration, supply chains are much more customer focused - they deliver great service at lower cost and a key ingredient of their success is strong collaboration between SCM partners, as well as marketing group where all are focusing on the customer value proposition as explained in Fig. 3.

SCM and marketing integration links marketing decisions with supply chain planning and execution decisions, so that demand can be anticipated and met with the right amount of inventory. Otherwise, either excessive leftover inventory or stock-outs will result. Real time SCM -marketing collaboration boosts and creates demand for new products. As customer data and information is shared with the SCM partners, quality enhancements and product innovation process accelerates and time to market decreases drastically. A tight linkage between SCM and marketing can improve the product strategy and overall decision making related to it. Integration of SCM and marketing can enhance an organization’s ability to introduce new products and enhancements of existing products.

### SCM and Marketing Integration: Major Barriers

Despite the inarguable benefits of SCM and marketing integration, only a small number of firms have been able to build it. The challenges of implementation are big: vastly different cultures between marketing (customer relationship, sales and service) and SCM functions; hard-to-match information, measurements, and incentives; and increased concerns about relentlessly accelerating customer needs and expectations. Understanding barriers of SCM and marketing integration is crucial for firms in achieving competitive advantages. Following are three such barriers:

**Vastly Different Culture Between SCM and Marketing Operations:** Many firms have had big success in SCM and marketing initiatives when measured in isolation as a stand alone function. SCM managers in most firms have made significant progress in reducing time and costs in production, procurement, and distribution, while improving product and service quality, and managing
inventory. At the same time, managers in customer-facing front end functions such as marketing, sales and services have been improving customer loyalty mainly through marketing and CRM initiatives. However, in most firms these SCM and marketing/CRM initiatives typically have operated independently. In part, this is due to the long-established practice of functional excellence – managers of SCM (including production, warehouse and distribution) and marketing focused on improving their piece of the overall value chain.

Fearing loss of control, they often become resistant to cross functional initiatives that may tamper with their finely tuned close loop operations. Further amplifying the gap between the SCM (or supply side) and marketing (or customer side) are differences in their working styles. Because they are continually measured on improving the way goods are produced and delivered, SCM people are process-oriented and thus more focused on operational details and rooting out workflow inefficiencies. On the other hand, marketing people are product oriented and thus focus more on identifying needs of customer segments, buying patterns, new product introduction, product enhancement and marketing communications.

Incompatible Information, Performance Measurement, and Rewards System: The incompatibility of information, performance measurement, and incentives of SCM and marketing management related functions often don't match. SCM managers keep their own information on customer orders and shipments records; marketing and service people keep their own records on those customers, in different systems and formats that can't be integrated easily with the data that SCM managers possess. But incompatible information and technologies are not only point of the difference. Performance measurement and reward systems can be so incongruous that SCM and marketing managers won't even identify ways of creating mutual benefits. For example, SCM managers rewarded on achieving the lowest costs of production and distribution, will view products and delivery customization as a threat to their operating performance. On the marketing or customer-facing side, the monthly sales incentives that drive higher sales also drive huge artificial peak in product demand, followed by drastic drop-offs as the next delivery cycle gets underway, causing much higher production and logistics costs in the supply chain.

Constantly Increasing Customer Expectations: In this era of globalization, customers are getting overly accustomed to faster delivery times, customized products and delivery options, and continually ask for more. Hence, increased customer expectations create strain in relationship between...
SCM and marketing functions.

How to Achieve SCM and Marketing Integration?
Overcoming the challenges to integrate SCM and marketing in a firm begins not with a huge business process overhaul or the creation of a new corporate structure. Rather, it starts with the integration of key linkages between the supply and demand sides of the firm. By connecting and sharing collaboration-based information, SCM and marketing management functions can take several big first steps toward aligning themselves with overall business goals. With SCM and marketing integration, the market side's knowledge of the end consumer's needs and behavior is combined with the logistics' knowledge of how demand is being satisfied through product availability, effective flows and correct information.

In order to achieve SCM and marketing integration there are both internal and external alignments to consider. Internal alignment focuses on putting together SCM and marketing efforts. Based on SCM and marketing a common demand chain strategy is created. The external alignments include customer relationship management that target customers and perform one-to-one marketing and it also maps the customers' explicit and implicit needs and requirements. Customer value is created through well planned, systematic use of market knowledge to shape flexible logistic and supply chain systems. The flow of goods and services must be adjusted constantly according to the development of the customers and the market. Conflicts between SCM and marketing are very common and widely prevalent in the industry. In the cross functional environment, if such situation is not controlled at the initial stages, it can aggravate in to a fireball giving rise to chaos, buck passing and loss to the company. The conflicts could be handled or rather avoided by:

1. Integrated system:
   a) Use of communication and information technology (IT) is vital in managing dynamic interface of various functions of the organization such as SCM and marketing.
   b) Use of standardized IT system for data collection and acquisition, for better visibility in the forecasts, customer behavior and marketing effectiveness.

2. Analytical tools:
   a) Usage of analytical tools for planning processes and policy decisions like inventory policy (finished goods and WIP), forecasting models, logistics optimizations for maximizing product availability and minimizing cost.
   b) Extensive market research provides a constant stream of inputs into the product development process rather than discrete decisions in batches.

3. Role and Job definitions:
   a) Restructuring of the process flows for control on activities of the entire cross-functional areas.
   b) Performance linked job and role definitions for process owners and teams.
   c) Locating various business functions in close proximity allows the various functions to coordinate and take joint decisions very quickly.

4. Alignment of KRA and KPI:
   a) Linking of KRA (Key Review Areas) and KPI (Key Performance Indicators) of the SCM and marketing functions for avoiding conflicts.
   b) IT based performance management for visibility and faster corrective actions.

Conclusion
The globalization of manufacturing and distribution, increasingly demanding customers, and tightening firm margins have raised the stakes for retailers, consumer products, manufacturing, transportation and distribution companies. During recent years, firms all over world have tried to make the supplies and flows of product and goods more efficient. In this era of globalization and intense competition, great efforts have also been made to cut costs and adjust flows in supply chain to increase profits. The goal of SCM and marketing integration is to create unique competitive advantages by linking together customer values with a more effective flow of products and goods. The flow must always be refined and create customer value proposition in a constantly changing market. By encouraging SCM and marketing people meet in new interesting scenario, firms can develop unique competitive advantages. SCM and marketing integration helps in enhancing customer value proposition by delivering the right product - in the right quantity, at the right location, and at the right price. This paper supports the emerging view that SCM strategy and marketing strategy are highly connected.

References


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Abstract
Currency carry trade has been widely observed in post Brettonwoods financial markets. Significant interest rate differential between funding and investing currencies make carry trade profitable. However, returns of the carry trade strategies have been found to be negatively skewed and had positive kurtosis. This paper presents the status of research surrounding currency carry trade. The discussion includes economic theory - failure of 'uncovered interest rate parity' leading to carry trade, noticeable incidents of carry trade, detection methods, common strategies adopted by market participants, return and risk characteristics, implication for market participants and macroeconomic policy making, and consequences of reversal of carry trade.

Key words: carry trade, uncovered interest rate parity, skewedness, kurtosis, Sharpe ratio, VaR

Introduction
One phenomenon has been widely observed in foreign exchange markets since 1973-the year markets started determining exchange rates. One word referring to that phenomenon has also caught imagination of financial media for last few years. The word for this phenomenon is 'carry trade.' Learning of the dynamics of foreign exchange market is incomplete without understanding carry trade. So, what exactly is carry trade? Does it impact foreign exchange rates in short or long term? What are its implications for market participants and policy makers? Carry trade is defined as a strategy where the trader borrows (goes short) in a low interest rate currency and simultaneously lends (goes long) in a high interest rate currencies (Plantin & Shin, 2007). Generally low return currencies such as Japanese yen, Swiss franc and recently even US dollar are borrowing (source) currencies and high return currencies like Indian Rupee, Indonesian Rupiah, New Zealand Dollar, Australian Dollar, Brazilian Real or South African Rand are investing (target) currencies. The trader, for example, borrows in Japanese Yen, converts the Yen into New Zealand Dollars and invests New Zealand Dollar for a specific maturity.

At the same time, the trader also sells New Zealand Dollars in forward market so as to pay back the borrowed Japanese Yen. In broader terms, asset shift from low interest currency to high interest currency like emerging market debt, equities, real estate and even commodities in an international portfolio is classified as carry trade (Jorda & Taylor, 2009). Interest rate differential between currencies has to be significant enough to compensate for exchange rate risk (Cavallo, 2006). Hence, carry trade rarely involves major currencies as target currencies but always has emerging market currencies as one. Some studies have found carry trade and reversal of carry trade to be responsible for short term, significant unidirectional movement in foreign exchange rate, and responsible for certain currency crashes also (Burnside, Eichenbaum, Kleshchelski, & Rebelo, 2011). The carry trade in foreign exchange market has been so common in developed countries that retails investors also regularly indulge into this kind of trades and Bloomberg has a page showing daily returns on different pairs of currencies. Adopting standard carry trade strategy as demonstrated above, renowned investment bankers like Credit Suisse First Boston, Deutsche Bank and Barclays, Capital have introduced 'carry trade indices' since 2007.
Carry Trade and Economic Theory

In real world, carry trade is profitable because of significant interest rate differential between currencies. However, according to economic theories, carry trade should not exist or should not be hugely profitable. Foreign exchange markets are said to be operating under a state of “covered interest parity” (Jorda & Taylor, 2009). Interest rate differential between two currencies should be exactly reflected by the gap between spot and forward exchange rate of these currencies. High interest rate currencies are at a discount and low interest rate currencies are at a premium in forward markets. Economic theory also suggests that “uncovered interest parity” operates (Jorda & Taylor, 2009). As per uncovered interest parity, high interest offering currencies should be compensating the investors for the risk of investing and high return currency shall depreciate. In other words, forward market rates should be a good estimate/indicator of the expected future spot rate. However, in real world, uncovered interest parity has failed to hold its ground for last thirty years or so. A number of academic studies have shown that high interest rate currencies tend to appreciate and low interest rate currencies tend to depreciate – the reverse of uncovered interest parity (Jorda & Taylor, 2009). Carry trade, in a way, is a bet against uncovered interest parity. The failure of uncovered interest parity is no secret to participants of currency markets and it is so well accepted that it is termed as 'forward premium puzzle' in academic studies.

Historical Incidents of Significant Carry Trade

Carry trade exists since 1973. However, carry trade in currency market becomes distinctively visible during periods when interest rate differentials between currencies are wide and a large number of market participants are entering into carry trade. One of the earliest incident of currency carry trade occurred between 1981 and 1984. In order to control reining inflation, Paul Volcker led Federal Reserve had set high interest rates in US resulting into large amount of capital flowing from low interest rate countries like Japan to US (Gagnon & Chaboud, 2007). During this period, carry traders made a killing from not only interest rate differential but also strongly appreciating US Dollar. Also, during formative days of European Monetary System is a good source to detect carry trade. Information pertaining to capital flow in the internaional banking system is a good source to detect carry trade in a market. Bank of International Settlements regularly publishes international banking statistics with this information. Banks acting as primary intermediaries provide loan in funding currency and also accept deposits in target currencies. Banks, through their proprietary trading books, may be having their own currency carry trade position, showing liabilities in funding currencies and assets in target currencies.

Off-shore financial centres like Cayman Islands, Bahamas, Caribbean countries and European principalities generally host a large number of hedge funds and other speculative traders (Becker & Clifton, 2006). Bank and financial data originating from these centres is an obvious place to look for carry trade activities.

Also, carry trade activities leave their footprints on foreign exchange markets for apparent reasons. Hence, data on futures positions and Over the Counter transactions in the currency spot forward and swap market is a potentially rich source to detect the carry trade in a market.

Strategies and Participants

Carry trades are implemented in currency spot and derivatives markets with varying degree of complexity by financial institutions and retail investors. One of the simplest strategies of carry trade, particularly relevant for emerging markets, is exchanging borrowed currency for target currency and investing the target currency for short term in bank deposits or government securities till maturity.
A somewhat more complicated approach of this strategy may result into simultaneous position in currency spot, futures, interest rate swaps and options market (Plantin & Shin, 2007). Retail investors also use margin accounts with brokerage houses to take leveraged positions across markets establishing carry trade positions.

Another strategy, favorite of retail investors is to diversify their portfolio by holding high return assets denominated in foreign currencies. Foreign currency/assets portfolio of Japanese retail investors (held through investment trust funds) is a very notable example of this strategy.

Borrowing in lower interest foreign currencies to finance purchase of domestic assets is another approach employed by retail investors. For example, retail investors in eastern and central European countries have borrowed in Swiss francs to finance their real estate assets. Unlike the regular carry trade, this kind of carry trade cannot be reversed quickly.

Investors can also enter into carry trade through some of the carry trade related structured indices available for last three years (Jurek, 2008). Deutsche Bank has floated DB Harvest, Barclays Capital has GEMS Asia Index and Intelligent Carry Trade Index and CSFB has introduced Rolling Optimized Carry Trade Indices.

Risk and Return of Carry Trade
Earning return from carry trade is analogous to “picking coins in front of a steamroller.” The trader has a long run of small gains but once in a while he gets squashed. In other words, this means a steady stream of profits from interest rate differential gets wiped out by a large, sudden shift in exchange rate in adverse direction.

An interesting study of risk and return of carry trade involving 10 pairs of currencies (including Indian rupee) was published by Bank of International Settlements in December 2007. The study encompasses a period from January 2001 to September 2007. It found that carry trade returns outperform returns from major equity markets of the world during this period. Carry trade strategies analyzed, yielded average returns that seemed extraordinarily high relative to their risk measured in terms of volatility. The study showed that carry trades have much higher Sharpe Ratios – which expressed return for a unit of risk measured as standard deviation- than equity markets. One of the interesting finding was that the return distribution was negatively skewed (long tail in negative direction) and had positive kurtosis (heavier than normal distribution) (Gyantelberg & Remolona, 2007). The negative skew reflects the presence of occasional large losses for traders. However, negative skew was less pronounced for target currencies Indonesian rupiah, Indian rupee and Philippine peso that were under managed float (Jylha, Suominen, & Lyytinen, 2008). Also, because of negatively skewed of return distribution, volatility (standard deviation) underestimates actual risk. For such a distribution of returns, tools like Value at Risk (VaR)- which focuses more on down side risk - is better suitable to measure risk of carry trade returns.

In view of these findings, attractiveness of carry trade among currency players can be very well understood. At the same time, player should not be blind to occasional potential large losses highlighted by the study. Each of the historical examples described above – periods when currency speculators earned handsomely from the carry trade- has ended with rather superfast reversal in fortune of traders. In one week of 1998 (October 4-10), Japanese yen appreciated 16% against US dollar, thereby suddenly reversing years of profitable carry trade from low interest currency to high interest currency. Returns on carry trade rises through stair case but declines through elevator (Brunnermeier, Nagel, & Pedersen, 2009).

Implications for Financial Markets and Monetary Policy
Carry trade has notable implication for both financial markets and monetary policy. Presence of carry trade in currency market explains appreciation of high interest rate currencies and depreciation of low interest rate currencies. Swift reversal of carry trade also explains periodic high volatility in exchange rates. Carry trade also underlines the importance of basic financial tenets like law of one price or exploiting arbitrage opportunities. Carry trade offers returns higher that broad equity markets for comparable risk. This creates a dedicated class of investors who are regularly indulging into carry trade. At the same time, carry trade also highlights speculative dimension of currency market.

Further, implications of carry trade for monetary policy should be seen in the light of role of reference rate in carry trade, efforts by authorities to control capital flows and spill over effect of carry trade in general economy. Short term reference rate set by central bankers (like repo and reverse repo rate in India and Fed funds rate in US) acts as a signal to carry traders. These rates influence the scale of carry trade and duration of investment or asset holding. The effects of
carry trade usually do not remain confined to currency markets and spill over to general economy and have been found to pump air in asset bubbles. According to a study sponsored by Institute of Economic and Monetary Studies, Bank of Japan, in lead up to subprime crisis of 2007-08, buying of mortgaged assets and related derivative securities like CDO, CDS etc by hedge funds and financial institutions were in part financed by money originally borrowed in Japan. This is the reason why, during the early stages of crisis, both asset prices and US dollar were falling together and Japanese yen appreciated substantially (Hattori & Shin, 2009). It would not be ambitious to say that analysis of carry trade can assist predicting currency crashes. Managers of an economy are justified in imposing tax on capital inflows and outflows (Tobin Tax) as this tax curtails returns to speculators including carry traders and controls asset prices and short term, significant appreciation of target currency. Such tax also restricts sudden reversal of carry trade.

Conclusion
Carry trade has been part of global financial landscape for last thirty years. It will remain part of the same for foreseeable future, whether someone likes it or not. Carry trade has a definite economic role in financial markets. Ease with which the trade can be carried out makes it very attractive to all kinds of investors. However carry traders should not be forgetful that small potential gains are interspersed with large potential losses also. And at the last, carry trade should not be viewed as pure foreign exchange transactions only. Its implications for exchange rate movements and real economy needs to be considered while designing economic policies.

References


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This play-book on strategy is a practical endorsement of Alvin Toffler who stated some four decades ago that 'the age of permanence is dead.' Conventional thinking on strategic management has been based on the concept of long-term sustainable competitive advantage. Rita Gunther McGrath, based on her extensive teaching and consulting exposure, tells us through this book, that today’s business environment is extremely volatile and uncertain, and hence focusing on long-term sustainable competitive advantage is like waiting to quench your thirst from the mirage; or simply it is like waiting for Godot. Instead, the author advises us to focus on the transient, short-term competitive advantage that may exist fleetingly. Did not Keynes say that in the long run we are all dead?

Transient Competitive Advantage is about exploiting at short notice, the opportunities thrown open by the dynamic environmental factors of all businesses today. The author articulates the need for a new strategic logic that alerts a business about ‘when, where, what and how’ to surf the emerging space of transient competitive advantage as a means of survival and growth.

Today the customer-preferences, purchase-behaviours and buying channels are changing faster than the time a business takes to articulate sustainable competitive advantage in place. Porter, Prahlad and Hamel based their theories and prescriptions on the bedrock of sustainable competitive advantage. Their relevance is becoming increasingly questionable in the face of volatile markets and opportunities of today. So businesses would do well to develop a new paradigm to adopt transient competitive advantage to be the winner. This has to be done with speed and precision. Says McGrath, “Diverse clients like DuPont, Nokia, Intel and IBM were all beginning to recognize the traditional approaches to strategy and innovation weren’t keeping pace with the speed of the markets in which they were competing”. The same argument is echoed by Rich D’Aveni (Hyper Competition – Managing the Dynamics of Strategic Manoeuvring, Free Press 1994) when he said ‘the competitive advantages of firms would fast be competed away.’

The author attributes the failure of a long list of firms (Sony, Blockbuster, Circuit City etc) to their inability to realign to this new paradigm. Within the industry, a firm must be able to move from one arena to another to take advantage of the short term and short lived opportunities. Successful firms were able to migrate from one product segments to another at phenomenal speed and agility. The advent of iPhone in 2007 has totally transformed the mobile phone segment though mobile phone industry remains the same. There are any number of examples to prove this point, almost in all industries where the industry remains relevant but the arena is fast changing. How to compete and win in the fast changing short lived business opportunities? Experience of many firms indicates that embracing transient competitive advantage is a powerful solution. Some of the tactics engaged by these firms in the re-alignment process are:

- Critical resources are controlled by an exclusive group within the firm to scout for short term opportunities and deploy the resources without much of procedural wrangles.
- The firm should be able to move quickly out of an established opportunity to take advantage of short term gains that may be more lucrative.
- Should be able to exit a business without much adherence to systems and procedures.
- Disengagement to be seen as a part of normal business process without much of excitement or sentiments.

Reviewed by Rajashekar Narasimhan
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• Failures are to be anticipated and experiences gained out of the failures should pave way for future successes
• The planning process should be flexible to accommodate the flow of new information
• There should be enough flexibility in asset utilization
• Should take the risk of pulling the resources out of a successful business to fund the more risky business.
• Should be easy to access senior leaders and be candid with them.

**Continuous Reconfiguration:** Firms that can reconfigure their assets, people and capabilities quickly are capable of benefiting from Transient Competitive Advantages. Reconfiguration of people’s skills is perhaps the most critical capability in achieving the re-alignment in the fastest possible time. A few of the critical areas where reconfigurations required are, moving from extreme downsizing and restructuring to continuous morphing and changing, balanced emphasis on all the phases of the competitive cycle, stability with dynamism, flexible deployment of resources, single vision with variety in execution.

The book is replete with cases of such firms. Infosys commenced operations in 1981 with the competitive advantage of low people-cost inherent in India, has been able to move to services such as independent software testing and enterprise applications with the right dose of reconfiguration. Milliken which was started with the focus on Textiles and Chemical has been able to transform in to making speciality materials and high IP speciality chemicals. Companies like Netflix, HDFC Bank, Yahoo Japan, Cognizant technologies have also been cited as the ones that were successful in reconfiguration. Firms that deftly handle seemingly incompatible situations, consistent in their core strategies, cultural norms, deploying multiple capabilities and customer relationships are best suited for benefiting from transient competitive advantages.

**Healthy Disengagement:** ‘When to stop doing an existing thing’ is as critical as ‘when to start doing a new thing’ while embracing transient competitive advantage. Some activities may have to be stopped almost abruptly as they may not contribute to significant growth or in some cases they may become a commodity in the backyard. In such cases, a radical and rapid disengagement is mandatory. In a declining phase of the firm’s life-cycle, *the business drops off faster than expected*. The leading indicators of disengagement are diminishing returns to innovation, increasing commoditization and diminishing returns to capital employed. The author cautions: While disengaging, the firm

- should move from defending an advantage to-the-bitter-end to ending advantages frequently, formally and systematically;
- should draw and document critical lessons learnt from such disengagement;
- should exit steadily and subjective early warnings should take precedent over objective analysis.

**Using Resource Allocation to Promote Deftness:** Identifying the right and critical resources, allocation and quick redeployment of resources depending on available business opportunities are crucial to exploit transient competitive advantages. *A transient advantage oriented firm allocates resources to promote what I call deftness-the ability to reconfigure and change processes with a certain amount of ease and quickly* says the author. In a firm aligned to transient competitive advantages, the assets are continuously redeployed; they are not owned by any department permanently. Assets are organized around opportunities than squeezing opportunities to existing assets. Leveraging external resources are preferred to building assets. By partnering with other companies and leveraging resources proved to be much more profitable and less time consuming; this became apparent in the joint venture (Avanade) between Accenture and Microsoft that began in the year 2000. Accenture was good at building alliances with its own industry expertise and skills at scaling operations. This has helped to create Avanade using Microsoft technology. The growth achieved by Avanade is mind boggling. The joint venture was announced in the year 2000 and in just a year the JV was operating in ten countries and has captures 120 of its high value customers awarding 150 projects. By 2010, 11000 people worked at Avanade and the company had completed thousands of projects and achieved sales of $1 Billion.
Building Innovation Proficiency: The author argues that the primary focus of a firm should be on following transient competitive advantage and innovation should be seen as an ongoing systematic process with dedicated human resources, budget and governance process in that direction. She further argues that the assumptions of innovation should be tested at work place irrespective of the outcome. Failure should be studied and analyzed with as much precision and priority as success. Only then will the firm learn to avoid mistakes in its core processes. This is the basic premise on which the nurturing of innovation is built upon. The sub-processes of ideation, discovery, incubation, acceleration and commercialization follow only the basic premise. Cognizant is cited as one of the firms that supports this framework with a heavy dose of technology.

The author lauds the partnership of HDFC Bank Mobile Bank Account and Vodafone m-paisa as one of the latest in successful innovations in the area of financial inclusion that would help millions of rural Indians with access to banking and money transfer. This partnership is considered a pioneering innovation as it had the potential to connect rural people from remote areas to the bank through Vodafone network. This is an example of transient competitive advantage by the partnership given the fact that there are only 89,000 bank branches to serve 600,000 habitations.

The Leadership Mind-Set of firms facing Transient Competitive Advantages: Firms that follow the path of transient competitive advantage and their leadership acknowledge that existing competitive advantages would not last forever, and hence encourage discussions that question the sustainability of current status. Leadership of such firms focuses more on scanning of the external environment to scout for signals of disruptions. A classic example to this phenomenon is the initiative of Jack Welch, close to the millennium, to engage teams in each SBU to explore the prospects of disruptions to its own line of business; in fact he encouraged such teams to innovate new ideas to disrupt their own businesses with the sole intention of keeping control of the future businesses within the firm. Jack Welch created an exclusive website www.dyb.com (dyb stood for ‘death to your business’) to promote and popularize this initiative.

What does transient advantage mean for Individuals? If the era is characterized by accelerating changes, individuals too should make themselves agile and adaptable to short-term opportunities thrown open to them. Individuals, instead of depending on organizational systems, should up-skill themselves to be in sync with the industry trends so that they can remain in the competitive advantage space. Broadly, the individuals should look for series of enhancing engagements than a career path in the same organization. Instead of looking for hierarchical growth in the same firm, individuals would do better to become individual super stars to be engaged by any company that takes advantage of transient competitive advantages.

The book has a racy style, full of case-histories to make it very readable. It has tried to have a simple narration of things that are complex. When Alvin Toffler talked about changes happening at an increasing pace it sounded futuristic. Today, after almost half a century, when the impact of such a continuing transition on products, processes, systems, organisations, businesses, economies and above all on individuals are beginning to be experienced, it is no more a prophecy. Rita Gunther McGrath’s narration is about this transition and the competitive realities; the author has attempted to give us a prescription for survival. Clayton Christensen sums up the essence of the book thus: "It acknowledges the competitive realities but shows a clear path forward. It is one of the most illuminating takes on how to deal with disruption that I have ever read."

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