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LIGHT TO ENLIGHTEN

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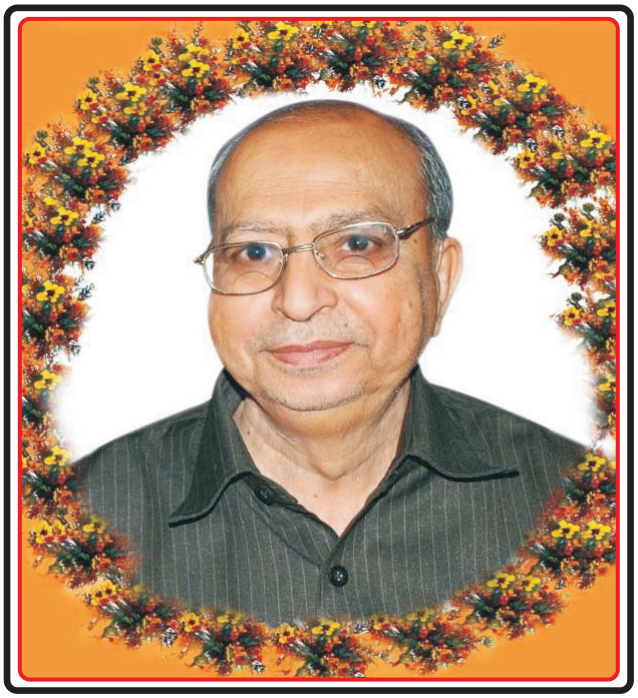
[UNDER THE AEGIS OF KAMAL EDUCATIONAL & WELFARE SOCIETY (KEWS)]



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EDITOR'S PAGE

We are happy to launch the third issue of "Trinity Journal of Management, IT & Media **(TJMITM)"**. The present issue incorporates 10 research papers-05 from management, 04 from IT & Computer Science and 01 from media. All these papers were presented in the 2nd National Conference of Trinity Institutes held on 17 March, 2012. With this issue, TJMITM is completing three years of uninterrupted publication. During all these years, we have received unstinted support from our Editorial Board without which it would not have been possible for timely publication of the journal. We also received constructive feed back from the readers and contributors for improvement in quality. I express my sincere thanks to our Editorial Team members for their dedication and involvement in printing the 3rd issue of TJMITM.

Since the year 2008, the Indian economy is passing through very critical stage. There is not much change in the situation in 2012. India is facing the pinch of recession in its GDP along with the other advanced countries in the world. Keeping the same in mind, the 2nd National Conference was arranged on the topic: INDIA-Survivor of Economic Recession. We received around fifty research papers for presentation in the said conference. Out of the 50 received papers, this issue carries only ten research papers. This is due to space constraints. The left out research papers are very much worthy for publication in other national and international journals.

This journal is an acclaimed platform for young academicians and researchers to inspire and motivate them for disseminating their research papers, research articles, literature reviews, case studies and book reviews etc. Volume3, Issue 3, 2012 of TJMITM covers a regular mix of articles and research papers from Management, Banking & Insurance, IT-Computer Science and Media. All the papers open up new dimension of research in the identified areas, such as, *India as the Emerging Economic Super Power, Indian Insurance Sector, Multimodal Biometric Authentication System, Expert Systems-as a tool of Knowledge Management, Recent Trends in Retail Sector in India, Requirements Engineering for Data Warehouse, Non-performing assets of Indian banks, Turning crisis into an advantage in media industry, Indian Rural Marketing, Methods of Training in Artificial Neural Networks.* My thanks to the authors who have presented the papers in the 2nd National Conference and extended their cooperation in making the conference a grand success.

On behalf of the Editorial Team of TJMITM, I extend sincere thanks to Dr. R.K.Tandon, Chairman, TIPS, who has always been a guiding force, encouragement and prime inspiration to publish this journal. We are grateful to Mrs. Reema Tandon, Manager, TIPS for her continuous support to bring out the journal in a proper form. I also appreciate Dr. L.D.Mago, Director, TIPS for his advice and suggestion in shaping up the journal.

I do hope that this issue of TJMITM will generate immense interest among researchers.

Dr.M.B.Pahari
Editor-in-Chief &
Director General, TIPS

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I, Dr. R.K. Tandon, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Dr. R. K. Tandon

(Signature of the Publisher)

'INDIA-AS THE EMERGING ECONOMIC SUPER POWER AND RECESSION CHAMPION'

Dr. Rajeshwari Malik *
Mr. Jagdeep Dahiya **
Mr. Harjender Singh ***

ABSTRACT

We all know money rules the world. Hence the economic health is the biggest parameter of the growth of any nation. Similarly economic recessions are dark realities faced by world's most of the economies whether big or small, grown or growing and even the third world. But the whole world is watching the growth of new economies like China, Russia, India, Brazil, and Mexico. These economies have faced, struggled and survived the recession better than expected by the world. This success is called 'The Rise of the Rest' the modern economic phenomenon, and is described by Freed Zakaria in his book 'The Post - American World'. The rest here means the countries other than America. There are too many questions floating in air, the major one's are: What is quantum or size of economic recession? How has it affected the various countries around the world? Which countries survived the economic recession the best? What is the status of Indian economy in these turbulent times? This secondary data based research article is an attempt to answer the above major questions and present a clear picture as to why and how India managed to survive the recession of 2008, and later.

KEYWORDS

Recession, Developing economy, economic superpower, globalization, survival strategy.

INTRODUCTION

"India is a developing economy" had been the opening statement in almost all Indian Economy books for years. But this paper is an attempt to present India as an emerging superpower, and also understand how India manages to dodge recession. To begin with let's first understand the concept of recession and depression. Recession is simply defined as "a slump in economy of a country for a minimum of two quarters of a year". In economics, a recession is a business cycle contraction, a general slowdown in economic activity. Macroeconomic indicators such as GDP, employment, investment spending, capacity utilization, household income, business profits, and inflation fall, while bankruptcies and the unemployment rate rise. Recessions generally occur when there is a widespread drop in spending, often following an adverse supply shock or the bursting of an economic bubble. Governments usually respond to recessions by adopting expansionary macroeconomic policies, such as increasing money supply, increasing government spending and decreasing taxation. A recession has many attributes that can occur simultaneously and includes declines in component measures of economic activity (GDP) such as consumption, investment, government spending, and net export activity. These summary measures reflect underlying drivers such as employment levels and skills, household savings rates, corporate investment decisions, interest rates, demographics, and government policies. The U.S. based National Bureau of Economic Research (NBER) defines a recession more broadly as *"a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP growth, real personal income, employment (non-farm payrolls), industrial production, and wholesale-retail sales".* A sustained recession may become a depression. Different economists and researchers predicted different dates for start of the most unwanted economic slowdown, but NBER declared year 2008 as the beginning of recession on account of massive slump in US economy, loss of thousands of jobs, unexpected fall in housing prices and a dramatic fall in American consumer spending. About 1.2 million jobs were eliminated in the United States between January and October of 2008. Since then-the industrialized world has been undergoing a recession, a pronounced deceleration of economic activity.

RECESSION OF 2008 AND ITS IMPACT ON WORLD ECONOMIES

The global financial turmoil that erupted in August 2007 originated in the United States, with the sub-prime mortgage market as its epicenter. In September 2008, after the collapse of Lehman Brothers, it significantly intensified and became a global financial crisis. The turmoil has been characterised by immediate and substantial spillovers from financial developments in the United States to financial markets and banking sectors in other advanced economies, by a loss of confidence and by negative feedback loops between the financial sector and the real economy, resulting in a global recession. The American economy is the most adversely affected victim of this recession. *The 2008 recession has not yet turned into a depression*. But the signs are looming large and hence no economy in the world is safe and secure. Every business is slowing down. In US and other developed nations the expatriates are leaving for native countries. In December'2007, many businesses and shops were closed. The cracks are visible even during a brief

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recession. When the markets are disrupted the effect shows. Unemployment is the greatest fear or dread of any man. America which has been home to many skilled people is now turning them out. Branches of American companies abroad are shutting down. When there are cuts in the weekly budgets, priorities changes, when job seekers are dumped it causes a big change in lifestyle. A broad survey of Americans has provided striking measures of the recession's effect on life at home and at work: People are now stuck in traffic longer, less apt to move away and more inclined to put off marriage and buying a house. The U.S. census data, revealed a dip in the number of foreign-born last year, to fewer than 38 million after it reached an all-time high in 2007. This was due to declines in low-skilled workers from Mexico searching for jobs in Arizona, Florida and California. Demographers said the latest figures were significant in highlighting how profoundly the recession affected Americans as it hit home in 2008. Findings come from the annual American Community Survey, a sweeping look at life built on information from 3 million households. Preliminary data earlier this year found that many Americans were not moving, staying put in big cities rather than migrating to the Sunbelt because of frozen lines of credit.

As USA is facing a visible recession in current times, it is evident that economists are in overdrive to review the fiscal statistics and give expert opinions. The stock markets have already created a panic situation in the country. The biggest lenders are now facing a cash crunch and for the first time they are also admitting it. Most of the credit has gone into housing, car, security and insurance schemes. Americans who have invested in such schemes have only their stocks to offer as collaterals and now are facing the brunt with embarrassing foreclosures. There has been no sustainable development in major sectors like housing, medical and small scale businesses. The US economy had reached its peak and is slowly going downhill. Jobs are being outsourced to other countries while Americans are themselves jobless. As Asian countries are getting more employment, even expatriates are returning home. India and China are major outsourcing backyards for the US. Cheap goods manufactured in China, Thailand and other poor countries have hitherto relied on the dollar power for sustenance. As the value of the dollar falls, the American dream is going to bust for many. Whether it is the shoe maker or the food chain or cola giants or even real estate developers, the earning potential has been cut. "The recession has affected everybody in one way or another as families use lots of different strategies to cope with a new economic reality," said Mark Mather, associate Vice President of the nonprofit Population Reference Bureau.

While at the beginning of the turmoil emerging market and developing economies appeared to have been decoupled from the economic downturn occurring in advanced economies, it became increasingly evident that such a decoupling was illusionary, owing to the intensity of the downturn, the collapse in global trade and the fall in commodity prices. Accordingly, the interconnected nature of the global economy led to a sharp and synchronised global downturn. Rising unemployment and reductions in working hours (no overtime, reduced working week or temporary stoppages), coupled with the scarcity of credit and concerns over possible further contractions in labour markets, among others, may explain the downturn in consumer confidence and retail sales witnessed during the past year and a half. The largest quarter on quarter reduction in the volume of retail sales for the EU-27 was recorded in the final quarter of 2008 (-0.74 %). Economic theory suggests that when a recession takes place consumers will defer some of their purchases – in particular, discretionary purchases and major purchases, such as a new car, furniture, holidays or a new house. In contrast, other types of consumer goods are considered as 'necessities', for example, food, and it is expected that demand for these will remain relatively stable even in times of recession. Among the Member States, those countries that recorded a large reduction in their overall levels of economic activity also tended to display some of the biggest reductions in retail sales. This was notably the case for the Baltic Member States, while the pattern was also repeated in Ireland, Romania, Slovenia and Slovakia. In contrast, there were a number of Member States, where despite falling overall economic activity, the volume of retail sales remained relatively stable, for example, Belgium, France and the United Kingdom. Finally, the volume of retail sales in Austria, Poland and Sweden continued to grow, despite the recession, as all three of these countries recorded a peak in sales volumes for the latest period available, namely, the second quarter of 2009.

Southeast Asia's economies have been hit hard by the world recession. On the positive side, the region's financial system, having learned from the financial crisis of 1997–98, has to a large degree avoided the types of high-risk lending and derivative investments that caused so much damage in the West. On the negative side, the global financial crisis has resulted in a serious drop in the region's exports, thereby posing a threat to Southeast Asia's main engine of growth. The decline in exports and the resulting fall in the GDP growth rates for a number of countries in Southeast Asia—notably Thailand, the Philippines, Malaysia, and Indonesia—have come in the middle of a long and incomplete transition process from authoritarian to democratic forms of governance. Other countries, such as Vietnam, have retained authoritarian governance but depend on continued high growth to maintain support for the government. The impact of the global recession on exports, therefore, threatens political stability in a number of the countries in the region. Because the nations of Southeast Asia regularly consult with each other through the Association of Southeast Asian Nations (ASEAN), among other venues, there is little prospect of a major military action by one country in the region against another-even if the economic recession proves to be deep and prolonged. This economic crisis is affecting the political situation in several of the countries of Southeast

Asia, notably Indonesia, Thailand, the Philippines, Cambodia, and Malaysia, where governments and people are struggling with difficult and incomplete transitions from authoritarian to democratic governance.

IMPACT OF RECESSION ON INDIAN ECONOMY

As the saying goes, "*When US sneezes, the world catches cold*", the recession that originated in US, did not take much time to engulf the whole world including India. The global economic recession has taken its toll on the Indian economy that has led to multi-crore loss in business and export orders, tens of thousands of job losses, especially in key sectors like the IT, automobiles, industry and export-oriented firms. It has also shaken up the investment regime, which is being restructured, with the telecom sector likely to be declared off-limits for foreign investors. Although the next two years or more are expected to usher in a difficult phase for the national economy, there are silver linings still amid the dark clouds looming on the horizon. Restrictions on exports of food, textiles and construction material to the Gulf have jacked up the prices there. Easing on export curbs should be welcome news to some 30 million people in that region.

On the higher end, people are cutting back on contracts. They are reducing the fees per manpower in their contracts." A survey of 125 companies by the commerce department in New Delhi has revealed that Indian companies lost export orders worth Rs. 1, 792 crores during August-October 2008 and were forced to lay off 65,000 workers. The manufacturing sector, especially the auto industry, has also sustained a severe hit. As a result, the global credit rating agency, Standard & Poor's (S&P) has downgraded Tata Motors rating for the foreign market. The company witnessed a 30 % drop in sales in India compared to last year. The manufacturing sector has been calling for an action in this regard to cushion the recessionary impact. In the meantime, it has impacted the entire spectrum of the automobile industry. Dunlop India Ltd, for instance, asked all 1,171 permanent employees at its Sahagunj unit and 917 staffers at Ambattur (in West Bengal) "not to report for work" for an indefinite period. What's strange about this management move is that it is an 'informal directive' with neither suspension of work (mandating a notice period) nor a lay-off that obliges the management to pay the basic salary and a portion of the dearness allowance. The Dunlop management, meanwhile, will pay each employee a monthly allowance to support their families.

For NRIs, this is the prime time to invest in the real estate market, which is bound to rally once it gets over the hump. On the educational front, bank officials point out that there is no impact yet on the grant of loans for higher education. Students of IIM, IIT, medicine, engineering and other professional courses continue to receive educational loans. Foreign students, too, will stay put, since security measures are being beefed around hotels, prestigious institutes and other places frequented by foreigners. Countries from Southeast Asia and the West have also advised their nationals to consider deferring their visit to India till the situation improves.

The tourism sector has also been a victim of recession. Hotels have already reported 20-25% cancellation from international tourists who were booked to visit over the next one year. Airlines, including low cost carriers (LCCs), may lower their fares by 10-12% to extend the benefit of lower fuel prices to the customers and rein in the sagging demand. With hotel occupancy levels and room rates dipping by 20% and 50% respectively in just two weeks, the sector is planning for a substantial cut in luxury tax slabs. According to market sources, guests are paying 20-25% higher room rates because of this tax structure. The reduced purchasing power of Indian consumers in the current situation has revived up the competition among shopping malls. They now have to step up their ad spend along with discounts to lure consumers who have restricted their shopping list to essentials, such as food and other consumables. After all, the purchasing power of 350 million Indians cannot be glossed over. Together with the package of incentives offered by the government to kick-start the economy, good management practices and self-imposed check on profiteering, the retail sector can hold its own. However, for the time being, the growth of this sector will be stunted as overseas investors will be on guard for two reasons. Firstly the financial meltdown has burnt a hole in millions of Indian pockets. Secondly with their shopping budget on a tight leash, one should not expect overseas malls to make forays into the Indian market anytime soon. The situation on the ground has since changed in the aftermath of economic recession and the current security threat.

MEASURES TAKEN BY THE GOVERNMENT OF INDIA

The Indian government has already unveiled a Rs.300,000 crore package to pump prime the economy with specific measures for various sectors. This amount is to be spent on revitalizing stake holders such as exporters, housing, infrastructure and textiles. A four-percent cut in Value Added Tax has also been announced to help the corporate sector in general. This apart, additional allocation has been made towards various incentives for exporters, guarantee of export credit, full refund of service tax to foreign agents and refund of service tax under the duty drawback scheme. Relief for exporters includes a 2% interest subvention up to March 2009 for pre- and post-shipment export credit for all exports. Additionally, a Rs.350-crore booster for schemes like Market Development Assistance (MDA) and Market Assessing Scheme has been granted to help exporters develop new markets. This will be applicable to all exporters. As a result of these measures, the Center's direct tax collection in November was Rs. 10,347 crore against Rs. 16,189 crore in the same month last year, a fall of 36 %.

Other measures in the offing include easy access to the credit market for exporters, textile manufacturers and farmers collectively to the tune of Rs.9, 000 crore. Of the total outlay, a Rs.4, 000 crore line of credit will be extended

to the National Housing Bank (NHB) and a similar allocation for the Exim Bank. The remainder of the rescue package will be utilized for the relief of farmers and infrastructural projects. But challenges still remain. One of these is the massive scale of corruption that has diverted crores of tax payer's money into the pockets of corrupt politicians and officials. This has strained the economy, tarnished India's image abroad, and sapped the investor's confidence. Another problem is the sluggish bureaucracy that taxes an investor's patience to the hilt. There is no active single window clearance mechanism in place where business decisions could be expedited. Therefore many potential investors have been moving away to greener pastures in the country or outside. Bangalore, which once served as a magnet for investors due to its operational efficiency, among other factors, has nose-dived on several counts, including poor infrastructure, traffic bottlenecks, culture of corruption and casteism. It is losing out to Andhra Pradesh and Tamil Nadu as the country's IT hub.

The challenges to overcome recession represent one side of the coin, there are opportunities galore on the other. The stimulus package that the Centre is offering to the state governments offers an exciting opportunity to the private sector to resume exports to the Gulf States as Indian exporters are being offered credit facilities. For exporters from Hyderabad, now is the time to strike a deal in view of the incentives being offered? In this context, it is worthwhile considering the Saudi market which, unlike a major segment of the international market, still remains vibrant as it gears up for the expansion mode. Right now, the growth areas are real estate, renewable sources of energy, especially solar, and seasonal market like pilgrimage, when nearly 2.5 million pilgrims become consumers of electronic, household and food items that are available at cheap prices. The immense market potential of the Haj season should not be underestimated, since the impact of recession will be felt at least over the next two years or more. The export-oriented facility is coming up in a SEZ-designated area and will enjoy fiscal benefits. Around 10 acres of land will be utilized initially with the remaining area allocated for future expansion. This is an exciting time of challenges and opportunities. Only those with a strong will, sound technological base and innovative solutions can ride out the crisis.

INDIA AS AN EMERGING ECONOMIC SUPERPOWER

India is a large country having population of more than a billion, second highest in the world. It is also the largest democracy in the globe. GDP India is fourth highest in the world in PPP terms. Here is a comparison of Indian economy vs. the US, EU, Canada, Japan, China and rest of the world. Indian GDP ranks to No.12 in nominal term of world GDP after US, Japan, UK, Germany, China, France, Italy, Spain, Canada, Brazil and Russia. However, India ($3000B) comes to No.4 after US (America) (($13800B), China ($7000B) and Japan ($4300B) in PPP terms. India is a large economy. It has GDP of $1100 B (2007) or RS.55000 B. It is approximately two percent of the GDP of the world i.e. $55000 B. It does not tell the real story because world GDP is calculated based on US dollars. However, Indians have to buy, sell and spend in Indian rupee. Price parity parameter shows comparatively better picture. In PPP method, Indian GDP is calculated to $3000B that is approximately 4.7 percent of world GDP of $64000B in PPP.

✹ HIGHEST GROWTH IN STOCK MARKET

More over India is growing at the rate of eight to nine percent per annum whereas most of the developed countries including US, Canada, Japan and countries of EU and UK are growing at a very slow speed until last year. Only China has shown greater growth rate than India. Picture is little different this year. Most of the developed countries have started showing tendency of negative growth. This will surely affect India and China but they can manage their growth in a positive range. It is expected that China will manage a growth rate of eight to nine percent where as India will anywhere between seven to eight percent. India has achieved highest growth rate in stock market in the world. If we compare the stock markets of India and America since 9/11, we find fascinating facts. Dow Jones fell after 9/11 to 8235 on 21st September 2001. The BSE (India) also fell during those days to reach a low of 2595. Particular data for Shanghai (China) and Hangseng (Hong Kong) are not available to me (If anyone has the data, please inform me) but those were around 1400 and 11000 respectively. Dow Jones is trading at 8787 (While writing this hub Dec. 09, 2008). If we compare it with the previous Dow Jones data (21st sept.2001), it has gained mere 550 points over the period of more than seven years. Whereas BSE India has traded at (on eighth Dec.2008, 9th market closed) 9162 level. It has jumped from 2595 to 9162 that is a gain of 6567 points or approximately 250 percent! Hangseng is 14753 and Shanghai is 2037 today. As I do not have actual data of 21st Sept. of both these indexes it is not justified to calculate the gain but it is something around thirty to fifty percent. Dow has increased mere six percent in more than seven years and China and Hong Kong index has raised by thirty to fifty percent (roughly estimated) but Indian stock exchange index BSE has shown an amazing growth of more than two hundred fifty percent.

✹ FIFTH HIGHEST FOREIGN CURRENCY RESERVE IN THE WORLD

India has fifth highest foreign currency reserve in the world. Foreign currency reserves of *China, Japan, Russia, Taiwan* and India were $ 1905, $997B, $485B, $282 B and $247 B respectively in 2007. This shows that foreign currency reserve of India was the fifth highest in the world after that of China, Japan, Taiwan and Russia. The most interesting fact is that Indian foreign currency reserve had been increased 64 percent in comparison to 32 percent of China and 57 of Russia, 9 of Japan and below 3 percent of Taiwan on year-to-year basis. It is worth mention that so called rich countries likes of the US, Canada, France and the UK are not in this list.

✹ COMPOSITE ECONOMIC SCENARIO OF INDIA

GDP India is twelfth largest economy in the world in nominal parameter but that does not show the real picture.GDP India represents the fourth largest economy in the world in price parity parameter (PPP). India has the second highest growth rate in the world after China. BSE stock index of India has grown at the fastest pace beating all stock indexes in the world including America, Canada, China, Japan and of course, all stock markets in European Union. India has no.1 growth rate among stock markets in the world. Global recession also hit Indian economy during the last quarter of 2008. However, It has started regaining its ground. India has successfully controlled its inflation problem. Indian auto sales up by 10 percent during the first quarter of 2009. It is continuing with its GDP growth. BSE sensex that has tasted below 8000 during recession has crossed 12000 marks on 7th May 2009. The Sensex had crossed 18000 marks at the end of 2009 before coming down to 16K at present. (Feb: 2010).

✹ INDIAN ECONOMY TRIUMPH OVER US: INDIA IN GREEN JOB SECTOR

India has announced carbon emissions cut voluntarily at Climate change conference in Copenhagen. This will be proved a major step towards clean energy sector. India is already generating wind power and hydro-electricity. Announcement of carbon emissions cut will push forward India in these sectors. Some of the major Indian industrialists have started making their industries green. Tata is one of them. This initiative will help growing environment friendly and energy efficient industries and businesses. India has started moving towards renewable sources of energy especially in solar energy and wind energy. Vast desert land in Thar area is ideal place to produce solar energy. Long coastal area viz a viz to desert are ideal places for producing wind energy. India is pioneer in recycling industry. Large numbers of Indian people are involved in recycling waste materials in unorganized sector. Some organized sector businesses have recently entered in to this business. Government incentives can boost this industry to sky height. India is growing organic food and other agricultural products in huge quantity. The country is also creating green forests and urban forests to fight global warming and climate change. Several urban cities authorities made water harvesting compulsory for new buildings. This government initiative is boosting water harvesting projects in urban areas. Government initiatives in rural areas will enhance these projects many folds. All these will make India pioneer in green industries. It will create large numbers of green collar jobs in India.

✹ SALARY HIKE IN INDIA AND OTHER COUNTRIES

Salary hike in India is the highest in the world. Recent survey reports suggest that salary hikes in different countries are different. Comparison of salary hikes in India and other countries in the world are mentioned below. Japan remains the lowest with just half percent hike in salary. it is approximately one percent in Canada and two percent in New Zealand, Australia. Hong Kong and Singapore. The US, of course, have achieved up to 2.8 percent. Indonesia has achieved a salary hike up to nine percent and Vietnam is at the level of ten percent growth. However, India beats all countries in the world with eleven percent hike in salary. India is leading even in the recession period. Where most of the countries facing bank failures, India has not that much affected. Though some small banks also failed here no major bank is in crisis. Job loss ratio in India is also very low in comparison to other countries. It has growth rate over five percent so far. It is worth mention that India has achieved almost zero percent inflation rate (Year to year basis) whereas most of the countries are either facing or in the brink of high inflation.

✹ INDIA WILL LEAD INTERNET AND TELECOMMUNICATION

India is showing amazing growth in internet connections and mobile phones. India is number two in mobile phone users in the world after China. It has surpassed the US long back. There are more than 650 million mobile users in India presently. Moreover, it is still increasing. India is showing tremendous growth in internet connections. India is adding more than five million users every month or more than sixty five million internet users every year. It is the highest growth rate in the world. It is expected that India will cross America, the US in number of internet connections by the year 2013. Any of the European Union countries, Japan and Canada cannot stand with India while it comes to numbers. It is well known fact that Indian IT professionals are the back bone of Silicon Valley. Numbers of websites are also increasing in India with the growth of internet connections. Indian IT companies are coming forward in web designing and software development.

CONCLUSION

The “Great Recession” of 2008 is now facing an uneven recovery across geographies and sectors with Asia, especially Asian industry, emerging as an “engine of growth”, said Professor Denis J. Encarnation He said there is also a wide variance in the recovery which has also altered the relative rankings of countries, starting with the BRIC nations (that is, Brazil, Russia, India and China). “Asia’s share of World Gross Domestic Products is about 35% at purchasing power parity or about 27% at market exchange rates in 2008,” he said, noting that the financial crisis had led to a geographic dispersion in World Gross Domestic Product. He said the “Great Recession” also saw the largest decline in global wealth since the “Great Depression” of the 1930s, and the most rapid recovery, albeit an uneven one with a wide variance. However, even after the crisis, wealth still remained concentrated in the top 10 economies of USA (US$14.1 trillion in GDP), Japan (US$5.1 trn), China (US$5.0 trn), Germany (US$3.3 trn), France (US$2.7 trn), UK (US$2.2 trn), Italy (US$2.1 trn), Brazil (US$1.6 trn), Spain (US$1.5 trn) and Russia (US$1.3 trn) at market forex rates in 2009. All these 10 top economies accounted for US$43.1 trillion or 62.6% of the World GDP. GDP is the market value of all the goods and

services produced within a country and is generally used to measure the wealth and standard of living of a nation. By 2012, India with a GDP of US$1.8 trillion would join these 10 top economies, replacing Spain with USA retaining its top position with a GDP of US$15.8 trillion, followed by China (with US$7.2 trn), Japan (US$5.9 trn), Germany (US$3.5 trn), France (U$2.7 trn), UK (US$2.5 trn), Brazil (US$2.3 trn), Italy (US$2.1 trn), Russia (US$1.9 trn), at market forex rates. All the top 20 economies accounted for US$53.5 trillion or 77.5% of the World GDP.

Government of India released its much awaited Economic Outlook for 2011-12 that pegs the India's GDP growth rate for 2011-12 at 8.2% as compared to 8.5% registered last year. Given the current adverse global circumstances and high Inflation to boot, expected growth rate of 8.2% looks quite good!

IMPORTANT HIGHLIGHTS OF ECONOMIC OUTLOOK 2011-12

- Agriculture grew at 6.6% in 2010-11. This year's monsoon is projected to be in the range of 90 to 96 per cent, based on which Agriculture sector is pegged to grow at 3.0% in 2011-12
- Industry grew at 7.9% in 2010-11. Projected to grow at 7.1% in 2011-12
- Services grew at 9.4% in 2009-10. Projected to grow at 10.0% in 2011-12
- Investment rate projected at 36.4% in 2010-11 and 36.7% in 2011-12
- Domestic savings rate as ratio of GDP projected at 33.8% in 2010-11 & 34.0% in 2011-12
- Current Account deficit is $44.3 billion (2.6% of GDP) in 2010-11 and projected at $54.0 billion (2.7% of GDP) in 2011-12
- Merchandise trade deficit is $ 130.5 billion or 7.59% of the GDP in 2010-11 and projected at $154.0 billion or 7.7% of GDP in 2011-12
- Invisibles trade surplus is $ 86.2 billion or 5.0% of the GDP in 2010-11 and projected at $100.0 billion or 5.0% in 2011-12
- Capital flows at $61.9 billion in 2010-11 and projected at $72.0 billion in 2011-12
- FDI inflows projected at $35 billion in 2011/12 against the level of $23.4 billion in 2010-11
- FII inflows projected to be $14 billion which is less than half that of the last year i.e $30.3 billion
- Accretion to reserves was $15.2 billion in 2010-11. Projected at $18.0 billion in 2011-12

	ANNUAL RATES	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
						QE	Rev	Proj.
1.	Agriculture & allied activities	5.1	4.2	5.8	-0.1	0.4	6.6	3.0
2.	Mining & Quarrying	1.3	7.5	3.7	1.3	6.9	5.8	6.0
3.	Manufacturing	10.1	14.3	10.3	4.2	8.8	8.3	7.0
4.	Electricity, Gas & Water Supply	7.1	9.3	8.3	4.9	6.4	5.7	7.0
5.	Construction	12.8	10.3	10.7	5.4	7.0	8.1	7.5
6.	Trade, Hotels, Transport, Storage & Communication	12.2	11.6	11.0	7.5	9.7	10.3	10.8
7.	Finance, insurance, real estate & business services	12.7	14.0	11.9	12.5	9.2	9.9	9.8
8.	Community & personal services	7.0	2.9	6.9	12.7	11.8	7.0	8.5
9.	**Gross Domestic Product (factor cost)**	**9.5**	**9.6**	**9.3**	**6.8**	**8.0**	**8.5**	**8.2**
10.	Industry (2 + 3 + 4 + 5)	9.7	12.2	9.7	4.4	8.0	7.9	7.1
11.	Services (6 + 7 + 8)	11.0	10.1	10.3	10.1	10.1	9.4	10.0
12.	Non-agriculture (9 - 1)	10.5	10.8	10.1	8.2	9.4	8.9	9.0
13.	**GDP (factor cost) per capita**	**7.8**	**7.8**	**7.6**	**5.0**	**6.2**	**6.8**	**6.4**
		Some Magnitudes						
14.	GDP at factor cost - 2004/05 prices in Rs. lakh crore (or Trillion)	32.5	35.7	39.0	41.6	44.9	48.8	52.8
15.	GDP market & current prices in Rs lakh crore (or Trillion)	36.9	42.9	49.9	55.8	65.5	78.8	89.8
16.	GDP market & current prices in US$ billion	834	949	1,241	1,223	1,385	1,732	1,994
17.	Population in Million	1,108	1,126	1,145	1,164	1,183	1,202	1,222
18.	GDP market prices per capita current prices	33,317	38,117	43,554	47,975	55,384	65,517	73,460
19.	GDP market prices per capita in current US$	753	842	1,084	1,051	1,171	1,441	1,632

Figure 1: GDP Growth – Actual & Projected (At constant 2004/05 Prices)
(Source: Economic Outlook 2011-12)

- Inflation rate would continue to be at 9 per cent in the month of July-October 2011. There will be some relief starting from November and will decline to 6.5% in March 2012.

The **Economy of India** is the ninth largest in the world by nominal GDP and the third largest by purchasing power parity (PPP). The country is one of the G-20 major economies and a member of BRICS. In 2011, the country's GDP PPP per capita was $3,703 IMF, 127th in the world, thus making a lower-middle income economy. India recorded the highest growth rates in the mid-2000s, and is one of the fastest-growing economies in the world. The growth was led primarily due to a huge increase in the size of the middle class consumer, a large labor force and considerable foreign investments. India is the fourteenth largest exporter and eleventh largest importer in the world. Economic growth rates are projected at around 6.9% for the 2011-12 fiscal year. Due to the global late-2000s recession, both Indian exports and imports declined by 29.2% and 39.2% respectively in June 2009. The steep decline was because countries hit hardest by the global recession, such as United States and members of the European Union, account for more than 60% of Indian exports. However, since the decline in imports was much sharper compared to the decline in exports, India's trade deficit reduced to 25,250 crore (US$5.56 billion). As of June 2011, exports and imports have both registered impressive growth with monthly exports reaching $25.9 billion for the month of May 2011 and monthly imports reaching $40.9 billion for the same month. This represents a year on year growth of 56.9% for exports and 54.1% for imports.

India's reliance on external assistance and concessional debt has decreased since liberalisation of the economy, and the debt service ratio decreased from 35.3% in 1990–91 to 4.4% in 2008–09. In India, External Commercial Borrowings (ECBs), or commercial loans from non-resident lenders, are being permitted by the Government for providing an additional source of funds to Indian corporate. The Ministry of Finance monitors and regulates them through ECB policy guidelines issued by the Reserve Bank of India under the Foreign Exchange Management Act of 1999. India's foreign exchange reserves have steadily risen from $5.8 billion in March 1991 to $283.5 billion in December 2009. India's gross national income per capita had experienced astonishing growth rates since 2002.India's Per Capita Income has tripled from $ 423 in 2002–03 to $ 1219 in 2010–11, averaging 14.4% growth over these eight years. It will further go up to $ 1440 during 2011–12 fiscal. Indian official estimates of the extent of poverty have been subject to debate, with concerns being raised about the methodology for the determination of the poverty line. As of 2005, according to World Bank statistics, 75.6% of the population lived on less than $2 a day (PPP), while 27.5% of the population was living below the new international poverty line of $1.25 (PPP) per day. However, data released in 2009 by the Government of India estimated that 37% of the population lived below the poverty line. Housing is modest. According to *The Times of India*, a majority of Indians had a per capita space equivalent to or less than a 100 square feet (9.3 m^2) room for their basic living needs, and one-third of urban Indians lived in "homes too cramped to exceed even the minimum requirements of a prison cell in the US."The average is 103 sq ft (9.6 m^2) per person in rural areas and 117 sq ft (10.9 m^2) per person in urban areas.

India is poised to take over the developed countries to emerge at the top of the heap in the global economic superpower league by 2030, says a survey. More than half of the respondents (53 per cent) of a survey commissioned by London-based independent think-tank Legatum Institute said India is likely to be the world's most important economic power by 2030. According to the respondents of the survey, India is now on course to outstrip developed nations such as-the United States, Japan, Germany and the fast-emerging economic giant China over the next two decades. The survey, which questioned nearly 2,400 Indian senior managers, entrepreneurs and aspiring entrepreneurs said the levels of confidence among the country's wealth-creators is very high, with nearly nine in ten saying they expected India to be in a stronger economic position in the next five years.

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INDIAN INSURANCE SECTOR : A STUDY OF CHALLENGES AND OPPORTUNITIES OFFERED BY RECESSIONERY FORCES

Dr. NITI SAXENA *

ABSTRACT

The global economy is still perplexed with the impact of the recession which started with the sub-prime crisis in the United States and found its way to other developed and emerging economies of the world. The financial meltdown has definitely cast a deep shadow over the Indian financial sector, most significantly the insurance arena which is still not 'recession-proof. Economic growth spurs insurance activities and recession creates manifold problems for the insurance mechanism. Indian Insurance industry follows closely the fortune of the financial sector and is directly influenced by the movements at the macro-economic level. Continued depressed market and resultant decline in premium volumes (and consequently reduced profits) is likely to put pressure on the management of Indian insurance companies. Yet, despite the slowdown, the performance of the Indian insurance sector has shown consistent improvement. With the liberalization of the financial sector in India, the entry of new private players in the Indian insurance segment has helped accelerate the pace of capital deployment. The present study focuses on the stand of Indian insurance industry amidst economic crisis and the unequivocal impact of recession shaping the future of the insurance business in India.

KEYWORDS

Insurance, Liberalization, Recession

INTRODUCTION

Finance and financial markets play a dominant role in growth and development of modern economies. The global economy is reeling with the impact of the ongoing recession which started with the sub-prime crisis in the United States and found its way to other developed and emerging economies of the world. Insurance industry follows closely the fortune of the financial sector and is directly impacted by the movements at the macro-economic level. Economic growth spurs insurance activities and a recession creates manifold problems for the insurance industry. However, in a world that is more integrated within each country as well as across nations, the events in the financial sector have eventually trickled down to the insurance sector of the economies as well. India has witnessed rapid rate of economic growth over the past decade which has its roots in the introduction of economic liberalisation in the early 1990s, that allowed India to exploit its economic potential and raise population's standard of living. Insurance has a very important role in this process. Health insurance and pension systems are fundamental to protecting individuals against the hazards of life and India, as the second most populous nation in the world, offers huge potential for that type of cover. Furthermore, fire and liability insurance are essential for corporations to keep investment risks and infrastructure projects under control. Private insurance systems complement social security systems and add value by matching risk with price. Following the move towards economic reform in the early 1990s, various plans to revamp the sector finally resulted in the passage of the Insurance Regulatory and Development Authority (IRDA) Act of 1999. Significantly, the insurance business was opened on two fronts. Firstly, domestic private-sector companies were permitted to enter both life and non-life insurance business. Secondly, foreign companies were allowed to participate, albeit with a cap on shareholding at 26%. While insurance penetration in India is higher than that in countries such as China and Brazil, it still has a considerably long way to go. The insurance industry in India has visibly progressed since the time when businesses were tightly regulated and concentrated in the hands of a few public sector insurers. Following the passage of the Insurance Regulatory and Development Authority Act in 1999, India abandoned public sector exclusivity in the insurance industry in favour of market-driven competition. This shift has brought about major changes to the industry. The new era of insurance development has seen the entry of international insurers, the proliferation of innovative products and distribution channels, and the raising of supervision standards.

A well developed and evolved insurance sector is a boon for economic development as it provides long-term funds for infrastructure development and concurrently strengthens the risk-taking ability of the country. Further, insurance has been a notable employment generator, not only for the insurance industry, but has also created significant demand for a range of associated professionals such as brokers, insurance advisors, agents, underwriters, claims managers and actuaries. By the nature of its business, insurance is closely linked to saving and investing. Life insurance, funded pension systems and non-life insurance have accumulated a significant amount of capital over time, which can be invested productively in the economy.

“Premium income of Indian insurance industry is expected to touch US$350-US$400 billion by 2020” (FICCI report). The total penetration of insurance (premium as percentage of GDP) has increased from 2.3% in 2001 to 5.2% in 2011. In addition, there has been a vast increase in the coverage of insurance. The number of life policies in force has increased nearly 12-fold over the past decade and health insurance, nearly 25-fold. This progress has been aided by the dramatic shift in the availability of

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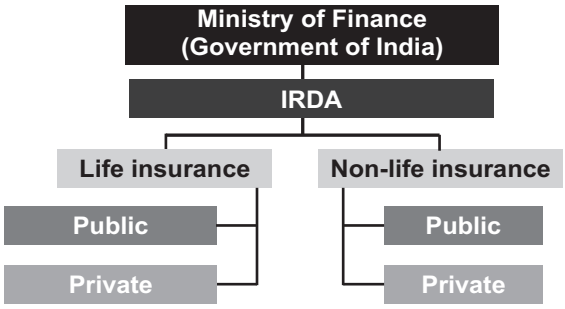
products. "Availability of a wide variety of products, like unit-linked products, whole life, maximum net asset value guarantee, auto assistance, auto pay per km insurance, disease management and wellness, have helped the industry to flourish".(Shah Alpesh) Higher per capita income is the key driver of higher demand for insurance products. "It has been found that unit-linked policies are prone to volatility as they are linked to equity markets, Companies should look at products that provide cheaper, de-risked policies."(Report of Mckinsey & Co.)

In India, the Ministry of Finance is responsible for enacting and implementing legislations for the insurance sector with the Insurance Regulatory and Development Authority (IRDA) entitled with the regulatory and developmental role. The government also owns the majority share in some major companies in both life and non-life insurance segments. Exhibit 1 depicts the structure of the insurance industry in India.

Exhibit 1 : STRUCTURE OF INDIAN INSURANCE INDUSTRY



Source : IRDA report

The number of players during the last decade(Table 1) has increased from four and eight in life and non-life insurance, respectively, in 2000 to 23 in life and 24 in non-life insurance (including 1 in reinsurance) industry as in August 2010.

Table 1 : Growth in the number of insurance players

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Life insurers											
Public	1	1	1	1	1	1	1	1	1	1	1
Private	3	10	12	12	13	13	15	15	21	21	22
Non-life insurers											
Private	4	4	5	6	6	6	6	6	6	6	6
Private	3	6	8	8	8	8	9	10	15	15	17
Reinsurer	1	1	1	1	1	1	1	1	1	1	1

Source : Planning commission Report 2011

OBJECTIVE OF STUDY

To diagnose the impact of recessionary forces on the Indian insurance sector during the years 2006-07 to 2009-10.

RESEARCH METHODOLOGY

The data used in the research study is basically secondary in nature obtained from publications and reports of planning Commission, Insurance Regulatory and Development Authority and from reports of various commissions and committees on insurance in India.

DISCUSSION AND ANALYSIS

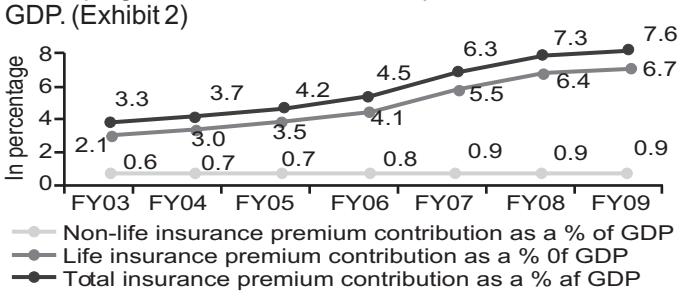
Even amidst the tumultuous ride of the financial markets across the globe, the Indian life insurance sector, still at a budding stage, has continued to grow. It has witnessed a 66 per cent rise in capital deployed during April 2006 to December2010. The private sector players have been the most active participants in capital deployment. The growth in a way brushes off the recessionary impact on the sector. It is not only capital deployment but also the expansionary mode of the private players which is providing the sector the necessary cushion (out of 11,043 branches set up by the life insurance firms a whopping 8,331 belongs to the private players). Insurance sector as a whole did not get impacted due to recession. People have become aware of risks which has given the sector the priority status. Capital infusions and the relatively healthy premium collections have given a boost to the industry. Considering the fact that the Indian pension market is expected to reach $300 billion in the next 10 years, the regulator (IRDA) is already mulling over ideas to push products combining pension and health insurance for the senior citizens. New products are being launched and the companies are optimistic about their success. India is home to around 17 per cent of the world's population and is largely an untapped market. 80 per cent of the population is without life, health and non-life insurance. The per capita spending on life insurance is a mere $33.2 (compare this to the world average of $330). The 24 million rural households can prove to be the next stimulus for the sector. During 2007-09, the growth of insurance industry was in single digit i.e. 5-8 per cent as there is an impact of recession. Certainly, the impact cannot be ruled out in totality. There have been two major changes that have taken place in the insurance sector in the last few years. One positive change is that many new players have emerged in the market and negative is that the companies did not rationalize their expenditure.

PERFORMANCE OF LIFE INSURANCE INDUSTRY IN INDIA

The life insurance sector grew at an impressive Compound Annual growth rate (CAGR) of 25.8% between FY03 and FY09, and the number of policies issued increased at a CAGR of 12.3% during the same period. As of August 2010, there were 23 players in the sector (1 public and 22 private). The Life Insurance Corporation of India (LIC) is the only public sector player, and held almost 65% of the market share in FY10 (based on first-year premiums). To address the need for highly customized products and ensure prompt service, a large number of private sector players have entered the market. Innovative products, aggressive marketing and effective distribution have enabled fledgling private insurance companies to sign up Indian customers more rapidly than expected. Private sector players are expected to play an increasingly important role in the growth of the insurance sector in the near future. In a fragmented industry, new players are gnawing away the market share of larger players. The existing smaller players have aggressive plans for network expansion as their foreign partners are keen to capitalize on the enormous potential that is latent in the Indian life insurance market. ICICI Prudential, Bajaj Allianz and SBI Life collectively account for approximately 50% of the market share in the private life insurance segment.

PERFORMANCE OF NON-LIFE INSURANCE INDUSTRY IN INDIA

Between FY03 and FY10, the non-life insurance sector grew at a CAGR of 17.05%. Intense competition that followed the de-tariffication and pricing deregulation (which was started during FY07) decelerated the growth momentum. As of August 2010, the sector had a total of 24 players (6 public insurers, 17 private insurers and 1 re-insurer). The non-life insurance sector offers products such as auto insurance, health insurance, fire insurance and marine insurance. In FY10, the non-life insurance industry had the following product mix. Private sector players have now pivoted their focus on auto and health insurance. Out of the total non-life insurance premiums during FY10, auto insurance accounted for 43.5% of the market share. The health insurance segment has posted the highest growth, with its share in the total non-life insurance portfolio increasing from 12.8% in FY07 to 20.8% in FY10. These two sectors are highly promising, and are expected to increase their share manifold in the coming years. With the sector poised for immense growth, more players, including monocline players, are expected to emerge in the near future. The last two years has seen the emergence of companies specializing in health insurance such as Star Health & Allied Insurance and Apollo DKV. The combination of tough economic conditions and the de-tariffing of the fire, motor and engineering sectors in the Indian insurance industry has resulted in a recorded compounded annual growth rate (CAGR) of 11.5 percent between 2007-2010, which compares with a growth rate of 16.8 percent during 2004-2007. A report released by ICRA, India's credit rating agency, analyzes the general insurance industry in India – a business which is estimated to be worth Rs 348 billion (US$ 7.6 billion). It found that the general insurance sector went through a challenging period between 2007-2010 set off by the global financial crisis, which triggered the complete (other than third party motor insurance) de-tariffing of the general insurance industry in the country from the 1st January 2007. The de-tariffing measures saw Indian general insurers activate the discounting of prices – initially within parameters permitted by the Indian insurance regulatory apparatus – but these were subsequently removed. As per the current scenario, a growing middle-class segment, rising income, increasing insurance awareness, rising investments and infrastructure spending, have laid a strong foundation to extend insurance services in India. The total premium of the insurance industry has increased at a CAGR of 24.6% between FY03 and FY09 to reach INR 2,523.9 billion in FY09. India's insurance industry has witnessed rapid growth during the last decade. Consequently, many foreign companies have expressed their interest in investing in domestic insurance companies, despite the Government of India's regulation, which mandates that the foreign shareholding limit is fixed at 26% for the life as well as non-life insurance sectors. The country's strong economic growth in recent years has helped increase penetration levels substantially. Premium income, as a percentage of GDP, increased from 3.3% in FY03 to 7.6% in FY09. However, the penetration of insurance in India still continues to be low, as compared to other developed and developing economies, insurance premiums as a % of GDP. (Exhibit 2)



Source: IRDA Report 2011

The insurance industry in India presently is at an inflexion point, thanks to the liberalization of the sector which enabled the entry of a host of new players with significant growth aspirations and capital commitments. Recession or no recession, renewals will keep happening and the premium scoreboard of the insurance companies will continue to tick. The market dynamics will only determine the momentum. The ratio of life insurance premium to India's GDP is around 4 per cent as against 6-9 per cent in the developed countries. The ratio is expected to rise to 6.2 per cent by 2012. Indians seem to prefer putting their money in insurance rather than putting it in to any other investment vehicle, for the purpose of investment as well as tax planning. By 2012, about 40 per cent of the urban population may have some form of life insurance cover as against 30 per cent currently. In rural areas, it could touch

35 per cent as against 25 per cent Global recession is not likely to rock the Indian insurance industry in a big way; However, most of the life insurance players are expecting their new business premium collection to ease down in the remaining financial year. Consumer sentiments are affecting the insurance industry because most of the prospective customers are putting their buying plans on hold. However, buying insurance products is a long-term investment and the ongoing crisis is not going to impact the returns on the assets.

Generally, countries with strong insurance industries have a robust infrastructure and strong capital formation. Insurance generates long-term capital, which is required to build infrastructure projects that have a long gestation period. Concurrently, insurance protects individuals and businesses from sudden unfavorable events. A well-developed and evolved insurance sector is needed for economic development as it provides long-term funds for infrastructure development and simultaneously strengthens the risk taking ability. Although the insurance sector is relatively young in India, its contribution to infra structural development has been on a visible rise as depicted in the following Table 2.

Table 2: Contribution of various insurance products to infrastructure (in INR billion)

	FY06	FY07	FY08	FY79
Investments from traditional products				
Approved securities including central Government Securities	3,131	3,541	4,013	4,439
Infrastructure and social sector	546	759	763	756
Investment subject to exposure norms, including other than approved investments	1,327	1,538	2,035	2,787
Housing and fire-fighting equipment	31	37	39	42
Unit-linked insurance product funds (ULIPS)				
Approved investments	234	576	1,115	1,515
Other than approved investments	25	95	219	213

Source: IRDA Report 2011

Insurance has to be sold the world over, and the Indian market is no exception. The touch point with the ultimate customer is the distributor or the producer, and the role played by them in insurance markets is critical. Insurance distribution is not simply about pushing products. An outsized share of the value across the entire insurance industry value chain is added in distribution. For customers, it is in distribution that needs are understood and assessed, options (from full risk transfer to self insurance and more exotic methods of managing risk) are identified, and counsel on the choice of carriers and other providers is given. It is because of distribution that relationships and trust are built with agents, brokers and customers, opportunities are identified and created, and products and services are sold. It is the distributor who makes the difference in terms of the quality of advice for the choice of product, servicing of policy post sale and the settlement of claims. In the Indian market, with their distinct cultural and social ethos, these conditions play a major role in shaping the distribution channels and their effectiveness. The Table 3 below provides an estimate of the current market share of the various distribution channels used by life insurers, and gives a view of how these channels could develop the future.

Table 3: CHANNEL WISE INDIVIDUAL NEW BUSINESS PERFORMANCE OF LIFE INSURERS

							(Premium in ` Crore)	
Particulars	**2009-10**		**2008-09**		**2007-08**		**2006-07**	
	No. of policies	**Premium**	**No. of policies**	**Premium**	**No. of policies**	**Premium**	**No. of policies**	**Premium**
Individual Agents	45036904	65289.25	43460589	55327.54	44752611	66515.43	42301907	54605.30
Corporate Agents-Banks	2084543	8688.68	1896457	6737.38	1693610	6329.22	1426919	3363.17
Corporate Agents-Others*	3819790	3510.76	2798776	3380.54	2599723	3461.89	1284785	1825.89
Brokers	439396	1128.50	306277	773.62	227403	473.73	259177	331.63
Direct Selling	1814558	3389.85	2442772	3310.33	1573849	2642.71	139077	235.33
TOTAL	53195191	82007.05	50904871	69529.41	50847196	79422.97	45411865	60361.32
Referrals	1232079	2567.61	1952102	2714.81	1349398	2345.63	715933	1256.51

Source: IRDA Report 2011

According to Swiss Re, among the key Asian markets, India is likely to have the fastest-growing life insurance market, with life premium poised to grow at a CAGR of 15% for the next decade, slightly faster than the 14% expected for China. The growing consumer class, rising insurance awareness and greater infrastructure spending have made India and China the two most promising markets in Asia. Europe and the Americas represent relatively mature insurance markets. Though India's penetration appears higher, it is not excessive, given the high level of investments in insurance policies underwritten. Nonetheless, besides India, Taiwan is the other Asian market that shares similar characteristics. Taiwan has the highest insurance penetration in Asia, largely driven by the immense popularity of ULIPs(Table 4)

Table 4: INTERNATIONAL COMPARISON OF INSURANCE PENETRATION(in %)

	2009			**2008**			**2007**			**2006**		
Countries	**Total**	**Life**	**Non-Life**	**Total**	**Life**	**Non-Life**	**Total**	**Life**	**Non-Life**	**Total**	**Life**	**Non-Life**
Australia	6.40	3.40	3.00	7.30	4.40	2.90	6.80	3.80	3.00	7.00	3.80	3.20
Brazil	3.10	1.60	1.50	3.00	1.40	1.60	3.00	1.40	1.60	2.80	1.30	1.60
France	10.30	7.20	3.10	9.20	6.20	3.00	10.30	7.30	3.00	11.00	7.90	3.10
Germany	7.00	3.30	3.70	6.60	3.00	3.50	6.60	3.10	3.60	6.70	3.10	3.60
Russia	2.50	0.00	2.50	2.30	0.00	2.30	2.40	0.10	2.40	2.30	0.10	2.30
South Africa	12.90	10.00	2.90	15.30	12.50	2.90	15.30	12.50	2.80	16.00	13.00	3.00
Switzerland	9.80	5.40	4.50	9.90	5.50	4.40	10.30	5.70	4.60	11.00	6.20	4.90
United Kingdom	12.90	10.00	3.00	15.70	12.80	2.90	15.70	12.60	3.00	16.50	13.10	3.40
United States	8.00	3.50	4.50	8.70	4.10	4.60	8.90	4.20	4.70	8.80	4.00	4.80
Asian Countries												
Bangladesh	0.90	0.70	0.20	0.90	0.70	0.20	0.70	0.50	0.20	0.60	0.40	0.20
Hong Kong	11.00	9.60	1.40	11.20	9.90	1.30	11.80	10.60	1.20	10.50	9.20	1.20
India#	**5.20**	**4.60**	**0.60**	**4.60**	**4.00**	**0.60**	**4.70**	**4.00**	**0.60**	**4.80**	**4.10**	**0.60**
Japan	9.90	7.80	2.10	9.80	7.60	2.20	9.60	7.50	2.10	10.50	8.30	2.20
Malaysia	4.40	2.90	1.60	4.30	2.80	1.50	4.60	3.10	1.50	4.90	3.20	1.70
Pakistan	0.70	0.30	0.40	0.80	0.30	0.40	0.70	0.30	0.40	0.80	0.30	0.50
PR China	3.40	2.30	1.10	3.30	2.20	1.00	2.90	1.80	1.10	2.70	1.70	1.00
Singapore	6.80	5.10	1.70	7.80	6.30	1.60	7.60	6.20	1.50	6.50	5.40	1.10
South Korea	10.40	6.50	3.90	11.80	8.00	3.70	11.80	8.20	3.60	11.10	7.90	3.20
Sri Lanka	1.40	0.60	0.90	1.40	0.60	0.90	1.50	0.60	0.90	1.60	0.60	0.90
Taiwan	16.80	13.80	3.00	16.20	13.30	2.90	15.70	12.90	2.80	14.50	11.60	2.90
Thailand	4.00	2.40	1.60	3.30	1.80	1.50	3.40	1.80	1.50	3.50	1.90	1.60
World	**7.00**	**4.00**	**3.00**	**7.10**	**4.10**	**2.90**	**7.50**	**4.40**	**3.10**	**7.50**	**4.50**	**3.00**

Source: Swiss Re commission report 2010

According to IRDA Regulations 2000, all insurance companies are required to maintain a solvency ratio of 1.5 at all times. But this solvency margin is not sustainable. With the growing market risks, the level of required capital will be linked to the risks inherent in the underlying business. India is likely to start implementing Solvency II norms in the next three to four years. The transition from Solvency I norms to Solvency II norms by 2012 is expected to increase the demand for actuaries and risk management professionals. The regulator has also asked insurance companies to get their risk management systems and processes audited every three years by an external auditor. Many insurance companies have started aligning themselves with the new norms and hiring professionals to meet the deadline and so far the solvency ratios of all the major Life and Non-Life insurance companies have remained stable even during recession times. (Table 5 and Table 6)

TABLE 5: SOLVENCY RATIOS OF LIFE INSURANCE COMPANIES IN INDIA

INSURERS	March 2010	March 2009	March 2008	March 2007	March 2006
Private Insurers					
Aegon Religare	2.66	1.93	-	-	-
Aviva	5.12	5.91	4.29	6.31	2.80
Bajaj Allianz	2.68	2.62	2.34	2.45	2.80
Bharti AXA	1.68	2.07	2.73	1.96	-
Birla Sun	2.11	2.44	2.37	1.80	2.00
Canara HSBC OBC	2.58	5.74	-	-	-
DLF Prameric	1.67	1.71	-	-	-
Future Generali	2.34	3.17	2.94	-	-
HDFC Standard	1.80	2.58	2.38	2.05	2.90
ICICI Prudential	2.90	2.31	1.74	1.53	1.60
IDBI Federal	4.05	6.11	3.45	-	-
IndiaFirst	5.27	-	-	-	-
ING Vysya	1.79	2.26	2.36	2.87	2.30
Max New York	3.22	3.04	2.25	2.08	2.00
Metlife India	1.65	2.27	1.70	1.73	1.70
Kotak Mahindra	2.79	2.69	2.41	1.64	1.80
Reliance	1.86	2.50	1.65	1.62	2.00
Sahara India	4.50	3.60	4.32	2.68	2.70
SBI Life	2.17	2.92	3.30	1.78	2.90
Shriram	2.69	3.05	2.85	2.74	2.20
Star Union Dai-Ichi	7.46	2.53	-	-	-
TATA AIG	2.11	2.51	2.50	2.59	2.70
Public Insurer					
LIC	1.54	1.54	1.52	1.50	1.30

Source: IRDA Report 2011

TABLE 6: SOLVENCY RATIOS OF NON-LIFE INSURANCE COMPANIES IN INDIA

SL No.	Insurer	March 2010	March 2009	March 2008	March 2007	March 2006
	PRIVATE INSURERS					
1	Bajaj Allianz	1.54	1.62	1.55	1.56	1.22
2	Bharti AXA	2.38	2.11	--	--	--
3	Cholamandalam	1.76	1.02	2.00	2.63	2.51
4	Future Genrali	1.54	1.83	2.61	--	--
5	HDFC Ergo	1.49	2.48	2.02	1.69	1.78
6	ICICI Lombard	2.07	2.03	2.03	2.08	1.29
7	IFFCO-TOKIO	1.76	1.77	1.51	1.70	1.95
8	Raheja QBE	3.79	--	--	--	--
9	Royal Sundaram	1.39	1.64	1.59	1.64	1.66
10	Reliance	1.70	1.59	1.64	1.95	3.04
11	SBI General	12.84	--	--	--	--
12	Shriram	1.75	1.94	--	--	--
13	TATA AIG	1.88	1.97	1.91	1.85	1.68
14	Universal Sompo	3.15	4.23	4.68	--	--
	PUBLIC INSURERS					
15	National	1.60	1.56	2.22	1.76	1.08
16	New India	3.55	3.41	4.00	3.57	3.09
17	Oriental	1.56	1.66	1.91	2.17	1.97
18	United India	3.41	3.32	3.24	3.00	2.23
	SPECIALISED INSURER					
19	AIC	2.07	4.58	3.27	2.05	2.16
20	Apollo Munich Health	1.64	1.82	1.39	--	--
21	ECGC	14.17	16.42	18.90	11.41	9.39
22	Max BUPA Health	2.07	--	--	--	--
23	Star Health	1.68	1.38	1.97	1.91	--
	RE-INSURER					
24	GIC	3.71	3.67	3.36	4.1	3.41

Source: IRDA Report 2011

The de-tariffing of charges has had a significant impact on the four public sector run insurers and private insurance companies, affecting the pricing, profit margins and growth of the general insurance business in India in the 2007-2010 period. De-tariffing resulted in pricing discounts without due regard to the risks and profitability of the business being generated. Market leaders in the general insurance business in India include ICICI Lombard, Bajaj Allianz, Reliance General and HDFC ERGO. The health insurance sector has been particularly challenging for insurers as prior to de-tariffing margins had been cross subsidized by the more profitable insurance products in the fire and engineering sectors. However, health insurance is the fastest growing segment of the Indian insurance market led by multi-national insurer's recent ventures with locally based and established insurance companies. This is reflected by the new developments such as the formation of MaxBupa the partnership between UK's British United Provident Association (BUPA) and locally based Max India Limited – competing with Star Health, Apollo Munich and Bajaj Allianz. In 2010, the health sector accounted for 20.8 percent of the general insurance market in India. Over recent years the Indian health insurance industry has maintained steady growth rates, driven by rising income levels and an increased awareness of the benefits of health insurance leading to a

CAGR in excess of 30% during the last six years. This level of growth is predicted to continue over the next five years with the prospect of improving returns from new written premiums; insurance companies in the private sector are expected to be particularly well placed to capitalize on emerging opportunities. Indian banks are expected to enter the Indian health insurance market, seizing on opportunities to cross-sell polices to customers buying other forms of insurance from them. The development of micro insurance products aimed at offering the high numbers of the low paid elements of society with a range of insurance cover could stimulate significant volumes of new business. While ICRA's analysis expects the soft pricing regime to continue in the short-term, placing continued pressures on margins for insurers in India, there is a reasonable prospect for premiums to return to levels to fully reflect risk attribution in the longer-term. In the meantime, the focus for insurers in the Indian general insurance industry will be on improving network efficiency, product development and differentiation as well as cost controls in order to maintain market share linked to the exceptional growth in the Indian economy.

FINDINGS, SUGGESTIONS AND CONCLUSION

The Indian insurance market has joined the league of the fastest growing insurance markets in the Asian region, with the total insurance premium projected to grow at a CAGR of more than 50% between 2008-09 and 2010-11. Unlike banks that were dumbstruck by the end of third quarter in 2008 due to the unfolding saga of financial crisis, insurers in India have shown rather remarkable resilience. New construction and infrastructure projects have dried up and ongoing projects have been stalled due to inadequate cash injection in the market. Banks are not releasing installments to firms even on limits which were agreed prior to this crisis. This has impacted the engineering class of business in the insurance sector. Inquiries for CAR (Contractors' All Risks), EAR (Erection All Risks), Machinery Breakdown and Equipment Insurance have almost dried up in the last few months. Construction, infrastructure projects by governments and energy projects by private as well as governments have either been shelved or being delayed and insurance industry will have to live without large premiums from the project insurance for some time. Continued recession shall have impact on property class of business too. Cost-cutting in the corporate sector may lead to reduced expenditure on insurance. Falling market prices of property shall further bring down the premium volume on property insurance. Business Interruption or Loss of Profit premiums also shall go down due to reduced profit forecasts for most corporate. Life insurance sector has to some extent got bigger erosion in volumes and profits. Employee benefit schemes, Workmen's Compensation, Medical Insurance, Group Life and Personal Accident Insurance, etc. are likely to take maximum hit.

Retail insurance sector has similar problems. Low consumer confidence and stringent lending norms for retail customers by banks have led to reduced demand for products and services. Automobile companies are struggling to keep afloat due to negative sales growth. This directly affects motor insurance premium. Travel industry including airline companies are witnessing lower traffic resulting into reduced travel insurance premium. Reduced sale of property is resulting in reduced premium income on mortgage insurance and householders' insurance. Declining international trade and consequent reduction in export and imports have resulted in inflated inventories and consequent redundancy of work force has increased job loss claims. Reduced international trade has also impacted marine cargo and marine hull insurance businesses and premium incomes have dropped substantially.

There are other issues too to ponder. Insurance industry is likely to see multiple bad moral hazard cases as depressed market conditions may lead to payment defaults and corporate frauds. Such situation stimulates claims on fire losses, business interruption losses and losses arising out of Directors' and Officers' liability litigation. Madoff and Satyam Computers are two recent examples to prove the point. Shareholders' and Regulators' role. Continued depressed market and resultant decline in premium volumes (and consequently reduced profits) is likely to put pressure on the management of insurance companies. As they struggle to satisfy their shareholders by providing similar returns as in the past, this could lead to rate cutting, imbalanced portfolio and compromised underwriting. A prudent board and shareholders of the insurance companies would do well to advise the management to concentrate on quality rather than volume business so that bottom lines are at least maintained.The insurance industry in India is on its way to development. The growing demand for insurance around the world continues to have a positive effect on the insurance industry across all economies. India, being one of the fastest-growing economies (even in the current global economic slowdown), has exhibited a significant increase in its GDP, and an even larger increase in its GDP per capita and disposable income. Increasing disposable income, coupled with the high potential demand for insurance offerings, has opened many doors for both domestic and foreign insurers. Even amidst the prevalence of recessionary forces in the economy, the total non-life insurance premium has increased at a CAGR of 25% for the period spanning from 2006-07 to 2010-11. With the entry of several low-cost airlines, along with fleet expansion by existing ones and increasing corporate aircraft ownership, the Indian aviation insurance market is all set to boom in a big way in coming years. Home insurance segment is set to achieve a 100% growth as financial institutions have made home insurance obligatory for housing loan approvals. Health insurance is poised to become the second largest business for non-life insurers after motor insurance in next three years. A booming life insurance market has propelled the Indian life insurance agents into the 'top 10 country list' in terms of

membership to the Million Dollar Round Table (MDRT) — an exclusive club for the highest performing life insurance agents. In times of volatility in financial markets worldwide, the overall performance of financial markets has been satisfactory and there are certain suggestions as mentioned below that are needed to be addressed to ensure rapid growth of the insurance sector in Indian economy.

i. NON-CAPTURED LATENT POTENTIAL

There is significantly untapped latent potential in India's insurance industry. There are many foreign players who want to enter into the insurance arena therefore foreign direct investment in insurance sector should be liberalized in order to utilize the untapped insurance scope basically in non-life insurance segment in India

ii. DISTRIBUTION CHANNELS

The effectiveness and cost of diverse distribution strategies of different players is crucial in ensuring the success of players in the insurance business, particularly in the retail lines of business.

iii. REGULATORY MECHANISM

The development of the insurance industry in India is likely to be critically dependent on the nature and quality of regulation. Overall, the regulatory environment is favourable and takes care that players maintain prudent underwriting standards, and reserve valuation and investment practices. It is IRDA's primary objective to promote stability and fair play in the market place through its norms and regulations.

iv. FOCUS ON FINANCIAL INCLUSION

The approach to insurance must be in sync with the evolving times. The mission of the insurance sector in India should be to extend the insurance coverage over a larger section of the population and a wider segment of activities.

V. CONSUMER NEEDS AND PREFERENCES

The growth in insurance industry has been spurred by product innovation, vibrant distribution channels, coupled with targeted publicity and promotional campaigns by the insurers. Innovation has come not only in the form of benefits attached to the products, but also in the delivery mechanism through various marketing tie-ups.

CONCLUSION

Thus it can be concluded that Indian insurance sector has been able to withstand the fluctuations and volatility in financial markets worldwide. In times of global markets still confounded with the recessionary forces, the mutual dependence of insurance and capital markets plays an instrumental role in channelling funds and investment capabilities to augment the development potential of the Indian economy. India's growing consumer class, rising insurance awareness, increasing domestic savings and investments are among the most critical factors that have positively driven the market penetration of the insurance products among its consumer segments even during the tough phase of financial meltdown globally. However, there are large untapped areas, which have yet not benefited from the upside of insurance. Imparting financial literacy, incentivizing Indian households to transfer savings from physical assets to financial assets and taking the distribution network to rural areas are expected to help bring more and more individuals within the insurance ambit.

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MULTIMODAL BIOMETRIC AUTHENTICATION SYSTEM

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ABSTRACT

A wide variety of applications require reliable and secure verification schemes to confirm the identity of an individual requesting authorized accessing to a specified service. Examples of such applications include secure access to buildings, personal computer systems, laptops, cellular phones and ATMs. In the absence of robust verification schemes, these systems are subject to the tricks of an impostor. Biometric authentication (BA) is a problem of verifying an identity claim using a person's behavioral and physiological characteristics.

Biometric identity authentication is based on a binary classification problem: reject or accept identity claim. The performance and robustness of identity authentication systems can be improved by combining two or more different modalities (speech, face, fingerprint, etc.). In literature, one of the issues is to improve the performance of multimodal biometric system. In this paper, we compared the performance of different binary classification schemes (support vector machine, multilayer perceptron, C4.5 decision tree, Bayesian classifier) on different combination of features for multimodal system. Our experiment on XM2VTS dataset shows that the performance of multimodal system is improved in comparison to individual modality system. The performance of a multimodal biometric system depends on the choice of baseline systems and classifier fusion being used.

KEY WORDS

Binary classifiers, biometrics, classifier fusion, feature extraction, support vector machine, ROC.

1. INTRODUCTION

In the last few years, the area of identity recognition has received a lot of attention. There is need of reliable automatic user identity recognition systems for secure accesses to buildings or services. Identity recognition systems based on passwords and cards are associated with a number of drawbacks. This is because of events in which one forgets his password, compromises his password, losses or stolen of his card, the system is not able to differentiate between a real client and the impostor etc. A lot of techniques have been investigated by different researchers to recognize original users using personal characteristics which are difficult to be faked.

A biometric recognition system can be used for person identification or verification. The biometric verification problem can be considered as a classification problem. The system accepts or rejects a claimed identity on the basis of some matching criteria. Several verification systems have been developed based on different biometrics characteristics (fingerprint, face, speech, iris etc) which help to distinguish individuals from each other. Each biometric has its own advantages and drawbacks due to its discriminative power, complexity, robustness involved. Research in last few years has shown that no single biometric system can achieve 100% authentication accuracy. This problem can be alleviated by combining two or more biometric modalities [1], also known as the field of multimodal biometric authentication. A user authentication scenario involving two modalities (Face and Speech) [2] is figured out in Fig. 1.

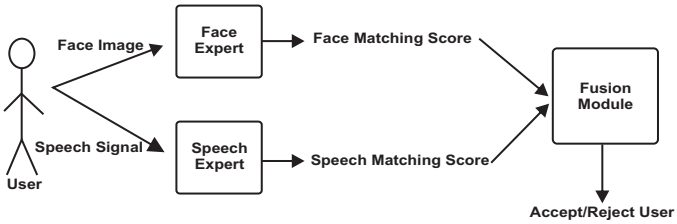

Fig. 1. Multimodal Biometric Authentication System.

It has been observed in pattern recognition problems that combining different biometric modalities enables to achieve better performances than techniques based on the single modalities [4]. If one of the modality is weak, the other modality involved in multimodal biometric system can be complimentary in nature which reduces the intrinsic problems involved in single modalities. This can increase the robustness of the multimodal biometric authentication system. The fusion classifier which combines different modalities is a very critical part of the biometric recognition system.

In literature, the performance of the fusion of face features (extracted using elastic graph matching) and speech features (extracted using sphericity measure and hidden Markov model) [2] are already reported using different binary classifiers. In this paper, we propose to investigate different fusion classifiers on a set of different baseline systems [18] obtained from a large database XM2VTS [16]. Feature extraction and Expert System is discussed in Section 2. In Section 3, different binary classifiers used for fusion are described. Criteria for evaluation of biometric systems are discussed in Section 4. In Section 5, we describe experimental results on a set of baseline systems obtained from the XM2VTS database. Conclusions are drawn in Section 6.

2. FEATURE EXTRACTION AND EXPERT SYSTEM

The performance of any biometric system depends on the choice of feature selection and extraction method. Feature

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extraction methods remove redundancy from the data and transform the given data in a suitable space that can best represent the data.

Face recognition as one of a biometric system has received considerable attention in recent years and many face feature extraction methods have been proposed and implemented. Among them, the following are quite familiar: Discrete Cosine Transform (DCT), Face Histogram (FH) [6, 13, and 18]. Also several speech features extraction methods such as Linear Filter-bank Cepstral Coefficient (LFCC) [12], Phase Auto-Correlation Mel Filter-bank Cepstral Coefficient (PAC-MFCC) [5], Spectral Subband Centroid (SSC) [7, 9] have been proposed and implemented [18].

The expert system plays a role of a classifier in matching features and generating scores as output of this classifier. Two different types of classifiers were used for score matching: Multi-Layer Perceptrons (MLPs) and a Bayes Classifier using Gaussian Mixture Models (GMMs) [3]. In theory both classifiers could be trained using any of the previously defined feature sets, in practice MLPs are better at matching feature vectors of fixed-size while GMMs are better at matching unequal size of feature vectors [18].

3. FUSION CLASSIFIER

The performance of a biometric system can be improved by combing different modalities [2, 20]. The performance is especially better if the different modalities are not correlated or complimentary in nature. In literature, the performance of the fusion of face feature (extracted using elastic graph matching) and speech feature (extracted using sphericity measure and hidden Markov model) [2] are already reported using the following binary classifiers: (i) Support Vector Machines (SVM's) (ii) C4.5 decision trees (iii) Multilayer perceptron (iv) Bayesian classifier and (v) Naïve Bayesian classifier.

SVM Classifier: The support vector machine is based on the principle of structural risk minimization (SRM) [8]. Better generalization capabilities are achieved through a minimization of the bound on the generalization error according to SRM principle. We assume that we have a data set *D* of *l* points in an *n*-dimensional space belonging to two different classes +1 and -1. A binary classifier should find a function *f* that maps the points X_k from their data space to y_k, their label space.

$$f : R^n \longrightarrow \{+1, -1\}$$
$$X_k \longrightarrow y_k$$

The SVM maps the input space R^n into a high-dimensional feature space H, given by $\Phi: R^n \rightarrow H$, satisfying a kernel $K(x; x_i) = \Phi(x_i).\ \Phi(x_j)$,which fulfills Mercer's condition [8]. The SVM constructs an optimal hyper-plane in the feature space which divides the data into two clusters. The SVM mapping model is build by equ. 2:

$$f(\mathbf{x}) = sign\left(\sum_{i \in S} y_i \alpha_i \ K(\mathbf{x_i}, \mathbf{x}) - b\right)$$

Where b is a bias (distance of hyper plane from the origin) estimated on the training set, y_i class label for sample point x_i , α_i holds the weight of every sample point and found by maximizing the functional based on Langrange coefficients:

$$W(\alpha) = \sum_{i=1}^{l} \alpha_i - \frac{1}{2} \sum_{ij}^{l} \alpha_i \alpha_j y_i y_j K(\mathbf{x}_i, \mathbf{x}_j)$$

Subject to the constraints: $\sum_{i=1}^{l} \alpha_i y_i = 0$, where $\alpha_i \geq 0,\ i=1,2,\ldots..,l.$

This functional coincides with the functional for finding the optimal hyper-plane. Examples of SVM's kernels:

$K(x;x_i)=[(x.x_i)+1]^n$; polynomial kernel

$K_\gamma(|x-x_i|)=\exp\{-\gamma|x-x_i|^2\}$; Gaussian kernel

The points on the decision surface satisfy: wX+b=0 where w is a norm of decision surface. While testing, SVM classifier returns a distance from the hyper plane, and accordingly assigns class label.

C4.5 Classifier: A decision tree, is a tree where at each node a test on a particular attribute of the data is performed, and where leafs corresponds to a particular class. Each path from the root node to a particular leaf is a rule. C4.5 is the most used algorithm for inducing decision trees [13]. The main problem here is deciding the attribute, which will best partition the data into various classes. C4.5 [13] uses the information theoretic approach to solve this problem. Information theory uses the concept of entropy, which measures the impurity of data items. Information gain is a measure on the utility of each attribute in classifying the data items. It measures the decrease of the weighted average entropy of the attributes compared with the entropy of the complete set of data items. To classify an unknown object, one starts at the root of the decision tree and follows the branch indicated by the outcome of each test until a leaf node is reached.

Multilayer Perceptron Classifier: Artificial neural networks (ANN) have the capability to design useful non-linear systems accepting large numbers of inputs based on instances of input-output relationships. ANN consists of a collection of highly interconnected processing elements to perform an input-output transformation. The actual transformation is determined by the set of weights associated with links connecting elements. The neural network gains knowledge about the transformation to be performed by iteratively learning from a sufficient training set of input-output training pairs. Training will be performed with the classical back-propagation algorithm [14], [15]. A MLP with one hidden layer will be used for the classification task.

Bayesian Classifier: It is based on Bayesian decision theory. We can calculate the a posteriori probability of the state of nature being in state w_j (given that the feature value x has been measured and a priori information $p(w_j)$) using the Bayesian decision formula given by Equ. (5):

$$p(w_j \mid x) = \frac{p(x \mid w_j)\, p(w_j)}{p(x)}$$

According to Baye's Decision Rule: Decide w_i if $P(w_i|x) > P(w_j|x)$; otherwise decide w_j. We try always to minimize the Bayesian risk [10] given by :

$$\frac{p(x \mid w_1)}{p(x \mid w_2)} \underset{w_2}{\overset{w_1}{\gtrless}} \frac{(c_{12} - c_{22})\, p(w_2)}{(c_{21} - c_{11})\, p(w_1)}$$

Where C_{12} is cost of misclassification when one chooses class w_1 instead of class w_2.

When we consider normal distribution and features are independent of each other then it reduces to Naïve Bayesian classifier.

4. CRITERIA FOR EVALUATION OF BIOMETRIC SYSTEMS

Biometric systems can be evaluated in terms of any one of the following three concepts [18]: (a) types of errors in biometric authentication, (b) threshold criterion and (c) evaluation criterion. Types of errors are false acceptance and false rejection. An evaluation criterion of biometric system is used to calculate the performance over evaluation set. A threshold criterion is an approach of choosing a threshold which can be tuned on a developmental set.

$$F(X) = \begin{cases} accept & if \quad y(X) > \Delta \\ reject & otherwise \end{cases}$$

Since the outcome of decision function is in terms of accept or reject, the system may make two types of errors, i.e., false acceptance (FA) and false rejection (FR). Normalized versions of FA and FR are often used and called false acceptance rate (FAR) and false rejection rate (FRR), respectively. They are defined as:

$$FAR(\Delta) = \frac{FA(\Delta)}{NI} \quad , \quad FRR(\Delta) = \frac{FR(\Delta)}{NC}$$

Where FA and FR count the number of FA and FR accesses, respectively; and NI and NC are the total number of impostor and client accesses, respectively.

The performance of a biometric system can be measured by reporting its false accept rate (FAR) and false reject rate (FRR) at various thresholds [17]. These two factors are brought together in a receiver operating characteristic (ROC) curve that plots the FRR against the FAR at different thresholds. The FAR and FRR are computed by generating all possible genuine and impostor matching scores and then setting a threshold for deciding whether to accept or reject a match. The point on the ROC defined by FAR = FRR is called equal error rate (EER). (5)

5. EXPERIMENTAL SETUP

The dataset used in this experiment is based on XM2VTS data base [16] which contains synchronized image and speech data. We will use the XM2VTS for two reasons: it has among the largest number of users, i.e., 200 clients and 95 casual impostors; and the results of many single modal experiments (in scores) are available for fusion. These scores are also publicly available [20], the following diagram Table.1. shows the dataset configuration.

Session	Shot	Clients	Impostors	
1	1	Training	Evaluation	Test
	2	Evaluation		
2	1	Training		
	2	Evaluation		
3	1	Training		
	2	Evaluation		
4	1	Test		
	2			

Table. 1. Dataset Configuration.

In our experiments, MATLAB version 7.2 will be used as a tool. Also Cygwin as UNIX environment to help in executing AWK scripts which is useful to manipulate large size files used in our experiments. We have used SVM-Light as SVM classifier software [21].

The experiment is performed on different combination of baseline systems available for face and speech. The baseline systems for face and speech are encoded in the pair (feature, classifier). In our experiments the following combinations are used in Table. 2:

A	(FH, MLP) and (LFCC, GMM)	**B**	(FH, MLP) and (PAC, GMM)	**C**	(FH, MLP) and (SSC, GMM)
D	(DCTs, MLP) and (LFCC, GMM)	**E**	(DCTs, MLP) and (PAC, GMM)	**F**	(DCTS, MLP) and (SSC, GMM)
G	(DCTs, GMM) and (LFCC, GMM)	**H**	(DCTs, GMM) and (PAC, GMM)	**I**	(DCTb, GMM) and (LFCC, GMM)

Table. 2. Baseline Combinations

Where DCTs refers to DCT applied over face images with a size 40 X 32 pixels, and DCTb refers to DCT applied over face images with a size 80 X 64 pixels.

Each one of these combination is evaluated with classifier fusion (a) SVM's (b) C4.5 decision tress (c) MLP (d) Bayes

and (e) Naïve Bayesian classifier. For SVM's, we have considered linear kernel, Gauss kernel and Cauchy kernel and used the values of parameters γ =1, C=1 and for MLP, the number of units used in a hidden layer is 5 units in these experiments. The results of our experiments for different combination of baseline systems using different classifier fusion are shown in Tables **3a, 3b and 3c.**

We observed from Fig.2 that the performance of multi-biometric system (Error is reduced) is better in comparison to individual biometric modality. Figure 3 shows ROC curves for γ =1, 2 and 7. It shows that EER changes with γ. The above results are shown for combined baseline (DCTs, MLP) and (LFCC, GMM) with SVM classifier. Similar results are also observed for different baseline systems with different classifier fusion.

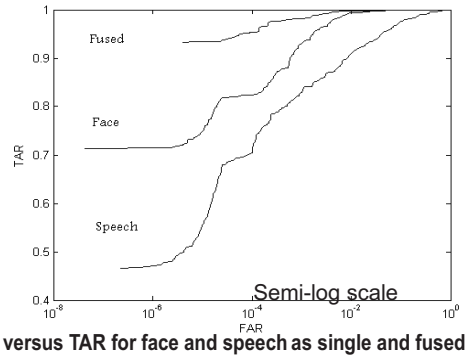

Fig. 2. FAR versus TAR for face and speech as single and fused modalities.

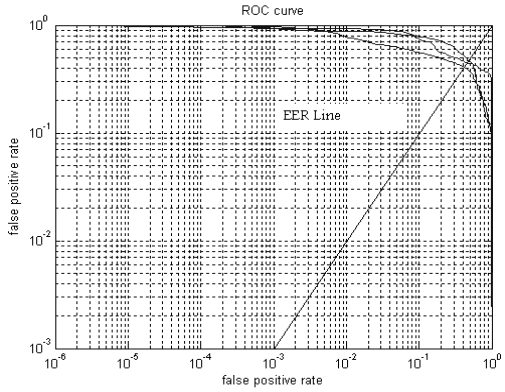

Fig. 3.ROC curves for γ =1, 2, 7.

6. CONCLUSION

The performance of multi modal biometric systems is better in comparison to individual biometric modality using any classifier. EER of a multimodal biometric system depends on the choice of baseline systems and classifier fusion being used. FAR is achieved zero for baseline systems (i) {(DCTs, GMM) and (LFCC, GMM)} (ii) {(DCTb, GMM) and (LFCC, GMM)} for all classifiers used in our experiments. The minimum value of EER is 0.25 for combination of (DCTb, GMM) and (LFCC, GMM) with polynomial kernel in SVM classifier.

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EXPERT SYSTEMS – AS A TOOL FOR KNOWLEDGE MANAGEMENT

Vani Kapoor Nijhawan*

Abstract

The exponential increase in information, primarily due to the electronic capture of data and its storage in vast data warehouses, has created a demand for analyzing the large amount of data generated by today's organizations so that enterprise can survive in the times of recession. There are various tools that can be used to capture and codify knowledge, include databases, data mining techniques, groupware and various types of artificial intelligence tools like expert systems. The paper outlines these techniques, and focuses on expert systems as a tool for deriving knowledge from organizations data assets.

KEYWORDS

Knowledge Management, Recession, Knowledge Management tools, Expert system

INTRODUCTION

Under the pressure of competition and in the times of recession, corporate as well as academic libraries are examining how they can cut their costs by better managing their existing intellectual capital. As the pace of global competition quickens, executives realize that their edge lies in more efficiently transferring knowledge across the organization. The emerging field of knowledge management addresses the broad processes of locating, organizing, transferring and more efficiently using information and expertise within an organization. So to make sure that valuable knowledge doesn't disappear with the death, resignation or retirement of an expert, we are required to convert their tacit knowledge into the explicit knowledge. This paper mentions various tools of KM but focuses on the use of expert system as a tool for Knowledge Management.

KNOWLEDGE MANAGEMENT - CONNOTATION

Knowledge Management is the process of capturing value, knowledge and understanding of corporate information, using IT systems, in order to maintain, re-use and re-deploy that knowledge. Knowledge Management is the systematic process of finding, selecting, organizing, distilling and presenting information in a way that improves an employee's comprehension in a specific area of interest.

According to Srinivasan, *"Knowledge Management refers to a collection of process, technologies and principles that serves to promote a learning environment supportive of the search community goal."*

PRINCIPLES OF KNOWLEDGE MANAGEMENT

Thomas H Davenport has formulated ten principles of knowledge management as listed below :

- Knowledge Management is expensive.
- Effective management of knowledge requires hybrid solutions of people and technology.
- Knowledge Management is highly political.
- Knowledge Management requires knowledge managers.
- Knowledge Management benefits more from maps than model, more from markets than from hierarchies.
- Sharing and using knowledge are often unnatural acts.
- Knowledge Management means improving knowledge process.
- Knowledge access in only the beginning.
- Knowledge Management never ends.
- Knowledge Management requires a knowledge contract.

KNOWLEDGE MANAGEMENT - TOOLS

Key types of knowledge related tools are given below which is effective in managing and handling information and knowledge and thereby maintaining the knowledge base organization :

- **Intranets/ Extranets :-** The intranet is not only a powerful communication medium but also a knowledge base. It has advantages over previous digital knowledge bases in that it more easily captures and handles unstructured and implicit knowledge. Intranets have emerged as one of today's most effective ways of sharing information and knowledge in organizations.
- **Help Desk Technologies :-** Many organizations use help-desk technology to respond to both internal and external requests for information.
- **Groupware :-** Organizations use groupware systems when users in workgroups or departments need to communicate and collaborate. Groupware allows formal and ad hoc conversations in cases when the participants can not communicate in real time.
- **Expert Systems :-** Expert systems are an ideal way to convert both tacit and explicit knowledge into a form that is available to many users. The implementation of expert systems involves systematic and well-established procedures for representing the knowledge of experts.
- **Data Mining :-** This stage is concerned with the extraction of patterns data. It includes choosing a data-mining algorithm, which is appropriate to search a particular pattern in the data.

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- **DBMS :-** Databases store structured information and assist in the storing and sharing of knowledge. Knowledge can be acquired from the relationships that exist among different tables in a database. These relational databases help users to make informed reliable decisions, which is a goal of knowledge management.
- **Document Management Tools : -** Documents are the most common repository of information and knowledge in any organization. Because of the great variety of the types and lengths of documents that an organization can produce, the systematic and organized management of these documents can save the organization's considerable effort and money and can serve as the starting point of knowledge management.
- **Brainstorming applications :-** Brainstorming tools help inspire creative thinking and convert tacit into explicit knowledge. These end user applications help categorize, organize and identify knowledge resources and are therefore useful knowledge creation tools.

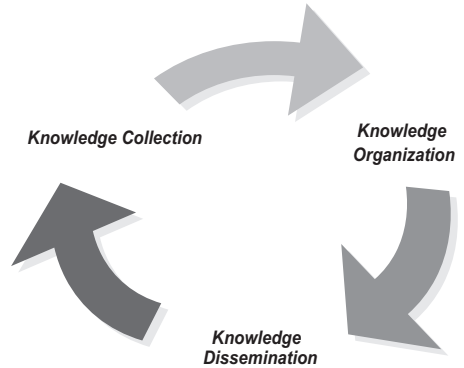
KNOWLEDGE MANAGEMENT - CYCLE

Knowledge Management is a process, which deals with knowledge creation, acquisition, packaging and application or reuse of knowledge. It is basically consists of the following four steps:

- **Knowledge Collection -** Identifying new knowledge and creating new knowledge and adding value and vision to the new knowledge and its application is the essence of KM.
- **Knowledge Organization -** Establishing semantic relationships, providing syntax, hyper linking, etc. (data gathering, classification knowledge database creation content mapping…etc.)
- **Dissemination of Knowledge -** In KM knowledge sharing deals with creating a value for the intangible assets (HR/Tacit Knowledge)

Knowledge Management is the way to keep knowledge growing through sharing and such sharing is best done either in material or human terms. The relationship between the knowledge and social development can be understood with the help of the following flowing chart:

Fig. 1.2 Knowledge Management Cycle



EXPERT SYSTEMS

An **expert system** is a computer system that emulates the decision-making ability of a human expert. Expert systems are designed to solve complex problems by reasoning about knowledge, like an expert, and not by following the procedure of a developer as is the case in conventional programming.

Over time, a human being in the process of becoming an expert will gain significant experience in their field of expertise. This experience is in turn used to solve problems that the expert encounters. Expert systems represent one way that expertise can be captured, coded, and reused.

Expert systems are an ideal way to convert both tacit and explicit knowledge into a form that is available to many users. The implementation of expert systems involves systematic and well-established procedures for representing the knowledge of experts. As yet, knowledge management efforts have often struggled with eliciting and documented tacit knowledge. At the same time, data warehouses, a mainstay for knowledge management, are a valuable source of information that may not always be used as effectively as it could in expert systems," says Lamont.

EXPERT SYSTEMS - STRUCTURE

An expert system has a unique structure, different from traditional programs. It is divided into three parts,

(i) independent of the expert system: the inference engine, and

(ii) the knowledge base.

(iii) a dialog interface to communicate with users

To run an expert system, the engine reasons about the knowledge base like a human.

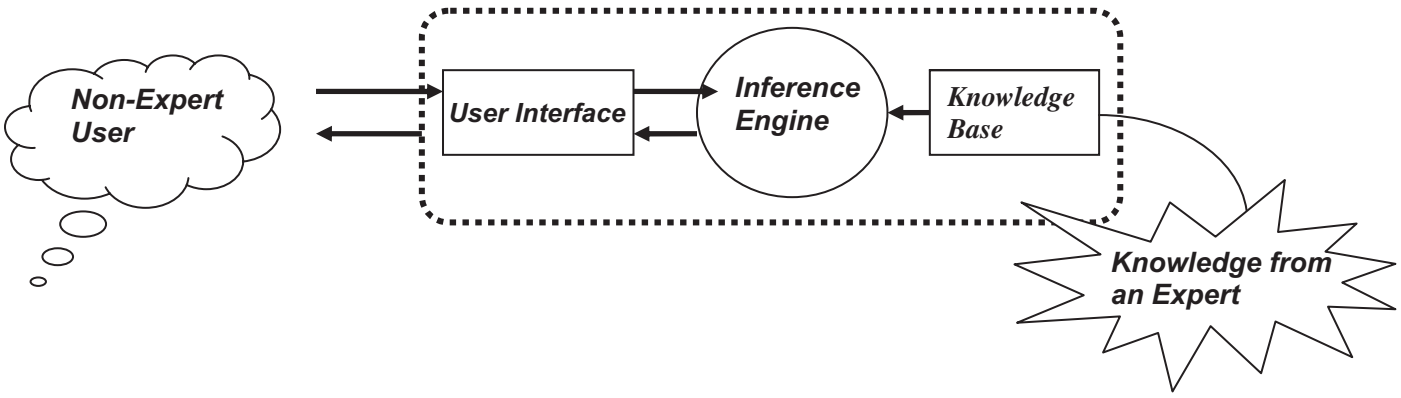
Knowledge Management Using an Expert System

It is the system that encodes the knowledge and performance of a subject matter expert. An expert system provides a powerful approach to managing and applying knowledge to the business. The paradigm here is to encapsulate knowledge in an automated "expert" who can utilize this knowledge for the company's benefit. An expert system can shield a company from employees leaving with critical information. It can help make knowledge available throughout the enterprise and help solve the problem of "knowing what we know." It can implement business rules to bridge the gap between written policy and practical application. It also allows importing automated subject matter experts when needed.

As shown in Fig1.1, A non expert feeds his rules through the user interface. The inference engine tries to find out the corresponding action using the knowledge base.

Expert systems guarantee the most reasonable solution in a finite time. Depending on the level of a human expert's

Fig1.1 Expert System



understanding of the causal connections of a system, a knowledge engineer can program an expert system using heuristic/empirical or structural/behavioral knowledge. The former is called **shallow knowledge** and latter **deep knowledge.** This knowledge is expressed as a collection of rules called the knowledge base.

CONCLUSION

The human knowledge cycle includes understanding in the knowledge collection; whereas computerized knowledge processes designed to be supported by computers are conceived as having understanding later in the process. From this statement one could identify as genuine knowledge processes only the ones that are able to combine understanding as part of knowledge creation (or as an immediate consequence). Therefore, a genuine knowledge creation would have to be performed either by humans of by intelligent systems that can emulate the required grounds for computer understanding, which include being able to manipulate knowledge and reason with it; identify analogies; and be able to autonomously reorganize its body of knowledge after each new collection.

We have examined methodology that perform knowledge management. This methodology is the expert system which gives useful results for knowledge management tasks.

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AN ANALYSIS OF RECENT TRENDS IN RETAIL SECTOR IN INDIA

Dr. Sunita Bishnoi*
Ms. Anjali Dhamija**

ABSTRACT

The Retail Sector of Indian Economy is going through the phase of tremendous transformation. The retail sector of Indian economy is categorized into two segments such as organized retail sector and unorganized retail sector. In Indian retailing sector the larger share of the retail market is captured by unorganized sector. Currently, India is the 5th largest retail market in the world. The market size in 2010 was estimated at US$ 353 bn (Source: IBEF) and is expected to reach US$ 543 bn by 2014. There are many factors which are contributing the growth of retail sector such as increase per capita income and living standard, easy and low cost credit facilities, change in consumption pattern, improvements in infrastructure, availability of retail space and sources of financing. The proposed paper would try to find out the factor, which are contributing in growth of retail sector in India. We would also try to compare the foreign and Indian retailing sector in terms of total share of organized and unorganized retail sector, Consumption spending and growth rate. The paper would also try to explain current and future trends in retail sector in India.

KEYWORDS

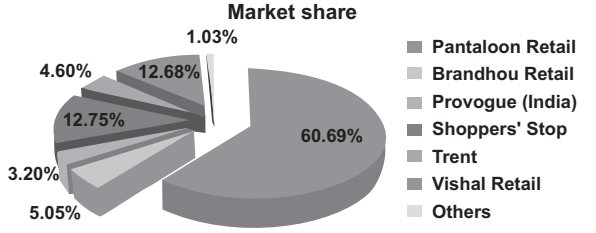
Retail, Indian Economy, Organized Sector, Unorganized Sector, World Retail

I. INTRODUCTION

Supermarkets started in the United States in the 1920s and 1930s and became dominant in the late 1950s. Supermarkets have been around for half a century in several developing countries, but the phenomenon was limited mainly to large cities, upper-middle-class or rich consumer segments, and domestic capital chains. In contrast, a supermarket revolution in developing countries took off in the early-to-mid-1990s. The patterns and determinants of that revolution are because of Diffusion of Modern Retail over Regions and Countries, Diffusion Trends within a Country over Space and Socio-economic Strata, and Product Markets. Determinants of the Diffusion of Supermarkets in Developing Countries are Income growth and urbanization, Foreign policy of retail FDI Liberalization as well as domestic policies concerning retail. The growth of the retail trade in India is associated with the growth in the Indian economy. Gross domestic product (GDP) grew by an annual rate of 6.6 per cent during 1994-00 but the growth slackened to 4.7 per cent per annum during the next three years before the growth remarkably rose to 8.7 per cent per annum in the last four years. This meant a substantial rise in disposable income of Indian households since the mid-1990s. Based on the *Market Information Survey of Households (MISH)* of the National Council of Applied Economic Research (NCAER), the number of people in the income groups of "aspirers" and the middle class with annual income ranging from Rs. 90,000 to one million, more than doubled from 157 million to 327 million during the last decade 1995-96 to 2005-06. The data from the Central Statistical Organization (CSO) indicate that the growth of real private final consumption expenditure, which dipped from an average of 5.7 per cent per annum during 1994-00 to 4 per cent per annum during 2000-03, shot up to 6.7 per cent per annum during 2003-07. Retail sales (in nominal terms) in the country also followed a similar pattern: a high annual growth of 13.6 per cent during 1994-00, a low growth of 4.8 per cent during 2000-03 and a smart pick up in the last four years, 2003-07 at around 11 per cent. (Report of ICRIER Report)

II. OVERVIEW OF MARKET SHARE

The market share of the industry is calculated by Sales of the players in the industry divided by total sales of the retail industry. From the graph we can say that Pantaloon holds the Maximum amount of share with 60.69%as a market leader, followed by Shopper's stop with 12.75%, Vishal by 12.68%, Brand house by 5.05%, Trent with 4.6% Share, Provogue with 3.2% and others with 1.03% amount of shares in organized retail sector.



Recently, they have tried to reduce the cutthroat pricing competition by offering frequent flier points, memberships and other special services to try and gain the customer's loyalty. Given the relatively weak financial state of unorganized retailers and the physical space constraints on their expansion prospects this sector alone will not be able to meet the growing demand for retail. Hence organized retail, which now constitutes a small 4% of total retail sector, is likely to grow at a much faster pace of 45-50% per annum and quadruple its share in total retail trade to 16% by 2011-12.

III. MAJOR MARKET PLAYERS IN THE INDIAN CONTEXT

- Shoppers' Stop
- Vishal Mart

Associate Professor, DAV Institute of Management, Faridabad, Haryana.
****Assistant Professor, DAV Institute of Management, Faridabad, Haryana***

- Westside (Trent)
- Pantaloon (Big Bazaar)
- Lifestyle
- RPG Retail (Foodworld, Musicworld)
- Crossword
- Wills Lifestyle
- Globus
- Piramals (Pyramid & Crosswords)
- Ebony Retail Holdings Ltd

IV. CURRENT SCENARIO

The Retail Sector of Indian Economy is going through the phase of tremendous transformation. Indian retail sector proves itself as a strong base for Indian economy and about 15% of its GDP depends on the retail sector. The economic value of retail market is estimated to be US$ 450 billion and comes in the category of top five retail markets in the world. The retail industries are one of the fastest growing industries in India since last couple of years. India, the fastest growing retail market in the world with 1.2 billion people initially based on one-man small shops. In 2010 the ratio of super markets and big stores was just 4 % of the industry settled only in urban areas.

In 2011, Indian central government proposed foreign direct investment (FDI) in multi-brand retail, forbidding foreign groups from any ownership in supermarkets, convenience stores or any retail outlets. The multi-brand retailers such as Walmart, Carrefour and Tesco and single brand retailers such as IKEA, Nike and Apple are waiting to compete with Indigenous retailers due to the retail reform on hold under pressure from the opposition in November 2011. January 2012, India approved reforms for single-brand stores welcoming anyone in the world to innovate in Indian retail market with 100% ownership, but imposed the requirement that the single brand retailer source 30 percent of its goods from India. Indian government continues the hold on retail reforms for multi-brand stores. IKEA announced in January that it is putting on hold its plan to open stores in India because of the 30 percent requirement. Indian retail sector categorized as organized retail and unorganized retail sector. Initially Indian retail market was unorganized and consists small and medium grocery stores, Kirana stores, stationery shops, fruits and vegetables shop, pavement vendors etc. but changes come with the changing customer demands and a new era of retail market comes in the picture as organized retail market. Organized retailing refers to trading activities undertaken by licensed retailers, that is, those who are registered for sales tax, income tax, etc. These include the corporate-backed hypermarkets and retail chains, and also the privately owned large retail businesses. In Indian retailing sector the larger share of the retail market is captured by unorganized sector. Currently, India is the 5th largest retail market in the world. The market size in 2010 was estimated at US$ 353 bn (Source: IBEF) and is expected to reach US$ 543 bn by 2014. 97% of Indian business being depends upon unorganized retail sector. Indian retail sector is the main source of employment after agriculture and a major contributor of India's GDP.

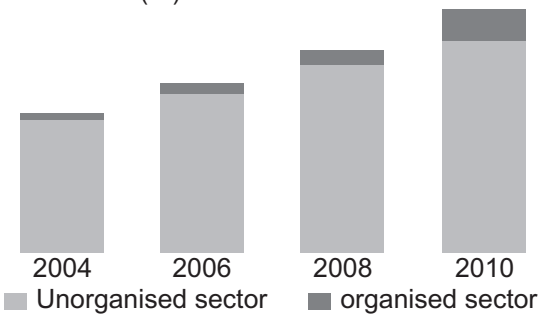
V. GROWTH OF INDIAN RETAIL MARKET 1995-2011

From the graph we can say that in 2004 share of the organized sector was 3% of total market size of 10,950 billion and reached upto 11.6% of total market size of 18,720 billions in 2010

Organised retailers are penetrating the growing retail market in india **EXHIBIT 1**

Evolution of the Indian retail market and share of the organised sector

Market size (billion)	10,950	13,299	15,778	18,720
Share of the organised sector (%)	3	4.6	7.4	11.6



Source: ICRIER BM, Image FR Research

2011: According to market research report by RNCOS the Indian organized retail market is estimated to reach US$ 50 billion by 2011

2010: Continued growth expected to grow retail market to $427.00 billion by 2010

2008: The Indian retail boom is at its peak and this phase has been termed the 'high retail gold rush'

2006-2007: Maintaining its #1 position as the market with the most opportunity for retail growth, India's retail market grew to $330.00 billion

2005-2006: **Retail Boom**: The beginning of the Indian retail boom, India is also ranked as the #1 market for global retailers to enter according to Global Retail Development Indices

2003-2004: Growth: Standing at $230.00 billion, India's retail market enters the Growth phase, characterized by the entry of new domestic and international participants and expansion by existing retailers in India

The last few years shows immense growth by this sector, the key forces influence this sector are changing consumer tastes, demographical factors, international brands available in the Indian market, changed Government Policies, increasing urbanization, easy credit availability, infrastructure development, advanced technology and real estate creating a world class shopping environment for the consumers. To fulfill the consumers demand retail sector is continuing its required growth with the help of major players of the Markets.

Table (1.1) Share of Formats in Organized Retail Space in India

Format	No. of Stores	Area ('000sq ft.)	Share in total space (%)
Supermarkets/ convenience Stores	4751	4751	15.5
Hypermarkets	75	3,-000	9.8
Discount Stores	1472	1472	4.8
Speciality Stores	20612	16490	53.7
Departmental Stores	166	4980	16.2
Total	27076	30693	100

Source: ICRIER and Techno park Advisors Pvt. Ltd.

VI. OBJECTIVE

- Factor, which are contributing in growth of retail sector in India.
- Comparison of the foreign and Indian retailing sector in terms of total share of organized and unorganized retail sector
- Consumption spending and growth rate.
- Current and future trends in retail sector in India.

VII. FACTORS CONTRIBUTING IN THE GROWTH OF RETAIL SECTOR

Retailing is the sector which is showing tremendous growth over the last five years. Many factors are responsible which triggers the growth are as follows

Prime Reasons

The prime reasons include favorable demographics, rising consumer incomes, real estate developments, entrance of new shopping malls, availability of better finance options within India and overseas and changing lifestyle. These factors contributed a lot in the consumer requirement and buying behaviour.

ORGANIZED VERSUS UNORGANIZED

Inefficiency and traditional approach of unorganized retailers provide further opportunity for organized retailers to set their modern outlets in recent years and chasing a fast growth from lat years. Today consumer is seeking more worth by their buying in terms of quality, shopping environment, credit facilities, return and exchange policies and competitive prices etc. Turning to unorganized to organized retail is also a considerable factor in retail sector as unorganized retailers suffers poor shopping experience and inability to offer a wide range of products and value-addition due to lack of sourcing capabilities.

CHANGING AGE PREFERENCES AND FAMILY STYLES

Change in the age and income profiles is the big reasons for the changes come in retail sector. A younger population tends to have higher aspirations and spends more as it enters the earning phase. Besides, gradually the sizes of families are also becoming short as joint families are now converting into small nuclear families and caused the increase rate of demand as earlier. Workingwomen and new job opportunities in emerging service sectors such as IT, retail, food, entertainment and financial services are also responsible of higher demand of retail sector. Easy loan facilities are also increasing the options for consumers.

GROWING DISPOSABLE INCOME

More Indian households are getting added to the consuming class with the growth in income levels. The number of households with income of over Rs 45,000 per annum is expected to grow from 58 million in 1999-2000 to 81 million by 2005-06.

This large base of households with growing disposable income is expected to drive demand for organized retail. Of this, 56 per cent (44. 8 million households) are expected to be concentrated in urban India.

Changing income demographics, age profile and macro environment are visible in the growth in consumption of durables. To cite live examples, the installed base of cars, cable TV subscribers and cellular subscribers has increased significantly over the last five years.

VIII. COMPARISON OF WORLD AND INDIAN RETAIL SECTOR

Global retail sales are estimated to cross US$12 trillion in 2007. Almost reflecting the growth in the world economy, global retail sales grew strongly in the last five years (2001-06) at an average nominal growth of about 8 per cent per annum in dollar terms (Table 1.2). This is in contrast to near stagnant global retail sales during the previous five years, 1996-01. Grocery dominates retail sales with a share of approximately 40 per cent, which varies from about 30 per cent in rich Japan to an average of 60 per cent in poor Africa. Retail sales through modern formats have been rising faster than total retail sales; the share of modern retail has risen from about 45 per cent in 1996 to over 52 per cent in 2006.

IX. POTENTIAL OF RETAIL SECTOR

Over the past few years, the retail sales in India show the scope to new entrants in the market to invest. In the developed economies, organized retail is in the range of 75-80 per cent of total retail, whereas in developing economies, the unorganized sector dominates the retaibusiness. (Table 1.3) Modern retail formats, such as hypermarkets, superstores, supermarkets, discount and convenience stores are widely present in the developed world, whereas such forms of retail outlets have only just begun to spread to developing countries in recent years. In developing countries, the retailing business continues to be dominated by family-run neighborhood shops and open markets. As a consequence, wholesalers and distributors who carry products from industrial suppliers and agricultural.

The table (table 1.3) gives the picture of India's organized retail as compared to the other countries.

Table (1.2) World Retail

		1996	2001	2002	2003	2004	2005	2006	CAGR (1996-01)	CAGR (2001-06)
1.	Total retail sale (US$ billion)	7682	7833	7987	8827	9833	1657	11375	0.4	7.7
2.	Total Grocery Sales (US$ billion)	3284	3161	3213	3571	3970	4308	4611	-6.8	7.8
3.	Modern Retail Sales (US$ billion)	3478	3916	4149	4672	5246	5633	5969	2.4	8.8
4.	Modern Grocery Sales (US$ billion)	2577	2816	2979	3378	3800	4074	4325	1.8	9.0
	As% of 1 3	42.7	40.4	40.2	40.5	40.4	40.4	40.5	-1.1	0.7
	As% of 1 4	45.3	50.0	51.9	52.9	53.4	52.9	52.5	2.0	1.0
	As% of 3	74.1	71.9	71.8	72.3	72.4	72.3	72.5	-0.6	0.2
5.	Nominal GDP (US$ billion)	30055	31889	32888	36904	41470	44713	48141	1.2	8.6

Source: *Excluding VAT or sales tax;[2] Including VAT or sales tax;[3] Compound annual growth rate.*
Source: Planet Retail Database

Table (1.3) Comparison Of Organized Retail Of India With Selected Countries, 2009

Countries	Total Retail sales (US $ Billion)	Organized sector share (%)
USA	2983	85
Japan	1182	66
China	785	20
United Kingdom	475	80
France	436	4
Germany	421	36
India	322	33
Brazil	284	15
Pakistan	67	35

Source: Planet Retail and Technopak Advisers Pvt. Ltd

Table 1.4 shows As per Global Retail Development Index (GRDI) 2011 high saving and investment rates; fast labor force growth; and increased consumer spending-make India for a very favorable retail environment and the 4th spot in the GRD.

Table 1.5 shows Growth of Retail Sales: Valued currently at $450 billion dollars, Indian retail is pegged to grow by 5.8 per cent in 2014 at about the same rate as Thailand, and next only to China (11.7 %) and Vietnam (9.8 %)

Table 1.6 shows the sector can be broadly divided into two segments: Value retailing, which is typically a low margin-high volume business (primarily food and groceries) and Lifestyle retailing, a high margin-low volume business (apparel, footwear, etc). The sector is further divided into various categories, depending on the types of products offered. Food dominates market consumption followed by fashion. The relatively low contribution of other categories indicates opportunity for organized retail growth in these segments, especially with India being one of the world's youngest markets. Historically, Indians have been conservative spenders, thus food forms a huge chunk of India's consumption needs. Transition from traditional retail to organized retailing is taking place due to changing consumer expectations, demographic mix, etc. With the revival in consumer spending, expansion plans of retailers are back in full swing. The convenience of shopping with multiplicity of choice under one roof (Shop- in Shop), and the increase of mall culture etc. are factors appreciated by the new generation. These are expected to be the growth drivers of organized retailing in India over the long run.

Table (1.4) Global Retail Development Index (GRDI)

2011 rank	Country	Region	Market Attractiveness(25%)	Country Risk(25%)	Market Saturation(25%)	Time Pressure(25%)	GRDI Score	Change in rank compared to 2010
1	Brazil	Latin America	100.0	79.4	42.9	63.9	71.5	+4
2	Uruguay	Latin America	85.0	73.8	63.6	39.6	65.5	+6
3	Chile	Latin America	84.3	100.0	30.3	44.3	64.7	+3
4	India	Asia	28.9	59.9	63.1	100.0	63.0	-1
5	Kuwait	MENA	80.4	80.6	57.3	27.1	61.3	-3
6	China	Asia	49.5	76.5	31.0	87.7	61.2	-5

Sources: Euromoney; Population reference Bureau; International Monetary fund; World economic forum; Economic Intelligence Unit; Planet Retail; A.T. Kearney analyses.

Table1.5 World Wide Growth Of Retail Sale (Asia Retail Sale Growth By Volume % Pa)

Territory	**2007***	**2008***	**2009****	**2010*****	**2011*****	**2012*****	**2013*****	**2014*****
Australia	5.5	0.7	1.4	-0.8	0.2	2.0	2.0	2.0
China	11.4	18.7	16.8	14. 8	14.6	12.4	11.6	11.7
Hong Kong	9.0	-0.4	-2.2	5.6	1.3	1.5	2.6	2.4
India	4.6	1.7	3.4	1.5	3.9	5.6	5.6	5.8
Indonesia	11.3	7.8	2.7	4.4	4.2	4.6	4.8	4.8
Japan	-0.2	-0.5	-0.9	1.3	0.8	0.5	0.4	0.4
Malaysia	10.2	7.0	-1.5	2.3	3.3	5.0	3.7	3.8
Newzeland	2.1	-1.7	-1.3	1.3	2.3	2.4	2.5	2.4
Philippines	5.3	3.0	3.9	7.0	3.2	4.3	4.5	4.7
Singapore	7.8	1.2	-2.0	1.6	3.2	2.9	4.4	5.1
South Korea	4.8	0.5	-0.2	0.8	2.0	2.4	2.7	2.2
Taiwan	4.6	0.3	-1.4	9.4	2.3	1.5	0.6	0.6
Thailand	7.5	-2.5	2.7	3.3	4.8	5.2	5.5	6.1
Vietnam	**9.9**	**3.6**	**3.9**	**13.1**	**10.6**	**9.2**	**8.6**	**9.8**

Source: Outlook for the retail and consumer products sector in Asia (PWC) - 2011

*actual **Estimate***forecast

Table 1.6 Consumption spending in India

Segment	% Contribution
Food	62.0
Fashion	9.5
Leisure and entertainment	7.9
Fashion Accessories	5.5
Consumer durables	4.0
Health, beauty and pharma	3.8
Furniture	3.4
Telecom	1.8
Books and music	1.1
Others	1.0

Source: Pantaloon Retail analyst report

X. FDI IN INDIAN RETAIL SECTOR:

Foreign Investment in India is governed by the FDI policy announced by the Government of India and the provision of the Foreign Exchange Management Act (FEMA) 1999. The Reserve Bank of India ('RBI') in this regard had issued a notification, which contains the Foreign Exchange Management (Transfer or issue of security by a person resident outside India) Regulations, 2000. This notification has been amended from time to time. The Ministry of Commerce and Industry, Government of India is the nodal agency for motoring and reviewing the FDI policy on continued basis and changes in sectoral policy/ sectoral equity cap. It will be prudent to look into Press Note 4 of 2006 issued by DIPP and consolidated FDI Policy issued in October 2010 which provide the sector specific guidelines for FDI with regard to the conduct of trading activities.

a. FDI up to 100% for cash and carry wholesale trading and export trading allowed under the automatic route.
b. FDI up to 51 % with prior Government approval (i.e. FIPB) for retail trade of 'Single Brand' products, subject to Press Note 3 (2006 Series)
c. FDI is not permitted in Multi Brand Retailing in India.

As the panel of government is planning the final blueprint related to the entry of FDI in India's retail sector, Various Questions about the importance of retail sector among individuals is about to solve. The customer is doubtful about the changes comes in their shopping experiences due to entry of FDI in retail sector. Allover the India the percentage of Corner grocery "Kirana " stores are easily approachable due to the familiar way of shopping from thereof. It is easy for customers to choose the brands, avail credit facilities, easy policy of product return and exchange etc. All these facilities make the customer loyal for purchasing from these stores. Due to this type of consumer behaviour many big retail chains such as Reliance Fresh, subiksha, More etc. have closed down their operations in some part of the country. So. There is a big question about the entry of western multi brand stores as Wal Mart and Carrefour and about their strategies to access the Indian households?

RATIONAL BEFORE ALLOWING FDI IN INDIA

FDI has direct influence on large proportion on Indian households. Thus the distribution of foreign capital into multi-brand retailing needs to be balanced in such a way that it results in a win-win situation for India. This is possible only by integrating the rules and regulations for FDI in retailing. If Government is allowing FDI, it must do it in a rational way. Further, to take care of the concerns of the Government before allowing 100% FDI in Single Brand Retail and Multi- Brand Retail, the following recommendations are being proposed

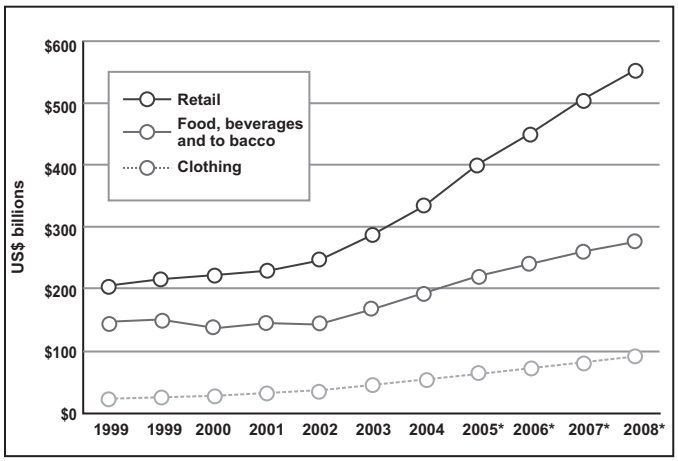
- Preparation of a legal and regulatory framework and enforcement mechanism to ensure that large retailers are not able to dislocate small retailers by unfair means
- Extension of institutional credit, at lower rates, by public sector banks, to help improve efficiencies of small retailers; undertaking of proactive programme for assisting small retailers to upgrade themselves.
- Enactment of a National Shopping Mall Regulation Act to regulate the fiscal and social aspects of the entire retail sector.
- Formulation of a Model Central Law regarding FDI of Retail Sector.(Pulkit agarwal,Esha tyagi)

XI. RECENT TRENDS AND OPPORTUNITIES

- Retailing in India is witnessing a sustainable growth as can be seen in the graph*
- India is rated the fourth most attractive emerging retail market: a potential goldmine.
- Estimated to be US$ 200 billion, of which organized retailing (i.e. modern trade) makes up 3 percent or US$ 6.4 billion
- As per a report by KPMG the annual growth of department stores is estimated at 24%
- Ranked fourth in a Global Retail Development Index of 30 developing countries drawn up by AT Kearney.
- Multiple drivers leading to a consumption boom :
  - ❖ Favorable demographics
  - ❖ Growth in income
  - ❖ Increasing population of women
  - ❖ Raising aspirations: Value added goods sales
- Food and apparel retailing key drivers of growth
- Organized retailing in India has been largely an urban
- Phenomenon with affluent classes and growing number of double-income households.
- More successful in cities in the south and west of India. Reasons range from differences in consumer buying behavior to cost of real estate and taxation laws.
- Rural markets emerging as a huge opportunity for retailers reflected in the share of the rural market across most categories of consumption
- The most encouraging format now would be the hyper marts

- The industry is expected to grow at a rate of 12% per annum for the next 5 years.
- The industry is eagerly awaiting the approval of the FDI in multi brand retailing.
- Luxury Retailing is gaining importance in India. This includes fragrances, gourmet retailing, accessories, and jewellery among many others. Indian consumer is ready to splurge on luxury items and is increasingly doing so. The Indian luxury market is expected to grow at a rate of 25% per annum. This will make India the 12th largest luxury retail market in the world.
- Rural retailing is now the focus for many retailers. It is observed that the rural regions registered saw consumption even during the economic slowdown. Rural India accounts for 2/5th of the total consumption in India. Thus, the industry players do not want to be left out and are devising strategies suited especially to the rural consumer.
- Retail is mainly a volume game, (especially value retailing). Going forward, with the competition intensifying and the costs scaling up, the players who are able to cater to the needs of the consumers and grow volumes by ensuring footfalls, while being able to reduce costs, withstand downturns, and face competition will have a competitive

***Retail Sales In India**



Source Economist Intervene Unit and A.T. Kearney analsis **Data for 2005-2008 is based on estimates*

XII. MAJOR CHALLENGES IN RETAIL SECTOR

- **Changes in supply:** Players are now moving to Tier II and Tier III cities to increase penetration and explore untapped markets as Tier I cities have been explored enough and have reached a saturation level.
- **Changes in demand**: Healthy economic growth, changing demographic profile, increasing disposable incomes, changing consumer tastes and preferences are some of the key factors that are driving and will continue to drive growth in the organized retail market in India.
- **Restricted Entry**: Reforms by India in opening up its economy have greatly improved trade prospects, but major barriers still exist such as regulatory issues, supply chain complexities, inefficient infrastructure, and automatic approval not being allowed for foreign investment in retail. But, some of these are set to change with FDI in multi-brand retail set for approval.
- **Bargaining power of suppliers**: The bargaining power of suppliers varies depending upon the target segment, the format followed, and products on offer. The unorganized sector has a dominant position, still contributing 95% of the total retail market. There are few players who have a slight edge over others on account of being established players and enjoying brand distinction. Since it is a capital-intensive industry, access to capital also plays an important part for expansion in the space.
- **Bargaining power of customers**: High due to wide availability of choice. With FDI coming in, this will increase further.
- **Competition**: High Competition is characterized by many factors, including assortment, products, price, quality, service, location, reputation, credit and availability of retail space etc. New entrants (business houses and international players) are expected to further intensify the competition and so would the foreign players' entry.
- **International Players** With the arrival of the Transnational Companies (TNC), the Indian retail sector will confront the following round of alterations. At present the Foreign Direct Investments (FDI) is not encouraged in the Indian organized retail sector but once the TNC'S get in they would try to muscle out their Indian counterparts. This would be challenging to the retail sector in India.

XIII. CONCLUSION

The retail sector shows an immense growth in the last few years not only in India but also all over the world. There is no denying the fact that the Indian retail industry is the largest among all the industries accounting for the major percentage of the country's GDP and employment. The Retail industry of India is ranked fourth as one of the most dynamic and fast paced industry in global development ranking index. Retail sector was in news throughout the year. The ongoing attempt to bring in foreign direct investment in retail continued and the proposal is through significant hurdles. It is now in the final stages and may see the light of the day soon.

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REQUIREMENTS ENGINEERING FOR DATA WAREHOUSE

Preeti Goel*
Renu Yadav**

ABSTRACT

Our research paper will focus on the effectiveness of a requirement engineering process on organizational data warehouses used by the business analysts and managers for an effective decision making during critical situations. The global slowdown due to economic recession of 2008-09 also affected the business climate within India and the growth rate of the Information Technology Sector. But, India being a developing economy managed to survive the economic recession to an extent. This paper focuses on the important role played by organizational data warehouse systems used for making important decisions during hard times that help in averting the impact of recession to a large extent.

Recession presented businesses with a dilemma: whether to cut costs to conserve resources, or to invest in new products and processes to exploit competitor weakness. Here comes the need of correct data on which strategic decisions can be made. Thus the need of an effective requirement engineering phase is there. The policies laid down by Indian Govt. caused a total change in the way in which India does business. There are challenges facing managers together with hope for more initiative and creativity, leading to success for industry and for the whole nation.

Building of efficient Data Warehouse and its maintenance is a costly and time consuming process. To overcome this problem, we should use such a technique that helps in exploring and clarifying each requirement in detail which can be considered while constructing the Data Warehouse at an early phase. The importance of an effective requirement engineering phase lies in the fact that if requirements are properly identified in the beginning, then the data warehouse would be built on an almost correct data. Correctly gathered and represented data would help the business managers to take an apt decision in the face of uncertainty to optimize the resources available at their disposal.

KEYWORDS

Engineering, Data Warehouse, Requirement Analysis, Requirement gathering techniques, ETL Process (Data Staging Process).

1. INTRODUCTION

In the discussion carried out through this paper, we try to relate the usefulness of an effective decision support system in realm of an economic crisis. So, the discussion of both, the economic recession and the data warehousing for an efficient decision based system goes hand in hand.

1.1 DATA WAREHOUSE

Every organization deals with vast amounts of data which is stored in different formats or patterns developed on different platforms by different developers and further form different database structures. This brings hurdles on the path of analysts or users with respect to its access. Thus, organizations have to write and maintain perhaps hundreds of programs that extract, prepare, and consolidate data for its use. All this process is done with respect to Data Warehouse.

DATA WAREHOUSE - "A data warehouse is a subject oriented, integrated, non-volatile and time-variant collection of data in support of management's decision." [9]

In other words, it is a system which collects, integrates data by performing extraction, transformation, loading and storage of the data in suitable format which can be easily read and accessed for making strategic decisions.

The data in the Data Warehouse is cleaned, transformed and cataloged and is made available to be used by managers and other business professional for data mining, online analytical processing, market research and decision support.

1.2 THE GLOBAL ECONOMIC RECESSION

The global financial crisis of 2007 has cast its long shadow on the economic fortunes of many countries, resulting in what has often been called the 'Great Recession'. [12]

"Crisis" represents two symbols "Danger" and "Opportunity". A choice is to be made. Choice must be based on strong decisions which can only be done when a decision maker has correctly represented data available at his disposal.

Recession presents businesses with a dilemma: whether to cut costs to conserve resources, or to invest in new products and processes to exploit competitor weakness. Here comes the need of correct data on which strategic decisions can be made. Thus the need of an effective requirement engineering phase is there.

2. PROBLEM STATEMENT

This section identifies the factors that lead to the global economic recession and the need of a quality data warehouse system on which the decision support system can be based on.

2.1 FACTORS BEHIND THE GLOBAL FINANCIAL CRISIS

The causes of the crisis have become, understandably, a major topic of discourse among both academics and

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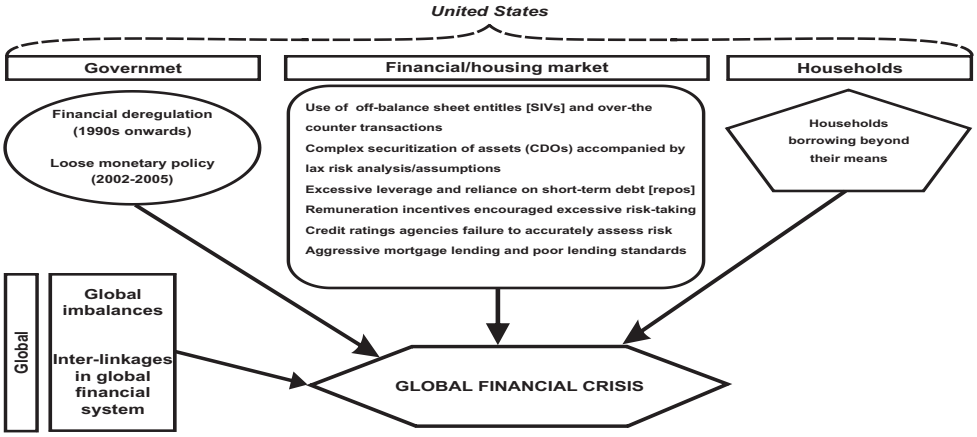
policymakers. The debate surrounding this issue has generally focused on the role of market failure in precipitating the crisis, namely the catastrophic performance of the financial market that was in stark contrast to the theoretical proposition that it is efficient (i.e. prices in the stock and bond markets instantly and accurately reflect all available information at the time). This puts one of the core tenets of capitalism into question. At the same time, most contributions to the ongoing post-mortem analysis of the crisis recognizes that government failure has played a major role in allowing banks and other financial institutions to capitalize on loop-holes in the regulatory system to increase leverage and returns. In terms of government policy, Taylor (2009) stresses that the excessively loose US monetary policy fuelled the credit boom, while others such as Elmendorf (2007) conclude that interest rates were not too low. In addition to these dimensions, the debate has considered both the contribution of domestic issues (US financial regulation and monetary policy) and global imbalances (the glut of savings flowing from surplus countries to deficit economies).

Overall, drawing from a comprehensive review of crisis-related studies17, four core, but interrelated, factors can be identified: interest rates, global imbalances, perceptions of risks and regulation of the financial system. These factors are captured in Figure 1 (though this diagrammatic representation of the crisis excludes the complex interactions between the different elements to ensure readability).

Fig 1: Explaining the key factors behind the global financial crisis



2.2 THE DATA WAREHOUSING APPROACH

Data warehousing implements the process to access heterogeneous data sources; clean, filter, and transform the data; and store the data in a structure that is easy to access, understand, and use. The data is then used for query, reporting, and data analysis.

This process is costly, inefficient, and very time consuming. So, Data warehousing needs a better approach.

For storage, Data warehousing however uses Decision Support Systems that enables decision making but the drawback is that these systems doesn't focus on the requirements in the early phase. These systems discover the requirements usually in the later phase.

These further crops to the issue of determining organizational requirements that provides the rationale for Data warehouse development. Data Warehouse must be designed keeping in mind the requirements for decision making which is often derived from the data sources. Designing of Data Warehouse consists of two categories: [8]

2.2.1 Supply-driven

It is also known as Data-Driven approach for designing Data Warehouse. It deals with acquiring the data with detailed analysis from the data sources. In this, the data warehouse designer selects the portion of data or information which is essential for analyzing and decision making, which is further structured according to the multidimensional model. Designing of ETL is simpler if this approach is followed but user's requirements are not given much importance which again leads to a problem.

2.2.2 Demand-driven

It is also known as Requirement Driven approach. It starts from determining the informational requirements of the users of the Data Warehouse. The problem arises in the later phase when mapping of these requirements is done onto the available data sources which makes its designing not as simpler.

3. IMPORTANCE OF REQUIREMENTS ENGINEERING IN DATA WAREHOUSE

3.1 STRATEGIC DECISION MAKING: NEED OF THE HOUR.

In the light of an economic recession, business analysts need to make strategic decisions in order to mitigate the adverse effects of the crisis. Recession presented businesses with a dilemma: whether to cut costs to conserve resources, or to invest in new products and processes to exploit competitor weakness. Here comes

the need of correct data on which strategic decisions can be made. Thus the need of an effective requirement engineering phase is there.

Building of efficient Data Warehouse and its maintenance involves extraction, cleaning and filtering of data etc. Although it is a costly and time consuming process, as this is performed before requirements are gathered. To overcome this problem, we should use such a technique that helps in exploring and clarifying each requirement in detail which can be considered while constructing the Data Warehouse at an early phase. The importance of an effective requirement engineering phase lies in the fact that if requirements are properly identified in the beginning, then the data warehouse would be built on an almost correct data. In term, the decisions or the predictions done on the basis of that data would be so far accurate. Correctly gathered and represented data would help the business managers to take an apt decision in the face of uncertainty to optimize the resources available at their disposal.

3.1.1 Coping with Recession: A Challenge or an Opportunityγ

The recession is the temporary economic climate of the business world. It will be changed through more productivity at minimal cost and maximize profit at moderate price of products in business.

Key learning from the recession is that an organization that looks at the recession as a period of consolidation and investment into the future is successful as compared to the ones that look at recession only in terms of riding it out. Even amidst all the gloom, the economic meltdown turns out to be an opportunity for change for many. For firms, it was a time to re-look at their costs, tighten the budgets and cut the flab and for employees, it turned out to be a time to enhance their skills and improve their performance. Perhaps, many took it as the right time to implement changes.

In this recession period HR play an important role to make the industry sustain and the entire economy flourish. HR needs to be proactive and come up with early interventions as for any organization to survive during recession; the ability to retain its best people is must. During these days, HR people sometimes even take the harsh decision of reducing the numbers and land up at downsizing. The word downsizing is even taken as rightsizing and optimizing but we may not know or ignore the fact that neither the bad situation nor the good conditions lasts long. Provide adequate support to leaders and managers in terms of people management processes. Find ways to keep up the motivation levels of employees.

The Indian IT industry poses a baffling challenge to HR professionals-from recruitment to retaintment, compensation to career planning and from technological obsolescence to labor turnover. This problem can be tackled with the use of HR planning which in itself is a challenging task in IT industry.

It is said that every adversity brings in certain opportunities. This stands true for India Inc too as many progressive firms have imbibed new lessons from their struggle against the worst economic recession that this century has ever witnessed. And hence, in an endeavor to ride the storm, companies are implementing the learning derived into action to ensure a smooth road ahead.

3.2 UNDERSTANDING THE REQUIREMENTS EARLY.

In Requirement Engineering, "Requirements" signify "what of a system", not "how".[5] It is basically "what a system must be able to do. Requirements change over time as project moves from analysis to design till implementation. These requirements can of different types- Functional, Non-Functional, Domain requirements depending upon the demands of clients.

Requirement Engineering enables us to prepare a documented form that describes what the system or the product will do without describing how it will perform. It aims at refining all the requirements of the system under construction where problem statements act as an input.

Requirements are defined during the early stage of system development. So, Requirement Engineering plays a vital role when the Data Warehouse is under construction, that is, we can cater to the requirements first and then build an effective data warehouse which was not possible earlier when decisions support systems were used. This is because, in decision support systems, requirements were taken into consideration in the end, which acted as a drawback. But with the use of requirement engineering we can prepare a document of the requirements by using its process which is as follows:

- Requirements Elicitation
- Requirements Analysis
- Requirements Documentation
- Requirements Review

From the above process of Requirements Engineering we have considered and combined 'Requirement Analysis' with the Requirement gathering technique of Data Warehouse i.e. 'Interview'.

4. REQUIREMENT GATHERING TECHNIQUES [9]

Interviews are used to gather information from key stakeholders of a software project. It can be performed one to one or in small groups and can be formal interview or informal interview. Interview can be performed by anyone but a successful interview is the one where all the essential requirements can be acquired, which might be needed during the whole process and attaining such an interview involves planning and scheduling, preparing, opening, conducting, closing and following up in a timely and cost effective manner.

JAD stands for Joint Application Development. With JAD Sessions we can gather a great number of interested users

to meet together in group sessions. It is a joint process that enables the users and the IT professionals to develop the application required. JAD is a five-phased approach consisting of: Project Definition, Research, Preparation, JAD Sessions, and Final Document.

5. APPROACH ADOPTED: INTERVIEW

Interviews are used to gather information. Pre-interview research plays a very important role in moving an interview to a successful interview. Thus preparing an interview involves background domain research. This Pre-interview research includes history and current structure being followed in the business; the primary goal of the business; number of employees with their authorities and responsibilities and the location of the users categorized into senior executives, departmental managers, analysts, and IT professionals. One can review organization reports to gain a sense of the projects scope, objectives and setting.

Now Interviews can be Structured or Unstructured. In Structured Interviews, the analyst develops specific sets of questions prior to the interviews and Unstructured Interviews seek a broad and roughly defined set of information. Structured interviews are often a better approach as they force the formalization of the interview process. The questions in the Interview can be- Close Ended questions, Open Ended Questions, Probing Questions.[5] Close ended questions require a specific answer, Open Ended Questions leave room for elaboration on the point of the interviewee and Probing Questions follow up on what has just been discussed in order to learn more.

These Interviews can be one-to-one or two or three persons can be interviewed at a time.

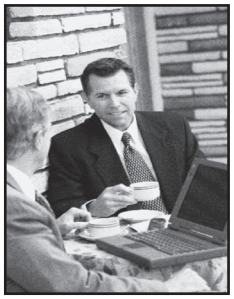


Fig 2: ONE-ON-ONE [4]

Fig 3: GROUP INTERVIEW [4]

An Interview can follow Top-Down Approach or Bottom up Approach. In Top Down Approach the interviewer starts with broad, general issues and gradually works toward more specific ones whereas in Bottom up Approach, the interviewer starts with very specific questions and moves towards the broader issues.

Now if we talk about how Interview-Requirement Gathering Technique helps in maintenance of a Data Warehouse, we have a very important reason to opt for this technique is that an interview helps in exploring and clarifying each requirement in detail.

This can only be obtained by organizing a conversational interview involving a question and answer session with stakeholders to elicit or validate needs and requirements. An interview may include one or more stakeholders that help in discovering needs and the high-level requirements derived from those needs resulting in detailed requirements. Interviews also enables in acquiring the approval from stakeholders with respect to needs, requirements or any other information.

Most important thing from the data warehouse point of view is that, with the help of Interview all the requirements from the stakeholders can be discovered and obtained at an early stage, that is, when the Data Warehouse is constructed. All the detailed requirements from all the important persons in the organization from top level to lower level can be catered in this Interview technique which ultimately helps in defining the objectives of the organization which is primary job. Though the requirements are gathered in the early phase, still it requires cleaning, filtering, and transformation of the data but benefit it gives is that the data can now be explored and processed with less cost and less time, thus, saving the two most important resources of the organization which further helps in achieving the organizational objectives.

5.1 FORMAL INTERVIEW PROCESS STEPS [10]

1. Identify stakeholders to be interviewed.
2. Obtain a general understanding of the customers business.
3. Develop interview questions using open-ended questions.
4. Set meeting time and location for the interview.
5. Provide a set of questions to interviewees prior to the interview (if they will need to prepare for the interview).
6. Use one or more Recorders to accurately preserve results of the interview.
7. Provide results to interviewees for confirmation of content.

5.2 INFORMAL INTERVIEW PROCESS STEPS [10]

1. Identify stakeholders to be interviewed.
2. Obtain a general understanding of the customers business.
3. Develop interview questions (for interviewer's use only) to make sure certain questions are answered during session.
4. Set up a casual meeting or telephone conversation time for the interview.
5. Takes handwritten notes during the interview; avoid using electronic data capture.
6. Provide results to interviewee for confirmation of content.

5.3 ADVANTAGES

1. Generally a simpler approach as it can be done with minimal preparation.
2. Interviews of individuals and small groups require less

planning and scheduling effort than large workshops.

3. Interviews of individuals and small groups require less stakeholder commitment than large workshops.
4. Interviews provide an opportunity to explore or clarify topics in more detail.
5. With the help of Interview, all the requirements from the stakeholders can be discovered and obtained at an early stage, that is, when the Data Warehouse is constructed.

6. SOLUTION APPROACH

6.1: BUILDING AN EFFICIENT DATA WAREHOUSE SYSTEM.

While working towards the solution i.e. Building an efficient Data Warehouse we came across many techniques and found Interview technique as best suitable techniques for solving this problem. Key facts that should be considered while applying this technique is that the questions used in the interview should not reflect the interviewer's preconceived ideas, as it can influence the responses. During the Interview, closed questions should not be asked and stressed upon because it limits the input with respect to the subject.

Closed questions are to the point and can be answered quickly by the user without providing any background or context to the interviewer. In fact, open-ended questions are advisable they don't deliver to the point answers and carry fewer constraints upon the subject's response, thus are more useful in identifying the scope of the problem domain.

For projects with a large number of stakeholders the interview technique may not work efficiently for the factors namely- type of information, depth of information, and breadth of information, integration of information, user involvement, and cost. To overcome this drawback, interview should not be the sole requirements gathering technique for a project. To make it an efficient tool it should be complemented with Survey approach. The survey can force users to select from choices, rate something ("Agree Strongly, Agree…"), or have open ended questions allowing free-form responses thus providing qualitative guidance for characterizing the market and achieving the objective appropriately and efficiently.

In our research project- "Requirements Engineering for Data Warehouse" we have focused on the drawbacks of operational systems and the need of Data Warehouses.

We have also highlighted the problems that were earlier faced when data warehouses were built without taking into consideration "requirements" during the early stage of the development. Requirements Engineering for the data warehouse aims to identify the informational needs of the decision-makers thus saving the cost, time which were incurred before, in extraction, cleaning and filtration of the data needed, when decision support systems were used .Here, Interview has been used as Requirement gathering technique as it helps in exploring and clarifying each requirement in detail which can be considered while constructing the Data Warehouse in the early phase.

6.2 AVERTING THE EFFECTS OF CRISIS IN INDIA.

India came out of the recessionary phase with minor bruises here and there. India's generally conservative financial system played a vital role, too. Its banks and financial institutions were not tempted to buy the mortgage-supported securities and credit-default swaps that ruined several Western financial institutions. Among the drivers of growth, domestic capital formation retained much of its momentum from preceding years.

Moreover, India's government adopted a pro-active fiscal policy, rolling out two rounds of stimulus packages. The authorities pursued pro-growth policies, including lower interest rates, expanded credit, and a reduction in excise duties.

The global slowdown due to economic recession of 2008-09 also affected the business climate within India and the growth rate of the Information Technology Sector. But, India being a developing economy managed to survive the economic recession to an extent.

It is said that every adversity brings in certain opportunities. This stands true for India Inc too as many progressive firms have imbibed new lessons from their struggle against the worst economic recession that this century has ever witnessed. And hence, in an endeavor to ride the storm, companies are implementing the learning derived into action to ensure a smooth road ahead.

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MOUNTING NON-PERFORMING ASSETS OF INDIAN BANKS - REASONS, IMPACT AND ROLE OF ARCIL

Dr. Anita Sharma*

ABSTRACT

The presence of mounting Non Performing Assets in the Indian banking system acts as a threat to their financial performance in several ways. Due to its increasing number earning assets in the financial sector decline even as operating expenses increases. Management and financial resources are diverted to Non Performing Assets problems and away from more productive uses. Non Performing Assets not only puts strain on the profitability on the banks but also eroded their productivity and efficiency. The Non Performing Assets are the bad debts and non recovered loans of the banks which now stand at over 90,000 crores. Large scale Non Performing Assets (NPA) when left unattended, causes continued economic and financial degradation. This results in credit crunch and generally signals adverse investment climate. To resolve NPA problems and help restore the health and confidence of the financial sector the Narshimham committee report (II) on banking sector reforms recommended the establishment of Asset Reconstruction Companies (ARC) and consequently, Asset Reconstruction Company Limited (ARCIL), the pioneer Assets Reconstruction of India, commenced its operation from August 29, 2003.

This paper traces the various aspects like causes and impact of increasing NPA of Indian Banks along with the step forward taken by the ARCIL in their restructuring.

KEYWORDS

Non-Performing Assets, SRFAESI, Asset Reconstruction Company Limited ARCIL, Asset Reconstruction Companies (ARCs)

INTRODUCTION

The banking industry has undergone a sea change after the first phase of economic liberalization in 1991 and hence credit management. While the primary function of banks is to lend funds as loans to various sectors such as agriculture, industry, personal loans, housing loans etc., in recent times the banks have become very cautious in extending loans due to mounting Non-Performing Assets (NPA). The presence of NPA has an adverse impact on the banking system of India.

An NPA is defined as a loan asset, which has ceased to generate any income for a bank whether in the form of interest or principal repayment. As per the prudential norms suggested by the Reserve Bank of India (RBI), a bank cannot book interest on an NPA on accrual basis. In other words, such interests can be booked only when it has been actually received. Therefore, an NPA account not only reduces profitability of banks by provisioning in the profit and loss account, but their carrying cost is also increased which results in excess & avoidable management attention. Apart from this, a high level of NPA also puts strain on a banks net worth because banks are under pressure to maintain a desired level of Capital Adequacy and in the absence of comfortable profit level, banks eventually look towards their internal financial strength to fulfill the norms thereby slowly eroding the net worth

DEFINING NON PERFORMING ASSETS

Non Performing Asset means an asset or account of borrower, which has been classified by a bank or financial institution as sub-standard, doubtful or loss asset, in accordance with the directions or guidelines relating to asset classification issued by RBI. An amount due under any credit facility is treated as "past due" when it has not been paid within 30 days from the due date. Due to the improvement in the payment and settlement systems, recovery climate, up gradation of technology in the banking system, etc., it was decided to dispense with 'past due' concept, with effect from March 31, 2001. Accordingly, as from that date, a Non performing asset (NPA) shall be an advance where

i. Interest and /or installment of principal remain overdue for a period of more than 180 days in respect of a Term Loan,

ii. The account remains 'out of order' for a period of more than 180 days, in respect of an overdraft/ cash Credit (OD/CC),

iii. The bill remains overdue for a period of more than 180 days in the case of bills purchased and discounted,

iv. Interest and/ or installment of principal remains overdue for two harvest seasons but for a period not exceeding two half years in the case of an advance granted for agricultural purpose, and

v. Any amount to be received remains overdue for a period of more than 180 days in respect of other accounts.

With a view to moving towards international best practices and to ensure greater transparency, it has been decided to adopt the '90 days overdue' norm for identification of NPAs, from the year ending March 31, 2004.

Accordingly, with effect from March 31, 2004, a non-performing asset (NPA) shall be a loan or an advance where;

i. Interest and /or installment of principal remain overdue for a period of more than 90 days in respect of a Term

Reader, Maharaja Surajmal Institute, New Delhi

Loan,

ii. The account remains 'out of order' for a period of more than 90 days, in respect of an overdraft/ cash Credit (OD/CC),

iii. The bill remains overdue for a period of more than 90 days in the case of bills purchased and discounted,

iv. Interest and/ or installment of principal remains overdue for two harvest seasons but for a period not exceeding two half years in the case of an advance granted for agricultural purpose, and

v. Any amount to be received remains overdue for a period of more than 90 days in respect of other accounts.

The Non Performing Assets can be classified into the following three broad groups

a. Sub—Standard Assets: With effect from 31 March 2005, a substandard asset would be one, which has remained NPA for a period less than or equal to 12 month. The following features are exhibited by substandard assets: the current net worth of the borrowers / guarantor or the current market value of the security charged is not enough to ensure recovery of the dues to the banks in full; and the asset has well-defined credit weaknesses that jeopardize the liquidation of the debt and are characterized by the distinct possibility that the banks will sustain some loss, if deficiencies are not corrected.

b. Doubtful Assets: A loan classified as doubtful has all the weaknesses inherent in assets that were classified as sub-standard, with the added characteristic that the weaknesses make collection or liquidation in full, on the basis of currently known facts, conditions and values – highly questionable and improbable. With effect from March 31, 2005, an asset would be classified as doubtful if it remained in the sub-standard category for 12 months.

c. Loss Assets: A loss asset is one which considered uncollectible and of such little value that its continuance as a bankable asset is not warranted- although there may be some salvage or recovery value. Also, these assets would have been identified as "loss assets" by the bank or internal or external auditors or the RBI inspection but the amount would not have been written-off wholly.

STATUS OF NON PERFORMING ASSETS OF SCHEDULED COMMERCIAL BANKS

The NPA reflect natural waste in any economy is the bad debts which stand at over RS.90, 000 crores. Table-I shows the volume of NPA of scheduled commercial banks operating in India. It highlights that from the financial year 2005 to 2007 there is a marginal declining trend in the gross non performing assets but the additions during the year shows a constant increase and as a result the trend of Gross NPA starts increasing from the year 2008 to 2010 which is critical, as it has seriously affected the profitability and operational efficiency of scheduled commercial banks in India.

Table -II shows the frequency distribution of Net Non Performing Assets to Net Advances of Scheduled Commercial Banks.

The frequency distribution analysis shows that in all the scheduled commercial banks the net non performing assets to net advances is maximum up to 2 percent. The most striking phenomenon of the frequency distribution is that even the new generation private sector and foreign banks are affected by the non performing assets.

REASONS FOR AN ACCOUNT BECOMING NPA :

I. Internal factors

II. External factors

INTERNAL FACTORS:

I. Funds borrowed for a particular purpose but not use for the said purpose.

II. Project not completed in time.

III. Poor recovery of receivables.

IV. Excess capacities created on non-economic costs.

V. In-ability of the corporate to raise capital through the issue of equity or other debt instrument from capital markets.

VI. Business failures.

VII. Diversion of funds for expansion \ modernization \ setting up new projects\helping or promoting sister concerns.

VIII. Willful defaults, siphoning of funds, fraud, disputes, management disputes, mis-appropriation etc.

IX. Deficiencies on the part of the banks viz. in credit appraisal, monitoring and follow-ups, delaying settlement of payments\subsidiaries by government bodies etc.,

EXTERNAL FACTORS:

I. Sluggish legal system -

- Long legal tangles
- Changes that had taken place in labor laws
- Lack of sincere effort.

II. Scarcity of raw material, power and other resources.

III. Industrial recession.

IV. Shortage of raw material, raw material\input price escalation, power shortage, industrial recession, excess capacity, natural calamities like floods, accidents.

V. Failures, nonpayment\over dues in other countries, recession in other countries, externalization problems, adverse exchange rates etc.

VI. Government policies like excise duty changes, Import duty changes etc.,

Table-I : Non Performing Assets of Scheduled Commercial Banks (Rs in Crores)

All Scheduled Commercial Banks	F.Y. 2005	F.Y.2006	F.Y.2007	F.Y.2008	F.Y.2009	F.Y.2010	TOTAL
Gross NPA- year beginning	64439	59124	50299	55419	68283	83906	381470
Additions	20396	21408	34420	52382	65674	70410	264690
Reductions and write off	25320	28717	29090	38828	49200	56390	646160
Gross NPA- year closing	59515	51815	55629	68973	84397	97922	418251

(Source: Compiled from "Reports on Trends and Progress of Banking in India" published by Reserve Bank of India) 2011

TABLE-II :
Net NPAs to Net Advances of Scheduled Commercial Banks **Frequency Distribution**

YEAR	PUBLIC SECTOR BANKS	PRIVATE SECTOR BANKS		
		OLD	NEW	FOREIGN
2005-2006				
Upto 2 percent	22	11	6	26
Above 5 percent and less than 5 percent	11	7	2	0
Above 5 percent and less than 10 percent	0	0	2	0
Above 10 percent	0	0	0	3
2006-2007				
Up to 2 percent	26	14	7	27
Above 5 percent and less than 5 percent	2	2	1	1
Above 5 percent and less than 10 percent	0	1	0	0
Above 10 percent	0	0	0	1
2007-2008				
Up to 2 percent	26	15	7	25
Above 5 percent and less than 5 percent	2	0	1	2
Above 5 percent and less than 10 percent	0	0	0	0
Above 10 percent	0	0	0	1
2008-09				
Up to 2 percent	28	15	7	25
Above 5 percent and less than 5 percent	0	0	1	2
Above 5 percent and less than 10 percent	0	0	0	1
Above 10 percent	0	0	0	0
2009-10				
Up to 2 percent	27	14	4	24
Above 5 percent and less than 5 percent	0	1	3	6
Above 5 percent and less than 10 percent	0	0	0	1
Above 10 percent	0	0	0	0

Source : RBI Annual Report

IMPACT OF NPA

PROFITABILITY

NPA means booking of money in terms of bad asset, which occurred due to wrong choice of client. Because of the money getting blocked the prodigality of bank decreases not only by the amount of NPA but NPA lead to opportunity cost also as that much of profit invested in some return earning project/asset. So NPA doesn't affect current profit but also future stream of profit, which may lead to loss of some long-term beneficial opportunity. Another impact of reduction in profitability is low ROI (return on investment), which adversely affect current earning of bank.

LIQUIDITY

Money is getting blocked, decreased profit lead to lack of enough cash at hand which lead to borrowing money for shortest period of time which lead to additional cost to the company. Difficulty in operating the functions of bank is another cause of NPA due to lack of money, routine payments and dues.

INVOLVEMENT OF MANAGEMENT

Time and efforts of management is another indirect cost which bank has to bear due to NPA. Time and efforts of management in handling and managing NPA would have diverted to some fruitful activities, which would have given good returns. Now a days banks have special employees to deal and handle NPAs, which is additional cost to the bank.

CREDIT LOSS

Bank is facing problem of NPA then it adversely affect the value of bank in terms of market credit. It will lose its goodwill and brand image and credit which have negative impact to the people who are putting their money in the banks.

THE SECURITIZATION AND RECONSTRUCTION OF FINANCIAL ASSETS AND ENFORCEMENT OF SECURITY INTEREST ACT (SARFAESI), 2002

The "The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act" 2002,came into force from June 21,2002.It provides the formal legal basis and regulatory framework for setting up Asset Reconstruction Companies (ARCs) and Asset Management Companies in India to acquire nonperforming assets of any bank or financial institution. In addition to asset reconstruction and ARCs, the Act deals with the following largely aspects,

- Securitization and Securitization Companies
- Enforcement of Security Interest
- Creation of a central registry in which all securitization and asset reconstruction transactions as well as any creation of security interests has to be filed.

The Reserve Bank of India (RBI), the designated regulatory authority for ARCS has issued Directions, Guidance Notes, Application Form and Guidelines to Banks in April 2003 for regulating functioning of the proposed ARCS and these Directions/ Guidance Notes cover various aspects relating to registration, operations and funding of ARCS and resolution of NPAs by ARCS. The RBI has also issued guidelines to banks and financial institutions on issues relating to transfer of assets to ARCS, consideration for the same and valuation of instruments issued by the ARCS. Additionally, the Central Government has issued the security enforcement rules ("Enforcement Rules"), which lays down the procedure to be followed by a secured creditor while enforcing its security interest pursuant to the Act. The Act permits the secured creditors (if 75% of the secured creditors agree) to enforce their security interest in relation to the underlying security without reference to the Court after giving a 60 day notice to the defaulting borrower upon classification of the corresponding financial assistance as a non-performing asset. The Act permits the secured creditors to take any of the following measures:

- Take over possession of the secured assets of the borrower including right to transfer by way of lease, assignment or sale;
- Take over the management of the secured assets including the right to transfer by way of lease, assignment or sale;
- Appoint any person as a manager of the secured asset (such person could be the ARC if they do not accept any pecuniary liability); and
- Recover receivables of the borrower in respect of any secured asset which has been transferred. After taking over possession of the secured assets, the secured creditors are required to obtain valuation of the assets. These secured assets may be sold by using any of the following routes to obtain maximum value.
- By obtaining quotations from persons dealing in such assets or otherwise interested in buying the assets;
- By inviting tenders from the public;
- By holding public auctions; or
- By private treaty.

Lenders have seized collateral in some cases and while it has not yet been possible to recover value from most such seizures due to certain legal hurdles, lenders are now clearly in a much better bargaining position vis-a-vis defaulting borrowers than they were before the enactment of SARFAESI Act. When the legal hurdles are removed, the bargaining power of lenders is likely to improve further and one would expect to see a large number of NPAs being resolved in quick time, either through security enforcement or through settlements. Under the SRFAESI Act ARCs can be set up under the Companies Act, 1956. The Act designates any person holding not less than 10% of the paid-up equity capital of the ARC as a sponsor and prohibits any sponsor from holding a controlling interest in,

being the holding company of or being in control of the ARC. The SARFAESI and SARFAESI Rules/ Guidelines require ARCs to have a minimum net-owned fund of not less than Rs. 20,000,000. Further, the Directions require that an ARC should maintain, on an ongoing basis, a minimum capital adequacy ratio of 15% of its risk weighted assets. ARCS have been granted a maximum realization time frame of five years from the date of acquisition of the assets. The Act stipulates several measures that can be undertaken by ARCs for asset reconstruction. These include:

- Enforcement of security interest;
- Taking over or changing the management of the business of the borrower;
- The sale or lease of the business of the borrower;
- Settlement of the borrowers' dues; and
- Restructuring or rescheduling of debt.

ARCS are also permitted to act as a manager of collateral assets taken over by the lenders under security enforcement rights available to them or as a recovery agent for any bank or financial institution and to receive a fee for the discharge of these functions. They can also be appointed to act as a receiver, if appointed by any Court or DRT.

PROGRESS OF SARFAESI ACT IN RECOVERY OF NPAS

The Narshimham Committee (II) was appointed to review progress in banking sector over the past six years with particular reference to the recommendation made by the committee on the financial system in 1991. The committee submits its report to the government of India on 22nd April 1998. One of the main recommendations was to set up Assets Reconstruction/Management companies in India to check the Non performing assets.

Table-III highlights the details relating to the various recovery channels of nonperforming assets. It highlights that Lok Adalats, Debt Redressal Tribunals and Assets Reconstruction Companies of SARFAESI Act are the three major NPA recovery channels of which the ARCs established on the basis of SARFAESI Act has been the most successful in the recovery of Non Performing Assets.

GENESIS OF ASSETS RECONSTRUCTION COMPANY INDIA LIMITED (*ARCIL*)

Assets Reconstruction Company India Limited (ARCIL) is a pioneer Assets Reconstruction Company to commence operation in India. It is registered with Reserve Bank of India under sections of Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002 (SARFAESI Act) and registered as a Securitization and Reconstruction Company. It commenced operations from August 29, 2003.

Table -III Recovery through various channels by Scheduled Commercial Banks

YEAR	RECOVERY CHANNEL		
	LOK ADALATs	DRTs	SARFAESI ACT
2006-07			
No. of Cases	1,60,368	4,028	60,178
Amount Involved	758	9156	9058
Amount Recovered	106	3463	3749
Amount Recovered as % of Amount Involved	**14**	**37.8**	**41.4**
2007-08			
No. of Cases	1,86,535	3728	83942
Amount Involved	2142	5819	7263
Amount Recovered	176	3020	4429
Amount Recovered as % of Amount Involved	**8.2**	**51.9**	**61**
2008-09			
No. of Cases	5,48,308	2004	61,760
Amount Involved	4023	4130	12067
Amount Recovered	96	3348	3982
Amount Recovered as % of Amount Involved	**5.4**	**81.1**	**33**
2009-10			
No. of Cases	7,78,833	6019	78866
Amount Involved	7235	9797	14249
Amount Recovered	112	3133	4269
Amount Recovered as % of Amount Involved	**1.55**	**32**	**30**

Source : Compiled from "Reports on Trends and Progress of Banking in India" published by RBI

RESTRUCTURING OF NPA BY ARCIL- PROCEDURE OF NPA TRANSFER TO ARCIL AND VALUATION OF NPA

ARCIL acquired NPA by way of "True Sale". Once an organization sells NPA to ARCIL the entire liability of the NPA shifts to ARCIL and the seller has no further interest in that asset. The valuation of NPA and the price offered by ARCIL depends on the nature of the security the lender has over borrower assets, the value realizable from the security, and the time to realize the value. There are specific guidelines from the RBI regarding the valuation of NPAs.

After acquiring the assets, the ARCIL raises resources through the issue of Security Receipts (S.R.) to eligible investors who are called **Qualified Institutional Buyers (QIBs)**.

The amount collected through the issue of Security Receipts is utilized towards the payment of the assets purchased from the banks and financial institutions. Thus ARCIL becomes the legal owner of the assets and Security Receipts holder becomes the beneficial owner. The Security Receipts represent the individual rights, title and interest of investors in the financial assets held in the fund floated by the ARCIL. These are redeemed out of the realization from financial held by the ARCIL.

On detailed analysis of all the cases acquired by ARCIL till March 2005, it is seen that 78% of all the units acquired are either fully operating or partly operating, rest 22 percent of the units acquired are non operating. If we assess the resolution strategy of the units acquired by ARCIL, it can be seen that 57 percent of the acquired units have been made operational through restructuring, 30 percent through merger and acquisition and 13 percent though the sale of assets and settlement.

Performance of ARCIL in NPA Restructuring

Table-6 Operational Performance of ARCIL **(Amount in Crores)**

Particulars	During First Half of FY07	Up to First Half of FY 07
Acquisition No of cases acquired	63	622
Total due	1286	22412
No of selling Bank	13	36
Resolution	28	204
Total dues involved in resolved cash	1741	11592
% of cases resolved out of cases acquired up to FY05	8%	56%
% of dues involved in cases resolved out of cases acquired up to FY 2005	10%	66%
Exited cases no of exited cases	43	107
Total dues involved in exited cases	759	2769
Recovery and distribution Amount Recovered and distributed	550	1157

Source: www.arcil.co.in (Newsletter November 2006)

ARCIL had completed five years of its operations on August 29, 2008.Its performance in the restricting can be judged clearly from the data given in Table-6.It clearly shows that ARCIL has acquired a total share of Rs. 22,212 crores belonging to a total of 622 cases up to fist half of the financial year of 2007. Of this ARCIL has resolved 204 cases involving Rs.11, 592 crores. The total amount recovered and distributed up to first half of 2007 were Rs.1157 crores. If one analyzes the percentage of resolved cases then it can be seen that till financial year 2005 ARCIL has resolved 56 percent of the cases it has acquired. Similarly 66 percent of the total dues involved in cases were resolved out in financial year 2005.

CONCLUSION

It is evident that the Non Performing Assets in India has adversely affected the profitability, productivity and efficient functioning of banks. Indian Banking industry was grappling with the huge amounts of NPA touching an amount of INR 1, 00,000 crores at one point in time. Due to the gravity of the situation Government of India introduced drastic and sweeping reforms in banking sector and positive results have started to flow. The introduction of SARFAESI Act by RBI is one of the concrete step in this direction. It results in reduction of NPA of public sector banks in a significant manner from Rs. 68,714 crores in the year 2003 to Rs.52,569 crores in the year 2006 despite more than the double growth (104 percent) during the four years. The credit for this goes to innovative regulations, accounting procedures and above all establishment of ARCIL. ARCIL undertook significant efforts in market seeding, creating awareness, and acquainting banks and financial institutions with the concept of business model, attracting capital to this new class of assets etc. ARCIL have shown a speedy recovery of NPA. It converts the NPA value into an investment in the books of the bank and financial institutions. The role played by ARCIL in the restructuring of NPA of Indian banks is significant but the process is yet to gain momentum and banks are yet to utilize the services of ARCIL fully.

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TURNING A CRISIS INTO AN ADVANTAGE:
(A STUDY OF CHALLENGES FACED BY MEDIA INDUSTRY)

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ABSTRACT

The influence of economic depression during late 2000 is widely experienced across the world and has affected almost every sector to some extent. The objective of present paper is to analyze this impact on media industry. Hereby, the paper will study the different fields in the media industry; they are – advertising, news and entertainment. These fields will be studied in a way to understand the degree of influence of economic crisis that followed in fiscal year 2008. The research will seek to examine the efforts put by the industry to overcome the crisis. Therefore, the paper will look at the growth drivers or the various mechanisms that were adopted by the respective media channels.

KEYWORDS

Growth Drivers, Consolidation Period, FDI and FII

INTRODUCTION

The structure of the Indian economy had undergone considerable changes in the last decade. The service sector has become a major part of the economy with GDP share of over 50 per cent and the country becoming an important hub for exporting IT services. The share of merchandise trade to GDP increased to over 35 percent in 2007–2008 from 23.7 per cent in 2003–2004. If trade in services is included the trade ratio is 47 per cent of GDP for 2007–2008. The subprime crisis that surfaced around August 2007 had affected financial institutions in the United States and Europe. The collapse of the Lehman Brothers in mid September 2008 further aggravated the situation leading to the crisis of confidence in the financial markets. The resulting heightened uncertainty cascaded into a full blown financial crisis of global dimensions that stymied prospects of an early recovery. The crisis meant that the economy experienced extreme volatility in terms of fluctuations in stock market prices, exchange rates and inflation levels during a short duration necessitating reversal of policy to deal with emergent situations.

The effect on Indian economy was not significant in the beginning; the initial effect of subprime crisis was in fact positive, as the country received accelerated Foreign Institutional Investment (FII) flows during September 2007 to January 2008. This led to a belief that emerging economies remained largely insulated from the crisis and provide an alternative engine of the growth to the world economy.

This paper traces the means through which media industry survived in this recession and the paper will categorize this impact on press and television channels. This will further consider that the various mechanisms that were adopted by the channels and the organization to overcome the recession.

METHODOLOGY

The methodology for the paper covers the literature review, data extraction from the annual reports and newspapers. Informal telephonic interviews of media officials have also been conducted.

BROADCASTING

The Indian media market is booming. It reflects strong performance of the domestic economy. But Indian broadcasters have faced crunch even if there is overall growth of the entrepreneurs. Broadcasters have not been getting fair share of subscription revenue from the analogue distribution system. Spread of DTH and Digital cable in addressable environment is seen as the way which can ensure fair share of subscription revenues to broadcasters.

Prasar Bharati, a public service broadcaster, gives due priority to the matters of national importance as determined by the government. The total expenditure in Prasar Bharati in 2007-2008 was Rs. 2,030.0 crore and the total receipts were Rs. 1,185 crore (gross) and Rs. 1,035.9 crore (net) in 2007-2008. It has taken number of steps to increase the revenue generation by aggressive marketing, introducing digital technology and television on mobile phones. Nine marketing divisions were set up at major cities which catered to the advertising needs of the All India Radio and Doordarshan through a single window facility. Prasar Bharati also hosted the Commonwealth Games held in 2010; which gave it an opportunity to introduce modern technology of High Definition Television (HDTV) to cover sports events.

Whilst, NDTV has considered this global economic crisis as much an opportunity as a challenge. It has taken key steps to being an efficient organization with higher revenues and lower costs. It has started to generate higher revenues through innovative programming initiatives and campaigns like the “7 Wonders of India” and “Toyota Greenathon”. NDTV Convergence is another such mechanism amongst the verticals with the greatest potential for future growth and impact. NDTV.com is one of India’s leading news websites with a large following both with the Diaspora outside India as well as with the younger generation within India. Overall, the growth witnessed in revenue was 7% from Rs. 3,184.99 million in the year 2008 to Rs. 3,417.33 million in the year 2009.

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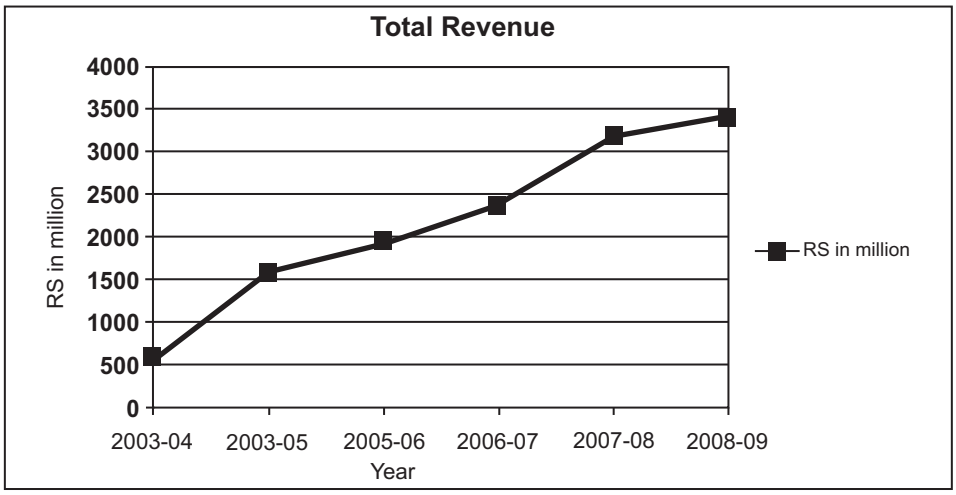
The following chart depicts the revenue over the years.



(Source: NDTV AR 2008-09)

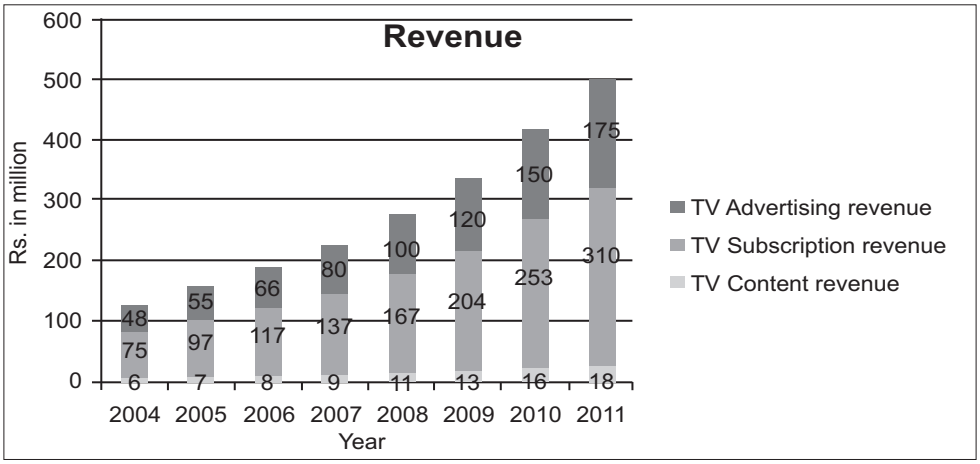
Zee Entertainment Enterprises Limited is India's largest vertically integrated media and entertainment. The company has 15 channels that serves widest array of content choices in India and enjoy nearly 50 percent of viewership share in Hindi speakink markets. Zee has witnessed the growth of Rs. 2 million in content revenue, that is, from Rs. 11 million in 2008 and Rs. 13 million in 2009. Zee TV is averaging 26% channel share for the year. Its talent-based reality show 'Sa Re Ga Ma Pa' has broken all records in TV ratings and is longest running reality show in India produced InHouse by the Company.

ADVERTISING

It has been believed that sector has continued to grow rapidly and will be continued in a same manner. There has been stong growth in GDP from 7 – 8 percent which has raised the disposable income and consumerism; ultimately has become the driving factor for both media penetration and corporate advertising with the emergence of new class of advertisers such as telecom, insurance, travel, education, holidays based multinational companies. Advertising revenue is usually comprised of revenue from sale of advertising time, which is recognised on accrual basis when advertisements are telecast in accordance with contractual obligation. It also comprised of sponsorship contracts, which is recognised proportionately over the term of sponsorship.

Advertising is one of the key risk factor; a decline in advertising revenue overall can adversely affect the company. Adverting revenue make up 78-79 percent of company's revenue and the trends of highlevels of contribution of advertising revenue to aggregate revenues is likely to continue for the forseeable future. In this scenario, if company's programming is unable to sustain high levels of viewership rating, the consequent decline in advertising revenue will manifest itself as a significant dip in aggregate revenues. Therefore, lot of focus is made to increase the viewership of the programmes of a channel and this also becomes the strategy for the advertisors to invest accordingly by making choices in the different time slots.

Zee has faced the growth of Rs. 20 million, that is, from 100 million in 2008 to 120 million in 2009. The following graphs gives the details of categorised revenue of Zee Ltd. and advertising base of NDTV.



(Source: Zee AR 2008-09)

NDTV has also seen the growth in terms of advertising base – number of advertisers has been increased from 1735 in 2007-08 to 1976 and number in 2008-09 and the number of brands has been increased from 3794 in 2007-08 to 4453 in 2008-09. The following graphs shows advertising base of NDTV.

NEWS

NDTV has made remarkable transformations by providing new ways of showing news to the world. Its Hindi news channel, NDTV India, has distinguished itself by refusing to turn 'tabloid' and 'sensational' - the two words used most often to describe all other Hindi news channels in the country. While the number of eyeballs that consume tabloid media all over the world is always much higher than for solid, credible news media, in other nations advertisers clearly distinguish between the two types of media. Consequently, advertisers tend to pay far higher rates per eyeball for a credible news channel/newspaper than for tabloid versions. But the trend has been changing. This sharp distinction by advertisers has so far not existed in India - but is now beginning. Finally, in this period of crisis, NDTV has started to see higher revenues per eyeball for its Hindi channel than the revenues per eyeball that many tabloid news channels are garnering.

On the other hand its , NDTV 24x7, is one of the India's most watched channel by family viewers across the country and particularly by the nation's opinion makers. For instance, a nationwide survey after the elections showed that among all English news channels, NDTV 24x7 was viewed by 52% of all viewers, CNN-IBN by 25% and Times Now by 12%.

BUSINESS STRATEGIES

The key elements of the Company's business strategy during the year were (i) strengthening existing operations through innovative and solution driven approach (ii) targeting increased operational efûciency across all functions in the organization (iii) expansion while protecting existing margins and (iv) maintaining consistently high standards of Corporate governance.

i. Strengthening existing operations through innovative and solution driven approach: Innovative tailor-made solutions for clients brought on board a healthy mix of advertisers from across sectors. Customized advertising solutions by way of non FCT properties helped create new revenue streams.

ii. Targeting increased operational efficiency across all functions in the organization: Our focus on efficiency enhancement, further rationalization of cost and strengthening of Balance Sheet strength enhanced our competitive advantage many fold.

iii. Expansion while protecting existing margins: Launch of new channels like Zee Tamil, Zee 24 Gantalu and Zee News U.P strengthened the ZNL bouquet of channels while generating synergy benefits.

iv. Maintain consistently high standards of Corporate Governance: Since inception the Company has believed that good governance is critical to sustaining corporate development, increasing productivity and creating shareholder wealth. When it comes to compliance and corporate governance, Zee News Limited has always tried to go a step further than what is prescribed for accountability, disclosure and judiciousness in conduct.

CONCLUSION

Indian media industry has seen ups and downs during the economic depression of late 2000s. This would be inappropriate to say that it went into huge losses; rather it used varied business strategies to overcome the situations and in fact it has been found that it led to the upcoming of new technologies, new markets. It seems the same situation where C.K. Prahalad (2004) in *The Fortune at the Bottom of the Pyramid* shows the mechanisms that how the market can be reinvented at poor socio-economic level. Somehow similar strategies have been used by media tycoons to enlage their market at all levels of socio – economic strata. And this is how the economic depression has been converted into an advantageous situation.

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INDIAN RURAL MARKETING - CHALLENGES, OPPORTUNITIES AND STRATEGIES FOR THE MARKETEERS

Benu Sharma*

ABSTRACT

The Indian rural market is becoming lucrative and demanding both for the companies and the customers. It is filled with challenges and opportunities both. On one hand, there are specific characteristics of the rural market which stops the companies to enter and perform on the other hand the market invites great business volumes in terms of population and its uniqueness.

KEYWORDS

Literacy, Rural, Potential, Price Perception, Socio – Psychological.

INTRODUCTION

According to the Census of India- 2011, in comparison to just 5161 towns in India, there are 6,38,365 villages which clearly reflects where the real India resides.The rural markets are green pastures for any marketer provided his marketing plans are attuned to specialties of rural markets. The rural markets are estimated to be growing fast compared to the urban markets. The potentiality of rural markets is said to be like a 'Woken up sleeping Giant'.

However, the rural market in India comes in picture along with a range of challenges, these challenges are necessary to be addressed in order to ensure sustainable growth of a concerned MNC in India. Further, on a positive note, these challenges are in themselves, proving to be the opportunities in one way or the other.

AN OVERVIEW

The Indian market scenario shows the signs that the urban market of the country is saturating at a faster rate which indirectly put forward the urgency in front of the MNCs operating in India to shift their focus on the rural markets. It is a well known fact that the rural population is making 70% of the total country's population and not only that, the factors like increasing awareness level along with the gradually increasing disposal income of the rural customer are positive signs for the marketing firms.

Till now, the scenario is pretty clear that the markets of rural India are witnessing a high demand and thus, are contributing more profits to the firms than their urban counterpart. Initially, there was a general impression that only agricultural products like seeds, fertilizers and cattle feed have a potential to sustain in the rural market but now, this has been proved as a myth with the growing demand of consumer goods like televisions, 2 and 4 wheelers, refrigerators.

WHAT IS RURAL MARKET

According to Census 2011, any habitation with a population density of less than 400 sq. km., where at least 75% of the male population is engaged in agriculture and where there exists no municipality or board.

On the other hand, if we talk about a global firm, LG India defines the rural and semi urban area as all other cities other than the 7 metros in the country while companies like Sahara, ITC and HUL treated the term rural market as any location having shops or commercial establishments with up to 10,000 people.

Thus, in a layman's language, a rural market can be defined as any market that exists in an area where the population is less than 10000.

FACTORS FOR GROWTH OF RURAL MARKET

1. Growing rural population.
2. Rising income of rural consumers.
3. Governing schemes in rural development program
4. Increase in productivity in agriculture and related activities.
5. Improvement in infrastructure facilities.
6. Improved distribution networks of companies
7. Expansion of rural market
8. Liberalized government policies
9. Manufactures and marketers placing special emphasis on rural marketers.
10. Emergence of new cadre of entrepreneurs
11. Innovative marketing and advertising program.
12. Introduction of new products, packaging, etc.
13. Change in price perceptions
14. Changing life style.

The vastness of the rural market poses both a challenge and an opportunity to the marketers. The desire to improve the living standards is felt as keenly in the rural areas as in the urban areas. The rural incomes are rising and the poverty ratio is falling. The marketing strategy to tap this vast market potential must take into account the special characteristics of the rural areas, attitudes, and socio-psychological characteristics of the rural population. The rural market paves both opportunities and challenges for companies, some of them can be highlighted as:

CHALLENGES/ OPPORTUNITIES IN INDIAN RURAL MARKETS

- **Literacy levels**

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The level of literacy is one of such parameters in which there can be no comparison between the customers of rural and urban background. Though the recent trends in this context are encouraging but there is a plenty to be achieved. This challenge is very crucial as far as the marketing of the firm is concerned as low levels of literacy makes the print media completely ineffective in the rural markets. However, the sources of electronic media like cinema, radio and television compensates the issue to the larger extent.

OPPORTUNITY

The factor of illiteracy in the rural customers makes the way for the firms to make intelligent use for the logos for maintaining brand recall in them. For example, the mascot of Asian Paints, a boy with a paintbrush in his hand known as Gattu is pretty famous in the rural surroundings.

- **DEMAND**

The main reason for the above mentioned **challenge** is that more than 70% of the rural income is based on the agriculture which is typically seasonal in its nature. This leads to a fair increase in the demands of consumer goods and durables during the harvesting season. Interestingly, the major festivals like Baisakhi, Deepawali and Sankranti are also coincide with the peak season maximum. Howeve, on the other hand, the profit contributions are negligible in the other seasons which results in to inadequate sales realizations.

OPPORTUNITY

The seasonal pattern of demand in the rural markets emphasize on the need of punctual and frequent distribution system unlike the uniform distribution system in the urban markets. This, in itself, is an opportunity for the firms as if they try to make a thoughtful and intelligent strategy along with the optimum use of resources, they will be in a seasonal hikes and keep on getting the dose of continuous profits from the urban markets as well.

- **MEDIA**

From many decades, the main periphery of the media of rural areas of India revolves around only two things- Radio and Cinema. Radio and cinema cannot be the wheels of the promotion for the products of the companies and that too, on a continuous basis as any firm needs to regularly innovate and upgrade the products to maintain its market is concerned. This condition poses a grave challenge as the above-mentioned tools of entertainment are outdated in today's world of information technology. Moreover, the third to be a lot broader in the coverage of the Indian population for becoming a countable medium of communication in the rural markets.

OPPORTUNITY

The positive thing about the issue discussed above is that though they are outdated tools of entertainment but for more than five or six decades, they are maintaining the levels of their popularity in the rural life. The concept of community radio-sets is still in trends and the programs like Binaca Chitramala is being reminded with a lot of favoritism. Further, the concept of Radio has been redefined over the period of last ten years and now, they are also a part of the life of urban people. Cinema has always been favorite mode of entertainment for the villagers and can be counted as a reliable source ofmarketing for the companies.

- **GEOGRAPHICAL**

This **challenge** is typically concerned with the uneven and vast length and breadth of our country India. Due to its geographical diversity, there is no pattern which anyone can chalk out to form and efficiently implementation of any marketing strategy. The interesting thing about this issue is the different cultures residing even in the rural India. Depending upon the major cultural traits, our country is mainly divided into five major zones- northern, eastern, western, southern and central. The rural life all these zones display a lot of heterogeneity which makes it very difficult for the marketers to form a uniform policy for promoting their product.

OPPORTUNITY

The problem mentioned above is, undoubtedly, one of the prime concerns for the MNCs to think over but on the other hand, it creates an opportunity also. Even in the five zones in which our country is divide is not only culturally heterogeneous but also shows opposite character in the sense of economy. E.g. the farmers of northern states like Punjab and Haryana are lot more prosperous and progressive than the farmer of Maharashtra and Chhattisgarh which gives the firms the level playing field to tap the former as a customer and turn the situation in their favor.

- **PIGGY BACKS**

Piggy backs are the imitative products which pose enormous challenge to the markets because of their lower prizes, local made, availability and enforcement.

- **MISCELLANEOUS**

Apart from the challenges discussed earlier, there are a lot of diverse things which, in one way or the other, are posing the problems in front of the marketers.

There are issues like rural electrification, uneven disposable income, large diversity in languages, inadequate credit facilities etc. which are yet to be tackled.

OPPORTUNITIES

All the miscellaneous problems are not over the enormous possibilities in the markets of the rural India. Moreover, the recent surveys and trends are optimistic

about most of the problems and give an encouraging picture for the future of all the multinationals in the rural counterparty of their urban markets.

SOME MEANINGFUL STRATEGIES OF COMPANIES:

PRODUCT RELATED

a) New product design : Design the products so as to meet the need of the population. Some initiative by the companies is; lower cost television, regional language mobile phones, branded cigarette at the price of bidi, extended warrantees.

b) Rough and Tough products : e.g., lower cost semi automatic washing machines, motor bikes, etc.

c) Brand name : Use of local brand names or the names from rural surrounding; like eveready Jeevansathi torch, Billi Chap batteries, Sarpanch tractor from Mahindra.

PRICE RELATED

The poor cash flow and lower disposable income in the hand of rural population guided the companies to design pricing strategies in a way that the rural population could afford it. It has also motivated the companies to think on packaging and value engineering.

DISTRIBUTION RELATED

Today most of the companies are using the strength of distribution and they are also using it. They are trying to cover almost all villages; the government is also helping in development of infrastructure like PradhanMantri Gram SadakYojana; which is connecting rural village to cities, paving the way of success to the companies.

Co-operatives are also providing a solid platform to sell products with their help. Approximately 5 lakhs co-operative are working in rural areas.

Utilization of public distribution system is also another imitative for the companies to sell some FMCG products. Even the petrol pumps of rural areas could be utilized as shopping centers.

Use of MANDI, HAAT, ANDJATHRAS & MELAS is also very common but effective distribution strategies in rural markets. ITC's E- Choupal, Hariyali Bazar from Shri Ram Group is some projects in this area.

PROMOTION STRATEGIES

Communications is essential element of marketing. Everything told by the companies about their products and services inth e market comes in communication. Some strategies in this are; Use of mass media like; radio; television, Direct to home services, Local cinemas. Even print media is also having good coverage in rural areas and companies are using it as upcoming mode of communication.

CONCLUSION

Every challenge gives some opportunities the marketers where they could utilize their managerial skills and generate profitable results. The rural market is changing so as the characteristics of the buyers. The need of the hour is offering them products accordingly.

List of piggybacks Products

S.No.	Original Products	Imitation Products
1	Ponds	Polons
2	Rin	Run
3	501 bar	509 Bar
4	Cadbury Eclairs	Choudhary Éclair
5	Brook Bond	Benson Brand
6	Nirma	Nilima, Narima
7	Lifeboy	Liteboy, Lifejoy
8	Colgate	College
9	Fair & Lovely	Friends & Lovely

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METHODS OF TRAINING IN ARTIFICIAL NEURAL NETWORKS

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Neha Bhatia**

ABSTRACT

An artificial neural network is a system based on the operation of biological neural networks, in other words, is an emulation of biological neural system. It consists of a collection of interconnected neurons. From an engineering prospective, it can he regarded as an extension of the conventional data-processing technique. The following definition of neural networks may be offered as "A neural network is a 'massively parallel distributed processor that has a natural propensity for storing experiential knowledge and making it available for use It resembles the brain in two respects: (1) knowledge is acquired by the network through a learning process, and (2) interneuron connection strengths known as synaptic weights are used to store the experiential knowledge. Recession prediction has lately raised a great interest due to the recent world crisis events. In spite of the many advanced shallow computational methods that have extensively been proposed, most algorithms have not yet attained a desirable level of applicability. All show a good performance for a given financial setup but fail in general to create better and reliable models. The main focus of this paper is to present a learning model with strong ability to generate high level feature representations for accurate recession prediction.

KEYWORDS

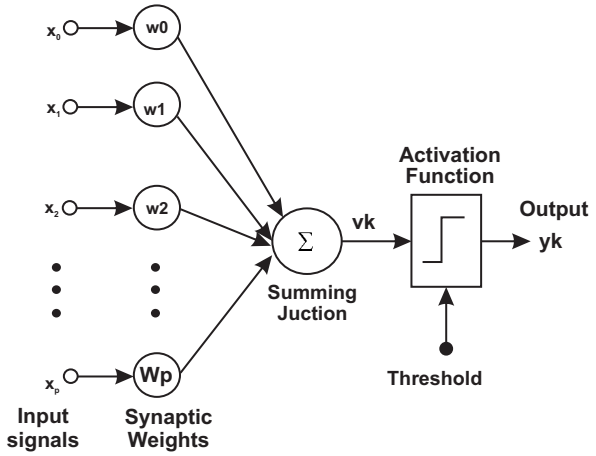
ANN, Neural Network, Biological Neuron.

ARTIFICIAL NEURAL NETWORKS

One type of network sees the nodes as artificial neurons. These are called artificial neural networks (ANNs). An artificial neuron is a computational model inspired in the natural neurons. Natural neurons receive signals through *synapses* located on the dendrites or membrane of the neuron. When the signals received are strong enough (surpass a certain *threshold*), the neuron is *activated* and emits a signal though the *axon*. This signal might be sent to another synapse, and might activate other neurons.

The complexity of real neurons is highly abstracted when modelling artificial neurons. These basically consist of *inputs* (like synapses), which are multiplied by *weights* (strength of the respective signals), and then computed by a mathematical function which determines the *activation* of the neuron. Another function (which may be the identity) computes the *output* of the artificial neuron (sometimes in dependence of a certain *threshold*). ANNs combine artificial neurons in order to process information.

Figure 2 An artificial neuron model



The higher a weight of an artificial neuron is, the stronger the input which is multiplied by it will be. Weights can also be negative, so we can say that the signal is *inhibited* by the negative weight. Depending on the weights, the computation of the neuron will be different. By adjusting the weights of an artificial neuron we can obtain the output we want for specific inputs. But when we have an ANN of hundreds or thousands of neurons, it would be quite complicated to find by hand all the necessary weights. But we can find algorithms which can adjust the weights of the ANN in order to obtain the desired output from the network. This process of adjusting the weights is called *learning* or *training*.

TOPOLOGIES AND TRAINING OF ARTIFCIAL NEURAL NETWORKS

The main Topologies we can make is between, **Feed-forward neural networks**, where the data flow from input to output units is strictly feed forward and **Recurrent neural networks** that do contain feedback connections. Contrary to feed-forward networks, the dynamical properties of the network are important. Classical examples of feed-forward neural networks are the Perceptron and Adaline .[1]

A **neural network** has to be configured such that the application of a set of inputs produces the desired set of outputs. One way is to set the weights explicitly, using a prior knowledge. Another way is to **'train' the neural network** by feeding it teaching patterns and letting it change its weights according to some learning rule. Learning situations may be

(1) Supervised learning or Associative learning in which the network is trained by providing it with input and

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matching output patterns. These input-output pairs can be provided by an external teacher, or by the system which contains the neural network (self-supervised).

(2).Unsupervised learning or Self-organizing in which an (output) unit is trained to respond to clusters of pattern within the input.

(3). Reinforcement learning, this type of learning may be considered as an intermediate form of the above two types of learning. Here the learning machine does some action on the environment and gets a feedback response from the environment. The learning system grades its action good (rewarding) or bad (punishable) based on the environmental response and accordingly adjusts its parameters. Generally, parameter adjustment is continued until an equilibrium state occurs, following which there will be no more changes in its parameters. The self organizing neural learning may be categorized under this type of learning.

BASIC LEARNING LAWS

The weight Vector at time instant (t) is

$W_i(t+1) = wi\ (t) + \triangle w_i(t)$,
Where $\triangle w(t)$ is the change/adjustment in the weight vector. As given in table 1.

Learning Laws	Weight Adjustment $\triangle w_{ij}$	Initial weight
Hebbian	$\triangle w_{ij} = \eta\ s_i\ a_j$, for j=1,2,….,M	Near Zero
Winner takes-all	$\triangle w_{kj} = \eta(a_j - w_{kj})$, k is the winning unit for j=1,2,….,M	Random but Normalised
Perceptron	?$w_{ij} = \eta\ (b_i - s_i)\ a_j$ for j=1,2,….,M	Random
Delta	$\triangle w_{ij} = \eta\ (b_i - s_i)\ f'(x)\ a_j$, for j=1,2,….,M	Random
Widrow-Hoff	$\triangle w_{ij} = \eta\ (b_i - s_i)\ a_j$	Random
Correlation	$\triangle w_{ij} = \eta\ b_i\ a_j$, for j=1,2,….,M	Non zero
Outstar	$\triangle w_{ij} = \eta\ (b_i - w_{jk})$, for j=1,2,….,M	Zero

Table 1 Basic learning laws [1]

1 THE BACK PROPAGATION NEURAL NETWORK ALGORITHM (BPNN)

It is a technique that models the learning procedures of a human brain, and employs a set of activation functions, either nonlinear or linear; this method has been proved to be very useful for various applications. BPNN, which provides advantages of non-linear problem solving ability[4]. BPNN is a multi-layered, feed-forward architecture with supervised learning method for computer learning and modeling. A supervised feed-forward neural network can not only learn from the training data to discover patterns,but approximate many problems with high accuracy. In a supervised learning approach, a set of input variables is used for which the corresponding output variables are known. It comprises one input layer, one output layer, with one or a number of hidden layers in between them. Although a network with multiple hidden layers is possible, a single layer is sufficient to model arbitrarily complex nonlinear functions. With proper selection of architecture, it is capable of approximating most problems with high accuracy and generalization ability. The input layer receives information from the external sources and passes this information to the network for processing. The hidden layer determines the mapping relationships between neurons are stored as weights of connecting links. When the input and output variables are related nonlinearly, the hidden layer can extract higher level features and facilitate generalization. The output from the output layer is the prediction of the net for the corresponding input. The structure of BPNN chosen for the present problem is shown in Figure 3. Each layer consists of several neurons and the layers are interconnected by sets of correlation weights. A standard ANN comprises numerous simple processing units called neurons. Each node is connected to other neurons through directed connecting links; each neuron is a processing unit that contains an activation function and an associated weight. In this paper, the activation functions of hidden layer and output layer are hyperbolic tangent sigmoid function and linear transfer function. A weight returns a mathematical value for the relative strength of connections to transfer data from one layer to another layer.

BPNN estimate relation between input and output of sample patterns by updating iteratively the weights in the network so as to minimize the difference between the actual output vectors and the desired output vectors. The back propagation learning algorithm is composed of initialization, a forward pass, and a backward pass. The weights and biases in the network are initialized to small random numbers. Once these parameters have been initialized, the network is ready for training. A training pattern consists of a set of the input vectors and the corresponding output vectors. In the beginning, a set of training patterns are fed to the input layer of the network. The forward pass starts from the input layer, the net inputs of the neurons are multiplied with corresponding weights, then summated, and transferred to the hidden layer. The activated signals are outputted from the hidden layer, and are passed forward to the output layer.

Finally, the output of BPNN is generated. Subsequently in the backward pass, the error between actual output and desired output is calculated. The error function ø is defined as the mean squared sum of differences between the actual output vector T_k and the desired output vector O_k.

$$\psi = \Sigma_k(Tk-Ok)\text{^}2 \quad (1)$$

The error signal at the output layer is propagated backward to the input layer through the hidden layer in the network. Back-propagation is so named because the error derivatives are calculated in the opposite direction of

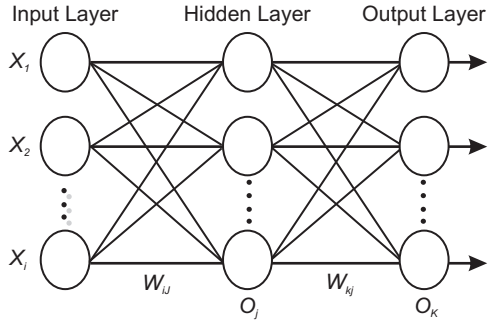

Figure 3. A fully connected multilayer feed-forward network with one hidden layer [6]

signal propagation. In the training process, the gradient descent method calculates and adjusts the weight of the network to minimize the error. In the weight updating algorithm, the derivative of the error with respect to the weight was first negated then multiplied by a small constant β known as the learning rate, as expressed in the following equation:

$$\Delta w_{ij}^{(t)} = -\beta \frac{\delta \Psi(t)}{\delta wij} \quad (2)$$

The negative sign indicates that the new weighting vector is moving in a direction opposite to that of the gradient. In the learning process of neural network, the learning rate affects the speed of convergence. The training process may lead to an oscillatory state if a learning rate is too fast, on the other hand, the convergence speed may suffer if the learning rate is too slow. The training process may not converge in the case of either a too high or too low value for the learning rate β. To accelerate the convergence, a momentum α can be added to the learning procedures.

$$\Delta w_{ij}^{(t)} = -\beta \frac{\delta \Psi(t)}{\delta wij} + \alpha \Delta w_{ij}^{(t-1)} \quad (3)$$

In Equation (3) α is between 0 and 1. When α = 0, a weight change is completely dependent on the value of gradient. When α = 1, the amount of new weight change is set to that of the last weight change and the gradient is simply ignored. The weights are adjusted to make the actual output move closer to the desired output and to obtain the final outputs. This process is repeated until the error is less than a pre-specified level for each of the training data points, or a large number of training iterations have already been run. In summary, the flow chart of training procedure of BPNN is in Figure 4 and the steps are listed as follows.

Set the number of the layer and the number of neurons in each layer :

1. Set β, α and initial values of the weights, and the biases in the network are initialized to small random numbers.
2. Giving input and output vectors.
3. Compute the output values of each layer and unit in a feed-forward direction.

(i) Calculate the output for the jth hidden neuron.

(ii) Calculate the output for the kth output neuron.

4. Calculate the error function at the output neuron.
5. Compute the deltas for each of the preceding layers by back propagating the errors.

(i) Calculate error for the kth output neuron.

(ii) Calculate error for the jth hidden neuron.

6. Update all weights and biases
7. Repeat steps 3-7 until the iteration has finished or the algorithm is convergent.

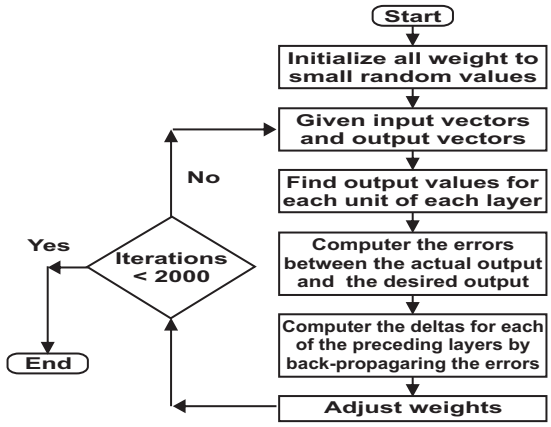

Figure 4. The flow chart of the BPNN[6].

5. CONCLUSION

This paper introduces to identify the indicators of recession, to analyze historical progress and to give different approaches to predicting recession using various methods of training in Artificial Neural Network. Artificial Neural Network is capable of approximating most problems with high accuracy and generalization ability which is very helpful in calculating parameters of complex network which can not be solved by mathematical model or it is difficult to solve it mathematically. Various software's is available to train the network and implement the various training algorithm for different kind of applications.

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