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Rashtreeya Sikshana Samithi Trust

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## **From the Desk of Chief Editor ...✍**

Welcome to the Volume 2 issue 1 of RVIM Journal of Management Research. I would like to begin by expressing my sincere gratitude to all our authors who have contributed to the journal. I am also indebted to the reviewers and the editorial team for their contributions. The current issue includes both conceptual and empirical papers with considerable depth and detail. These papers are selected from the list of 116 papers presented at the International Conference on **"Innovative Strategies for Value Creation and Management"**, held on 10th and 11th of December 2009 at R V Institute of Management. Through this issue we have tried to focus on theoretical, pragmatic, applied and interdisciplinary research in different areas for innovation and value creation. The articles reflect creative thoughts, ideas, opinions and beliefs that will stimulate professional thinking. This issue will serve as a channel for knowledge sharing. We hope readers will find articles in the journal informative and enlightening. I would like to thank all our readers for their continued support and goodwill for RVIM Journal of Management Research. We welcome the suggestions and criticisms to improve the quality and usefulness of our endeavour.

**Dr. T V Raju**  
Chief Editor

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*ALIREZA BADELEH*

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# CREATING INNOVATION THROUGH HUMAN CAPITAL ASSET MANAGEMENT BUILDING THE EDUCATION PYRAMID – A CASE STUDY

Prof Mike Dillon \*  
John Heap \*\*  
Will Davies\*\*  
Rory Dillon\*\*

**Abstract:** *It is a truism to say that people are an organization's most valued resources. This is often said, occasionally acted upon but rarely taken to the logical conclusion of making it the focus of organisational policy and strategy. Management of human capital has been overlooked as a driver of increased profitability.*

*This paper describes a journey through a landscape of thought and experimentation that has attempted to build on that simple concept and help companies realise the commercial benefits that can accrue through implementation of the concept. This journey has been undertaken over a number of years, with a few blind alleys and meandering paths, but always in pursuit of a simple objective – to find a way of maximising the value and creativity of the workforce in support of organisational objectives.*

**INTRODUCTION:** It is a truism to say that people are an organization's most valued resources. This is often said, occasionally acted upon but rarely taken to the logical conclusion of making it the focus of organisational policy and strategy. Management of human capital has been overlooked as a driver of increased profitability.

This paper describes a journey through a landscape of thought and experimentation that has attempted to build on that simple concept and help companies realise the commercial benefits that can accrue through implementation of the concept. This journey has been undertaken over a number of years, with a few blind alleys and meandering paths, but always in pursuit of a simple objective – to find a

way of maximising the value and creativity of the workforce in support of organisational objectives. The journey has been steered by the Grimsby Institute of Further & Higher Education which, in recent years, has partnered with the National Productivity Centre to further develop the concept.

Like most good ideas, the international think tank builds on earlier ideas and concepts, which in this case crystallised around the concept of a 'factory think tank', designed to harness the thinking power, and develop the skills of, an organisation's total workforce. (Some of the thinking along the way is outlined in various papers presented at international conferences and listed in the bibliography.) This concept was developed in response to what seemed to

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## Keywords :

*Human Capital,  
Profitability,  
Creativity*

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be perennial calls from UK manufacturing industry to address 'the skills gap' and maximise the return on existing human capital assets.

The concept of skills analysis and skills gap identification is well-established at national and organisational levels. Too often, though, this is a single-level phenomenon, addressing, say, the skills of the operational workforce, or the skills and abilities of the management team. If we really believe in the concept of 'people-power', this is not enough. We have to be comprehensive and all-embracing, working at all levels of the organisational pyramid.

### **The Factory Think Tank**

The factory think tank process involves Grimsby Institute working with companies to carry out a strategic review, followed by a skills audit and gap analysis and then putting together a tailored 'academy' consisting of a structured pyramid of education and training opportunities together with processes of empowerment and participation that weave around, within and beyond those training opportunities to exploit new skills, new ideas and new levels of commitment in support of positive change. The factory think tank approach aims to strengthen human capital within organisations by shaping programmes around current weaknesses and operational needs. These training opportunities, in addition to 'standard', operational-needs-based courses (process-based, health & safety, etc) specifically include training in continuous improvement techniques for all staff ... and in measurement and benchmarking

techniques for a range of staff. Where appropriate, specific tools are developed to meet specific sector-based, geographic or other 'special' needs for measurement or analysis. For example, one food sector think tank process involved the design of a software tool to log and evaluate freezing/icing trials – so that employees could see for themselves and understand the way in which their activities influenced the effectiveness of freezing processes ... and hence the quality of the final product.

Importantly, every factory think tank 'design and build' process is different – because different organisations have different contexts, different aims and objectives and are at different places in their 'journey to excellence'. However each of these journeys is directed towards maximising the contribution of all employees to improving what is done and how it is done (after understanding why it is done).

Four specific levels of learning are involved – level 1 contains short course programmes, which act as feeder routes to the vocational programmes at supervisory levels (level 2). These supervisory programmes link to the management programmes (level 3) which are finally linked to the strategy programmes (level 4).

Factory think tanks have been created in a range of organisations with great – sometimes spectacular – results. One such 'think tank' involved the training of:

- 10,000 operators at level 1 – creating an 'army' of multi-skilled operators with a knowledge of basic business improvement techniques

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*The factory think tank approach aims to strengthen human capital within organisations by shaping programmes around current weaknesses and operational needs.*

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*This project set about improving productivity by educating/training key employees in the sector in production management topics.*

- 2,000 supervisors at level 2 – adding a range of skills so that the role of ‘supervision’ changed to one of ‘facilitation’ and ‘mentoring’
- 200 middle managers at level 3 (foundation/bachelor degree) – to create a professional, enhanced management tier
- 50 senior managers and senior process workers at level 4 – Masters level – creating and extending strategic thinkers.

Of course, putting this number of employees through this range of programmes is a major commitment for an organisation. To minimise operational impact, a number of the programmes are delivered flexible using online materials .... produced by a dedicated team – known as OnlineLearn - at Grimsby institute with a range of pedagogic, computing, design and animation expertise. Importantly they can build exercises and simulations which mirror ‘real plant’ situations so that operators can see the relevance of what they are learning to their day-to-day activities. For some clients, they have also built ‘idea banks’ so that operators working through materials can log suggestions, ideas, thoughts, issues and concerns for later discussion and consideration – filling up the tank!

The whole think tank process is built around a simple model or ‘system’ in which:

- Elements of factory processes are measured and benchmarked
- Costs and performance are measured and analysed
- Ideas for improvement are put

forward and analysed

- Some of those ideas are selected for development ... and subsequently implementation.... before the system is once again benchmarked to identify and validate improvements .... before the cycle starts again.

This process involves staff from all levels of the business both systematically (perhaps in Kaizen events) and ‘on request’. One such think tank in a food factory saved £30k via improvements to a vegetable washing and processing line, and £100k via changes to inbound logistics – in the first year.

Another organisation decided to focus its ‘academy’ on energy management. OnlineLearn built an online course based around the specific plant of the company ... and built in an ideas bank to collect ideas from the employees. The net result was a saving in energy costs of over £1 million per year. During the ‘thinking through’ process, a major project was undertaken in partnership with the Sector Skills Council for the Food sector. This project set about improving productivity by educating/training key employees in the sector in production management topics.

The project, a part of the EU funded EQUAL programme, developed a blending learning approach to ‘world class production systems’ and produced a set of study guides, workbooks and an interactive on-line package to give flexible support to factory teams.

**Topics included in the programme were:**

- Understanding the factory - performance measurement and improvement.
- Cost of Production – understanding labour and establishing work rates and cost standards
- Cost of Production – calculating costs and using the standards
- Industrial Engineering- understanding and controlling equipment and line performance
- Overall factory performance – bringing it together – OEE and Quality The experience gained in designing flexible, blended learning programmes was invaluable in further refining the think tank concept in ways that prove attractive to companies eager to minimise the time that employees are away from their workplace for training.

### **The International Think Tank**

Grimsby Institute and the National Productivity Centre are both involved – separately and in partnership – in a number of international projects of which a number of are under the banner of UNIDO – the United Nations Industrial Development Organisation. This work led to an understanding of the need - at strategic levels - to understand cultural differences that might impact on project success. As a result, both have partnered to create a new M.Sc course in Productivity & Innovation Development which was designed to bring together students from a number of countries .... and has established partnerships with key institutes in (so far) India, Poland

and Australia to share knowledge and expertise.

**It became clear to those involved that:**

- projects in specific countries could benefit from a wide range of inputs – especially creative thought
- bringing together bright people from around the globe results in an interchange of ideas that creates 'energy' that is greater than the sum of its individual inputs.

This led to the concept of the international Think Tank – where the creative force of bright, post-graduate students could be focused on real-world issues and projects. By engaging those who worked within international value chains it was possible to achieve even greater returns from human capital asset management. The students benefit by getting real issues to work on for their projects and dissertations, and each project benefits by getting additional inputs from a group of bright minds.

The concept was extended to recognise specific knowledge and skills gaps needed across many of these external projects – in, for example, corporate finance, engineering, robotics and international marketing – and then to design electives for the M.Sc course which would attract students to fill these gaps.

The M.Sc programme thus became a project-based course providing students with a rich and varied set of practically-focused learning opportunities (which they know have direct and important outcomes for national governments and

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*The students benefit by getting real issues to work on for their projects and dissertations, and each project benefits by getting additional inputs from a group of bright minds.*

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*The team has developed an Economic Impact Assessment (EIA) model which models key parts of the seafood sector and can perform 'what if' analyses and sensitivity analyses to explore the effects of the various changes that might be brought about by changes to trade processes, Logistics, Infrastructures, Factory productivity etc.*

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global companies) and providing project teams and stakeholders with additional inputs from students immersed in productivity and innovation approaches and techniques.

During the brief lifetime of this concept it has been continually refined (proving that we do what we preach!) and one of the more recent innovations has been to cluster a number of student projects around a common theme (though this theme may extend across a number of external consultancy programmes) so that the various projects support and enhance one another, further extending the knowledge-base and the understanding of inter-relationships of situational factors.

For example, one recent theme related to the improvement of the seafood export trade for a particular country (a project sponsored by the national government). Specific individual student projects concerned:

- Sustainable use of renewables for improving energy efficiency in the food sector
- Applying six sigma strategies to packing operations
- Root causes of failures in FVO inspections (FVO = Food & Veterinary office of the EU)
- The concept of the Trade Corridor as the basis of sustainable development
- Effect of Eco-Labeling on fisheries productivity and innovation
- The Impact of education and training on energy efficiency
- Improving factory performance using a lean approach

Each of these individual projects resulted in a report that identified the specific issues relating to that part of the overall theme. However, each of them also contributed to the overall thinking that was addressing the overarching issue of the seafood value chain and thus to the final consultancy report.

These kinds of international projects often result in bigger projects which seek international donor aid. Such donors, not surprisingly, would like to know whether the thinking that results in specific recommendations is likely to have real and lasting impact on the situation under review. For example, in this particular case would the recommendations put forward in the report (which benefited from the thinking and research of the International Think Tank) have a significant and lasting impact on the volume of trade, the value of trade, the number of jobs in the seafood industry, the average earnings of those in the seafood industry ... and so forth.

To help in the identification of such impact, the team has developed an economic impact assessment (EIA) model which models key parts of the seafood sector and can perform 'what if' analyses and sensitivity analyses to explore the effects of the various changes that might be brought about by changes to trade processes, logistics infrastructures, factory productivity etc.

In this case, the EIA showed that an investment of about £4million over three years in particular and specific areas could yield an additional £400 million of export revenue and an extra one million jobs over a 10 year planning

horizon.

### Summary

Experience in building a number of 'factory think tanks' proved the concept of a strategy of developing and empowering staff at all levels of an organisation and harnessing the resulting collective thinking power. This demonstrates the possibilities of improving profitability by better utilising existing human capital. That experience showed real 'bottom line' benefits over relatively short time periods but also suggested that the benefits were retained over time.

The team from Grimsby Institute and the National Productivity Centre realised that this concept could be extended across organisational boundaries and had, in the students studying the M.Sc in Productivity & Innovation Development, a natural resource to provide an 'international think tank' to underpin global development programmes.

It is a little early to judge the success (or otherwise) of the concept but it is clear that the programmes are benefiting from a wider and richer set of thinking and research and that the students appreciate the opportunity to work on projects that have real-life impact.

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# INVESTOR STRATEGY UNDER VOLATILITY OF EQUITY MARKETS IN INDIA

N. S.Viswanath \*

Basanna S. Patagundi \*\*

Deepak. R \*\*\*

**Abstract:** *Irrational exuberance is a not only a term used to describe a phenomenon after collecting the remains in the melancholy days of the stock markets but a pattern to describe the behaviour of the investors in the stock markets. A momentous effect of global financial crisis has forced every investor to think rationally beyond the psyche of market. It appeared to have forced everyone to go back to basics and strategize once again to recuperate the money which had dried off. This paper attempts to:*

- 1) Assess the effects of volatility,
- 2) Formulate model strategies which would give 'safety lead period' for an investor in making strategic investments and
- 3) Estimate the likely losses / gains in the future.

*The scaffold of the study would be between January 2004 and September 2009. The daily stock data on equity would form the database. The likely pattern would be window for manifestation of aggregate strategic behaviour of investments. The 'safety lead time' would be determined by categorizing the companies and investors. The estimation of likely losses / gains would be attempted by harmonic harvesting. The study would attempt to find a synergy between the investors' decisions, investors' time frame and investors' confidence in the markets.*

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## Keywords :

*Safety lead period,  
volatility*

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"Riding a bicycle blindfolded on a moving Volvo automotive at 100 km/hr" may definitely be the expression to describe the agony of people after the global financial crisis. Though questions regarding the sustainability of the subprime businesses were long raised, risks associated with it were overlooked both in US and in other parts of the world. A few academic institutions had definitely prophesied another bubble burst based on obviously unsustainable household savings rates and debt levels, but the remains of the disaster were never expected to spread across the largest democratic nation of the world or beyond the largest oceans and seas in the world.

Risk is a term associated with any product from which we desire to get a nominal return in the future. In spite of the coherent risks involved in various products, investors over the period from 2000 onwards have blindly ignored or overlooked this fact. There may be several reasons for this collective trend behaviour of ignorance. First and foremost is the growing technology usage in everything which has happened to miniaturize the tasks (w.r.t time consumed) by bringing in innovations specially in the field of finance coined as financial engineering of the products and thus making it simple for companies to come up with customized products with the slogan

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“whatever you want, we deliver”. So, technological revolution played a key role in fitting the wrong notion in the minds of the investors that, “everything was alright and there was no need for worry”.

With heavy reliance on the technology, every industry in the world focused on creating brand value by enforcing huge pressure on the managers. The slogan “Think about the company before you can think about yourself” put huge pressure on the managers to rationalize everything in terms of shareholder value. This pressure led to unhealthy growth in the company’s performance which is clearly evident from the fact that the P/E multiples were above normal of the fundamental analysis. The rationalization of ethics overrides everything, which in fact, could have been avoided.

To the sheer surprise of the research analysts, the one trend that has been seen since 2004 is that the number of loss making companies, has declined drastically after the economy started to pick up pace. According to Table 1, the Indian companies have shown

remarkable improvement in terms of their performance. Around 1082 loss making companies were there in 2004. This number came down by 30 percent to 755 companies in 2005 and further fell by 38 percent to 469 companies in 2006. In 2007, when the economic growth was at its peak, the loss-making companies fell to 249 companies. But it was in 2008 that economies across the world, including India, felt the jitters of the global financial crisis. Due to the crisis, the number of loss-making companies increased to 349. But this number can rise in the coming years. This trend needs to be examined closely in the future which would clearly pinpoint the fact that pressure on rationalizing shareholder value as the primary goal did have tremendous influence on companies and its employees during the period 2004 to 2008 and even onwards. Figure 1 clearly indicates the fact that the overburden and pressure put on companies in increasing the shareholder value did have an impact on the performance of the companies.

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*The slogan “Think about the company before you can think about yourself” puts huge pressure on the managers to rationalize everything in terms of shareholder value.*

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Year	Number of loss making companies
2004	1082
2005	755
2006	469
2007	249
2008	349
2009	173

**Table 1 Number of loss making companies**

Source: Dalal street Investment journal, August 31-September 13, 2009

Of the several stocks, "A" "B1" "B2" "C" "Z" are from the equities and "F" is from the debt market.

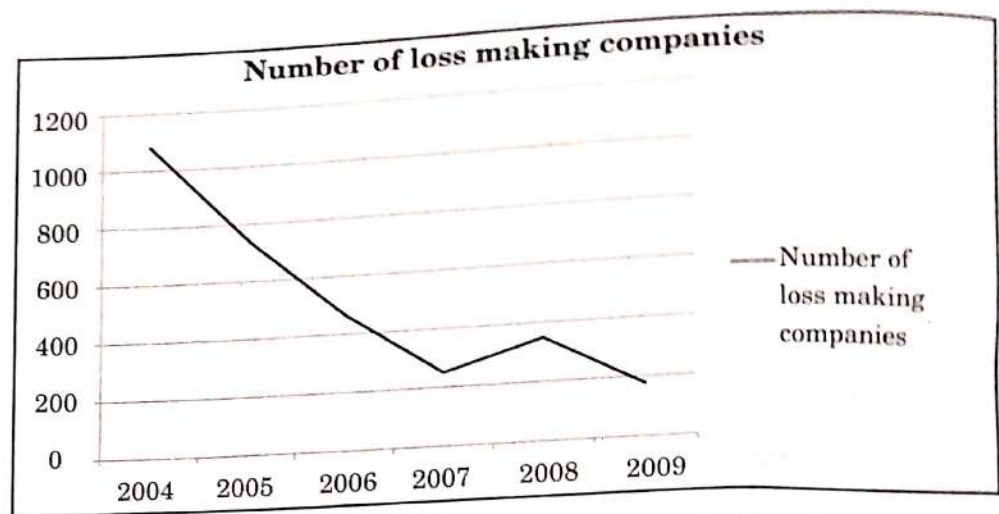


Figure 1. Graph showing number of loss making companies from 2004 to 2009  
Source : Dalal Street Investment Journal, August 31-September 13, 2009

The figure 1 if dissected further reveals important facts based on which several conclusions may be drawn. The group-wise breakup of loss making companies as shown in the table 2 reveals astonishing facts.

The grouping of the companies in stock markets is usually done considering two basic criteria, which are as follows:

- Compliance to the SEBI parameters and
- Trading and settlement cycles.

Of the several stocks, "A" "B1" "B2" "C" "Z" are from the equities and "F" is from the debt market.

The 'A' group is a category of those companies with fairly good growth record in terms of dividend and capital appreciation, number of years of listing on the exchange, public share holding, floating stock, trading volume etc.

The 'B1' 'B2' group is a subset of the other listed shares that enjoy higher market

capitalization and liquidity than the rest.

The 'C' group covers the odd lot securities in 'A', 'B1' & 'B2' groups.

The 'T' also termed as the trade to trade group, comprises shares which have to be settled in delivery for all buys and sells and square off of bought and sold positions during the day is not permitted. This is a part of the surveillance from the BSE to counter any awkward unwarranted movements in such scrips.

The 'Z' Group category comprises shares of the companies which do not comply with the rules and regulations of the Stock Exchange and are at times suspended from trading due to the above said reasons.

The 'F' Group represents the debt market segment.

From the Table 2, it is clearly evident of the trend changes in each group. The group 'A' doesn't show much variation but it is astonishing how the loss making

companies in the group 'B' companies have decreased from being 467 companies in 2004 to 69 companies in FY 2009. Group B companies performed very well to cope with the pressure that was felt throughout the world. As evident from table 3, the percentage decrease in the number of loss making companies in Group B was around 33 percentage on average from 2004 to 2007(pre-recession) and around 46 percentage during the

2008-09(recession period). Group C also showed tremendous decrease in the number of companies from 59 percentage decrease to around 61.1 percentage decrease during the pre recession and recession periods respectively. Group Z was the front runner in the race to have maximum performance oriented growth among all the groups. The number of companies decreased from a total 477 to a mere 5 in number.

Break-Up of loss Making Companies(Group-wise)

	2009	%change	2008	%change	2007	%change	2006	%change	2005	%change	2004
A	5	25%	4	0%	4	100%	2	-33%	3	-50%	6
B	69	-46 %	128	-11%	144	-35%	22	-33%	331	-29%	467
C	7	-61%	18	-28%	25	-14%	29	-49%	57	-7%	61
T	77	10%	70	43%	49	-4%	51	-6%	54	-11	61
Z	5	-96%	124	553%	19	-88%	161	-46%	300	-37%	477

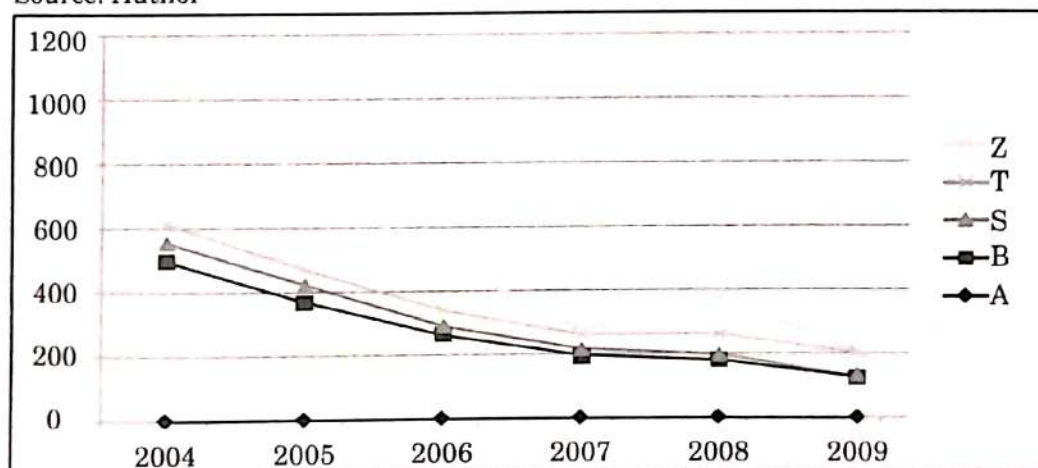
Table 2 Break-up of Number of loss making companies

Source: Dalal street Investment journal, August 31-September 13, 2009

Group/Years	After Recessission (2008-2009)	Before Recession (2004-07)
A	25.0	-0.33
B	-46.1	-0.69
C	-61.1	-0.59
T	10.0	-0.20
Z	-96.0	-0.96

Table 3 Before and after break-up of Number of loss making companies

Source: Author



Group B companies performed very well to cope with the pressure that was felt throughout the world.

*Better cost management initiatives and amendments to the AS11 could be the reason for this drastic drop in loss making companies in 2009.*

Figure 2 Graph showing number of loss making companies from 2004 to 2009

Source: Dalal Street Investment Journal, August 31-September 13, 2009

As evident from the figure 2, Group Z and Group B showed tremendous improvement which can be attributed to several factors.

- 1) Better cost management initiatives and amendments to the AS11 could be the reason for this drastic drop in loss making companies in 2009.

- 2) Out of the box thinking in the turnaround companies could also be a decisive factor.

So, existence of a trend is empirically obvious from the figures 1 and figure 2. If variable TIME is constructed artificially and is called a time trend or time dummy, then  $\text{Time}_t = t$ , where  $\text{Time} = (1, 2, 3, \dots, T-1, T)$ .  $\beta_0$  is the regression intercept;  $\beta_1$  is the regression slope;

The simple linear function of time is shown by the following equation

$$T_t = \beta_0 + \beta_1 \text{TIME}_t + \epsilon_t$$

Where  $\epsilon_t \approx \text{WN}(0, \sigma^2)$ ,

In Table 4, we show the results of fitting a linear trend model by regressing statistics of number of loss making companies on constant and linear time trend. The trend appears highly significant as judged by the p-value of the t-statistic on the time trend, and the R<sup>2</sup> of the regression equation is high. Moreover, the Durbin-Watson statistic indicates that the disturbances are positively serially correlated, so that the disturbance at any time  $t$  is positively correlated with the disturbance at time  $t-1$ .

The residual plot in figure 3 strengthens the theory and makes it clear on what has happened and is happening at present. The trend seen clearly pinpoints the declining trend but fails to capture since the actual trend is more nonlinear in nature (the residuals are too highly serially correlated). A plot of  $\pm 1$  standard error of the regression is considered for visual reference.

Therefore, when the number of loss making companies series together with the fitted linear trend seems inadequate because of the fact that still obvious persistent dynamic patterns exist in the residuals.

The trend appears to be nonlinear i.e., it decreases at an increasing or decreasing rate. Therefore, the quadratic models can potentially capture nonlinearities as opposed to linear functions of time.

**Dependent Variable: Number of loss making companies**

Method: Least Squares

Date: 11/13/09 Time: 23:24

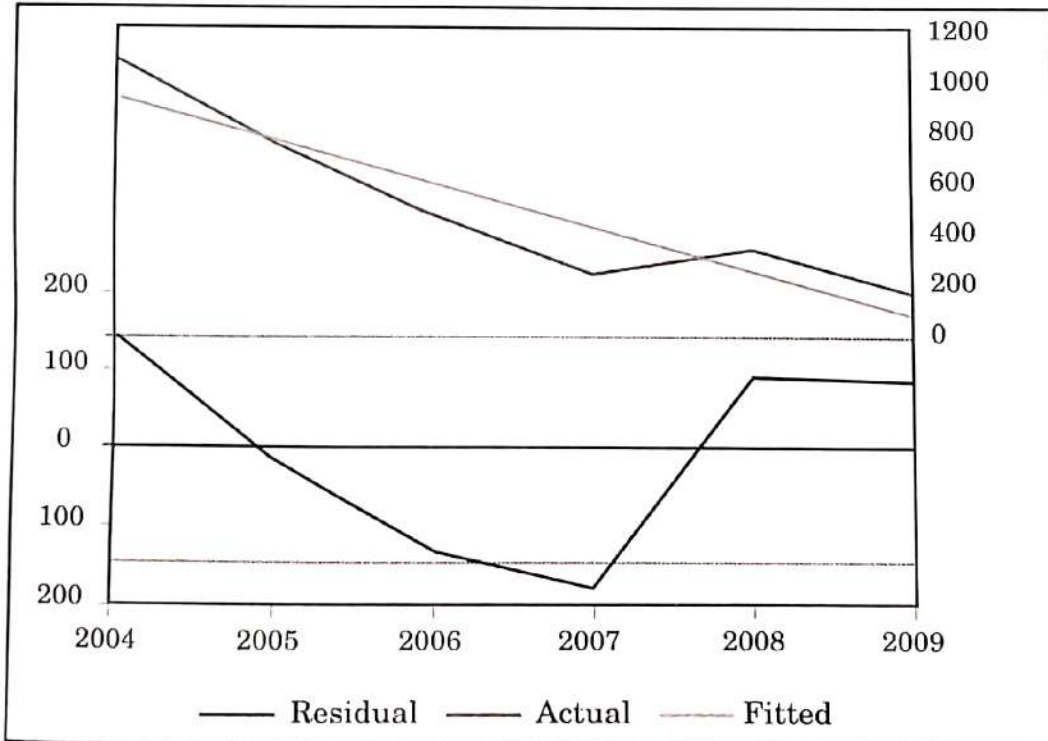
Sample: 2004 2009

Included observations: 6

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	940.1905	105.5513	8.907429	0.0009
T	-170.9429	34.86244	-4.903353	0.0080
R-squared	0.857361	Mean dependent var		512.8333
Adjusted R-squared	0.821702	S.D. dependent var		345.3847
S.E. of regression	145.8400	Akaike info criterion		13.06410
Sum squared resid	85077.28	Schwarz criterion		12.99469
Log likelihood	-37.19230	F-statistic		24.04287
Durbin-Watson stat	1.333308	Prob(F-statistic)		0.008025

**Table 4 : Linear trend regression of companies making losses**

Source : Authors



**Figure 3 Linear trend residual plot of number of loss making companies**

Source: Authors

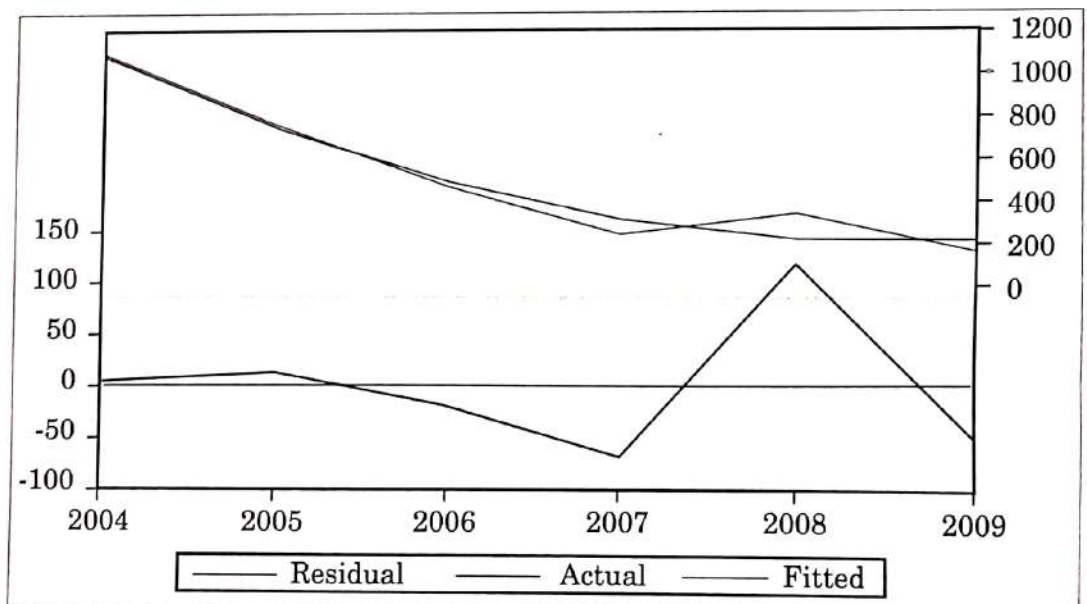
Figure 3 Linear trend residual plot of number of loss making companies Source: Authors The Table 5, presents the result of fitting a quadratic trend model and the trend appears to be highly significant as judged by the p-value of the first coefficient and regression R2of 0.96 when compared

with R2of 0.85 in linear fitted trend model. The residual plot in figure 4 clearly fits the trend and the presence of autocorrelation shifts to the upper side of the time series. A close observation of tables 4 and 5 explains better the variation in time trend.

Dependent Variable: Number of Loss making companies  
Method: Least Squares  
Date: 11/13/09 Time: 23:48  
Sample: 2004 2009  
Included observations: 6

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1077.036	77.88760	13.82808	0.0008
T	-376.2107	73.26333	-5.135048	0.0143
T2	41.05357	14.06485	2.918878	0.0616
R-squared	<b>0.962854</b>	Mean dependent var		<b>512.8333</b>
Adjusted R-squared	0.938090	S.D. dependent var		345.3847
S.E. of regression	<b>85.93764</b>	Akaike info criterion		<b>12.05197</b>
Sum squared resid	22155.84	Schwarz criterion		11.94785
Log likelihood	<b>-33.15592</b>	F-statistic		<b>38.88120</b>
Durbin-Watson stat	3.063328	Prob(F-statistic)		0.007159

**Table 5: Quadratic trend regression on Number of loss making companies**  
Source: Authors



**Figure 4 Quadratic trend residual plot of number of loss making companies**  
Source: Authors

The nature of an investor is known by his risk profile. According to finance textbook, risk is always taken when one perceives equitable returns in return. There are always chances of an investor not being aware of all the risks associated with his decision.

This mistake has been committed previously and now also by all the investors. The forecasting models or the risk adjusted models cannot be relied

upon until and unless one knows what assumptions are made in the course of analyzing data. High relevance on several models of risk could also have led to the ignorance of not only the investors. If based on the quadratic trend fitted to the trend of loss-making companies, a forecast is done, the figure 5 clearly reveals the turnaround of the declining trend.

Year	Time Trend	Forecast
2004	0	1082
2005	1	755
2006	2	469
2007	3	249
2008	4	349
2009	5	173
2010	6	297.7003
2011	7	455.7789
2012	8	694.7789
2013	9	1016.479
2014	10	1420.286

Table 6: Forecast of number of loss making companies

Source: Authors

The **W-shaped** trend can be attributed to several factors as follows;

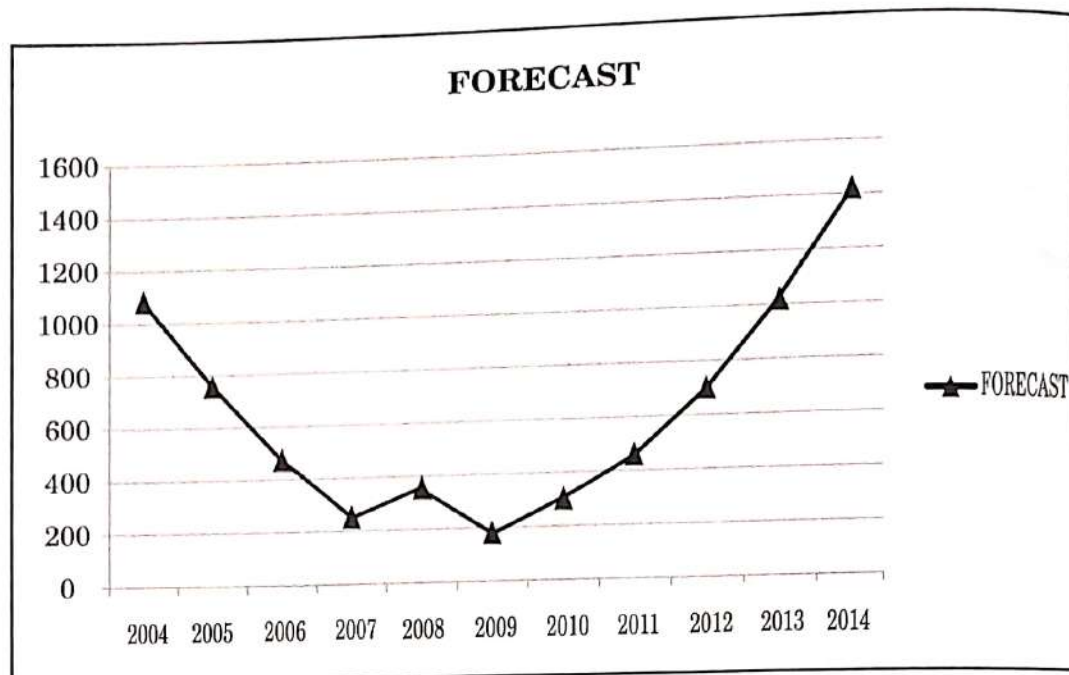
- 1) The effects of recession can have adverse impact in putting pressure on the companies.
- 2) The recession effect can put some restriction on companies to think out of the box.
- 3) The Retail investors may change their risk appetite and may switch to what they perceive as safer investments like Group A companies or Fixed deposits.
- 4) The risk appetite of the institutional investors and FDIs may also change towards other avenues for safe investing.

*The forecasting models or the risk adjusted models cannot be relied upon until and unless one knows what assumptions are made in the course of analyzing data.*

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*Strategic thinking process should be streamlined for better understanding of investor behaviour.*

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#### Limitations of the study:

The paper needs improvement in two areas.

First, the model should be reset for better predictability. Secondly, strategic investment thought-process of investors-small, medium and big-needs a search for aggregate psychological variable which can be incorporated in the model.

#### Conclusion:

From the study it is clearly evident that an investor should not anticipate the future merely on a few facts and figures but should make decision atleast of few key decisions based on risk management methods. Getting advice in personal finances should be done with utmost care. Strategic thinking process should be streamlined for better understanding of investor behaviour. The ripples may not reflect a Tsunami observed amongst performing companies.

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# FACTORS INFLUENCING DEVELOPMENT OF MANUFACTURING STRATEGY AND THEIR IMPACT ON FIRM'S PERFORMANCE

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Dr. Uma Kumar \*\*

Irfan Butt\*\*\*

**Abstract:** Strongly integrated with a firm's business strategy, manufacturing strategy is considered to be an important component of overall corporate strategy. However, none of the existing studies examines the comprehensive set of variables that could influence the development of manufacturing strategy. Also, there is a paucity of research that studies the impact of manufacturing strategy on performance. This study identifies, incorporates and empirically tests all the relevant factors taken into consideration by the firms while developing manufacturing strategy and subsequently examines the impact of influencing factors and manufacturing strategy on firm's performance. This paper presents preliminary findings from a sample of 194 Canadian manufacturing concerns, top executives and managers. It was found that the influencing factors – innovation orientation, environmental dynamism, and manufacturing capability exhibit positive and statistically significant association with manufacturing strategy. The manufacturing strategy positively impacts both financial and non-financial performance. Market orientation and innovation orientation impact only financial performance while manufacturing capability impacts non-financial performance.

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**Keywords :**  
Manufacturing  
Strategy, Resource  
Orientation, Market  
Orientation,  
Innovation  
Orientation,  
Environmental  
Dynamism,  
Manufacturing  
Capability,  
Organizational  
Performance

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Manufacturing strategy is defined as "the competencies that a firm develops around the operations function" (Amoako-Gyampah, 2003, p 577). These competencies are meant to achieve competitive advantage (Anderson et al., 1989). Skinner (1969) defined manufacturing strategy as the "set of manufacturing system design aspects managers (must) decide on" (Cagliano, Acur, and Boer, 2005).

There has been a steady stream of research in this area focusing mainly on two aspects of manufacturing strategy: content and process (Dangayach and Deshmukh, 2001). The content literature focuses mainly on the significance of the manufacturing function for improving product competitiveness through setting and accomplishing long-term goals in terms of cost, quality, flexibility, delivery, reliability and innovation etc. The

process of manufacturing strategy addresses the method used to develop and implement the manufacturing strategy (Hurreeram, 2007). Process relates to the development and implementation of strategic plan (O'Regan and Ghobadian, 2002) or "how these decisions and actions come about" (Pun, 2005).

Skinner (1969) and Hill (1985) emphasize the importance of the process of manufacturing strategy formation and implementation. However, most of manufacturing strategy literature is focused on the content aspects. Dangayach and Deshmukh (2001) conducted an extensive review of the manufacturing strategy literature, a total of 260 articles from 31 refereed international journals and conferences, and divided the entire literature into content and process-related issues. They concluded that process-related

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articles accounted for less than 10 percent of the literature, indicating that research on manufacturing strategy formulation is limited.

This paper addresses this gap in the literature. The objective of this paper is to empirically test a comprehensive list of variables that can influence development of manufacturing strategy and subsequently examine the impact of influencing variables on firm's performance.

## LITERATURE REVIEW

This section reviews the literature related to all the variables empirically tested in this study.

### *Factors Influencing Manufacturing Strategy*

There are two opposing views with respect to the development of manufacturing strategy – market-based view and resource-based view. The market-based view, which takes an external perspective, regards manufacturing strategy as a derivative of business strategy and emphasizes the consideration of market requirements at the manufacturing level. Market orientation is defined as “the organizational culture that most effectively and efficiently creates the necessary behaviours for the creation of superior value for buyers and thus, continuous superior performance for the business” (Narver and Slater, 1990, p.21). Market orientation aims to keep the firm close to its competitors. The focus of resource orientation is internal while market orientation is external (Paladino, 2007). The external environment comprising economic, technological, political, environmental

and social issues is relevant but the real emphasis is on the industry.

Though the literature points to the increasing use of resource orientation influencing the manufacturing strategy, market orientation is still considered vital, since knowledge of customer requirements and competitors' actions are necessary to compete effectively in today's highly competitive environment where customers are exposed to numerous product choices. It is posited, therefore, that market orientation will also have an impact on the development of manufacturing strategy.

The resource-based view, on the other hand, takes an internal perspective and considers a firm's internal assets, resources and capabilities to be the main determinant of the manufacturing strategy (Thun, 2008). The resource-based view of the firm stresses that its performance is driven by its resources. The objective of the firm is to develop and deploy a bundle of resources which are difficult for the competitors to imitate (Paladino, 2007). Bates et al. (2001) highlight the significance of developing manufacturing resources and capabilities by stating that the “manufacturing process is a result of a firm's long-term commitment to build manufacturing capabilities and resources.”

In addition to the market and resource based view, this study posits that there are three other variables that influence the development of manufacturing strategy – manufacturing capability, innovation orientation and environmental dynamism.

The manufacturing strategy literature borrowed the term ‘capabilities’ from

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*The objective of this paper is to empirically test a comprehensive list of variables that can influence development of manufacturing strategy and subsequently examine the impact of influencing variables on firm's performance.*

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*The dimensions of manufacturing strategy – cost, quality, flexibility, dependability and so on, are firmly dependent on capabilities of the firm, it is posited that manufacturing capability will have a direct impact on manufacturing strategy.*

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business strategy literature focused on resource-based view of the firm (Corbett and Claridge, 2002). Manufacturing capability is defined as “the ability of a production system to compete on basic dimensions such as cost, flexibility and time” (Sarmientom et al., 2007, p. 368). Bates et al. (2001) emphasize the role of resources in building manufacturing capability which, aligned with business strategy, serves as a source of competitive advantage. Since the dimensions of manufacturing strategy – cost, quality, flexibility, dependability and so on, are firmly dependent on capabilities of the firm, it is posited that manufacturing capability will have a direct impact on manufacturing strategy.

Innovation is defined as “the search for and the discovery, development, improvement, adoption, and commercialization of new processes, products, organizational structures and procedures” (Dosi, 1988, p. 1122). A number of authors have stated that, in the face of rising competition, investments in innovation are likely to give firms competitive advantage in global and international markets (Brown and Eisenhardt, 1995; Conner, 1991). Akman and Yilmaz (2008) consider innovation as a vital success factor in a highly competitive, global economy. Qian, Qi, and Yu-cheng (2008) also emphasize that an increasingly competitive world and highly demanding customers make it imperative for firms to develop strategies based on innovation. Innovation seems to have a significant impact on a firm’s productivity and on the overall performance of the organization (Yamina et al., 1997).

Innovation, for the purpose of this study, is limited to technological innovation. An innovation orientation is a characteristic of the corporate culture and is normally considered as a component of a broader innovation culture. For this study it is defined as “openness to new types of technologies, the ability to search for these technologies proactively, being able to recognize them early on, and reacting to them appropriately, as well as an attempt to use these technologies purposefully for innovation to develop technologically first-class products that are superior to those of the competitors” (Herrmann, Gassmann, and Eisert, 2007).

Management decisions are guided by the overall corporate strategy. It is imperative for firms to continually monitor their environment for changes in buyer preferences, rapid environmental changes, and increased competition. Such changes could make the firm’s current positioning outdated and/or offer new growth opportunities. Scanning of the environment provides an effective basis for linking corporate strategy to marketing strategy (Cravens, 1975).

There is no consensus amongst the researchers as to the best way to conceptualize and measure external environment. However, environmental dynamism is one of the most frequently used measures of external environment. It is defined as the “rate of environmental change and unpredictability of that change” (Bierly and Daly, 2007, p. 498). This change can be caused by the entrance of new competitors, changes in customer preferences and variations in the firm’s

technological capabilities (Bierly and Daly, 2007).

### Manufacturing Strategy Dimensions

Competitive priorities of manufacturing strategy, also called competitive strategy or manufacturing strategy in the literature, are defined as the dimensions on which the firm competes in the marketplace (Hayes and Wheelwright, 1984). A number of studies in the literature propose manufacturing strategy dimensions. Fang and Wang (2006), however, conducted a systematic and extensive review of the literature to develop taxonomy of manufacturing strategy dimensions from the literature. They reviewed thirty-seven studies over a period of twenty years. They found cost, quality, reliability and flexibility to be the most frequently used dimensions. Since their analysis was limited to 1995, the most recent studies, starting from 1996 onward, were scanned to identify the manufacturing strategy dimensions currently being proposed in the literature. Based on extensive literature review the dimensions of manufacturing strategy were classified as quality, cost, flexibility, delivery and innovation.

### Organizational Performance

Organizational performance is a widely used construct and a number of studies in varying disciplines measure organizational performance for different objectives. There are two types of measures, objective and subjective, that are used in the literature to capture organizational performance. Objective measures are more tangible but are constrained to financial data only and thus are limited in scope. The standard measures of financial performance - revenue and profitability growth - are used by most of the studies. Subjective measures, on the other hand, are less concrete but provide a different and richer perspective about organizational effectiveness, especially in comparison to the competitors. The subjective measures, however, vary depending upon the precise objective of the study. It is recommended that researchers should consider multiple indicators of the performance to get a more comprehensive assessment of the performance (Allen et al., 2008). The organizational performance measure for this study comprise financial - market share, sales growth, return on investment, overall profit and profit growth and non-financial, customer satisfaction and customer loyalty.

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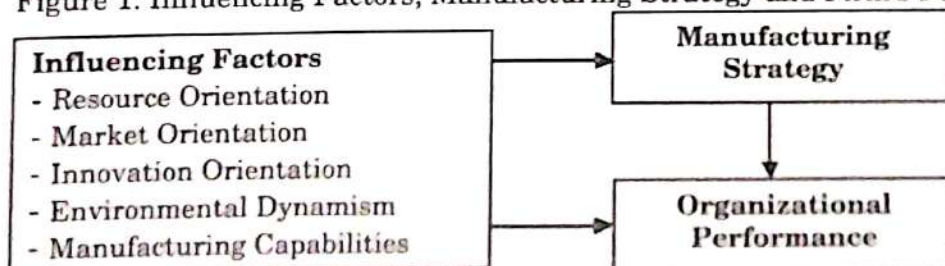
*The organizational performance measure for this study comprise financial - market share, sales growth, return on investment, overall profit and profit growth and non-financial, customer satisfaction and customer loyalty.*

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### CONCEPTUAL FRAMEWORK AND HYPOTHESES

The variables discussed in the literature review are posited to have a relationship as depicted in the conceptual framework given below:

Figure 1: Influencing Factors, Manufacturing Strategy and Firm's Performance



The following hypotheses are posited to test the relationship between the variables:

*Impact of Influencing Factors on Manufacturing Strategy*

- H1a: Resource orientation will have an impact on manufacturing strategy.
- H1b: Market orientation will have an impact on manufacturing strategy.
- H1c: Innovation orientation will have an impact on manufacturing strategy.
- H1d: Environmental dynamism will have an impact on manufacturing strategy.
- H1e: Manufacturing capability will have an impact on manufacturing strategy.

**Impact of Influencing Factors on Organizational Performance**

- H2a: Resource orientation will have an impact on firm's financial and non-financial performance.
- H2b: Market orientation will have an impact on firm's financial and non-financial performance.
- H2c: Innovation orientation will have an impact on firm's financial and non-financial performance.
- H2d: Environmental dynamism will have an impact on firm's financial and non-financial performance.
- H2e: Manufacturing capability will have an impact on firm's financial and non-financial performance. Impact of

**Manufacturing Strategy on Organizational Performance**

- H3: Manufacturing strategy will have an impact on firm's financial and non-financial performance.

**DATA COLLECTION AND ANALYSIS**

The structured questionnaire was sent to 2,500 manufacturing firms in Canada. The data was collected from top decision makers in two sub sectors - NAICS code 334 (Computer and electronic product sub sector) and NAICS Code 335 (Electrical equipment, appliance and component sub sector). The findings of this study are based on 194 usable questionnaires, a response rate of almost 8%.

The data was checked for normality, independence and linearity. Non-response as well as common method bias were tested and do not seem to have any impact on the results. Since measures used in the study were validated in the literature, Principal Component Analysis (PCA) was used as a data reduction technique which resulted in removal of 11 items with loading of less than 0.5. The factor loading ranged from 0.53 to 0.92, comparable to figures obtained in many management studies. In addition the explained variance ranged from 0.68 to .82 which exceeds the 0.5 benchmark (Fornell and Larcker, 1981). The reliability of measures was assessed with Cronbach's Alpha which ranged from 0.60 to 0.93, with most of them well above 0.70. Both convergent and discriminant validity were established along with content validity. The regression analysis was used to test the hypotheses.

## TESTS OF HYPOTHESES

The regression analysis with manufacturing strategy as dependent

variables and influencing factors as independent variables was used to test the first set of hypotheses. The findings of the analysis are given below:

**Table 1: The Impact of Influencing Factors on Manufacturing Strategy**

Independent Variables	Dependent Variable Manufacturing Strategy
Resource orientation	0.047
Market orientation	0.043
Innovation Orientation	0.154 **
Environmental Dynamism	0.102 *
Manufacturing Capability	0.559 ***
R Square	0.475
F Statistics	32.814 ***

Standardized regression coefficients are shown

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .10$

Despite vigorous support from theory, both resource and market orientation are not significant predictors of manufacturing strategy. However, all three remaining variables – innovation orientation, environmental dynamism and manufacturing capability are statistically significant predictors of manufacturing strategy development. With a beta coefficient of 0.559 at p value of .01, manufacturing capability is the

strongest predictor of manufacturing strategy. Hypotheses H1c, H1d and H1e are fully supported but H1a and H1b are not supported.

The second set of hypotheses was tested with financial and non-financial performance as dependent variable and influencing factors as independent variables. The results are given below in Table 2.

*Despite vigorous support from theory, both resource and market orientation are not significant predictors of manufacturing strategy development.*

**Table 2: The Impact of Influencing Factors on Firm's Performance**

Independent Variables	Dependent Variable	
	Financial Performance	Non - Financial Performance
Resource orientation	0.044	0.058
Market orientation	0.204 **	0.123
Innovation Orientation	0.239 ***	0.103
Environmental Dynamism	-0.090	-0.022
Manufacturing Capability	0.015	0.179 **
R Square	0.162	0.119
F Statistics	7.019 ***	7.896 ***

Standardized regression coefficients are shown

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .10$

Manufacturing capability, however, is a significant predictor of manufacturing strategy in our study. The concept of manufacturing capabilities originates from resource-based orientation of the firm.

Market orientation and innovation orientation are the only two variables which have positive and statistically significant impact on financial performance. Manufacturing capability, however, has a positive and statistically significant impact on non-financial performance. Hypotheses H2a and H2d are not supported but hypotheses H1b,

H1d and H1e are partially supported.

Another regression analysis was done to test the impact of manufacturing strategy (independent variable) on firm's performance (dependent variable). The findings are given below in Table 3.

**Table 3: The Impact of Manufacturing Strategy on Firm's Performance**

Independent Variable	Dependent Variables	
	Financial Performance	Non - Financial Performance
Manufacturing Strategy	0.281 ***	.263 ***
R Square	0.079	0.069
F Statistics	16.488 ***	14.282 ***

Standardized regression coefficients are shown

\*\*\* p < .01, \*\* p < .05, \* p < .10

Manufacturing strategy has a positive and statistically significant impact on both financial and non-financial performance of the firm thus supporting hypothesis H3.

### DISCUSSION

Resource and market orientation have been theoretically posited to influence the development of manufacturing strategy. The debate in the literature, however, clearly favours resource orientation over market orientation as the main premise for the development of manufacturing strategy. We did not find statistical evidence for either of them. Manufacturing capability, however, is a significant predictor of manufacturing strategy in our study. The concept of manufacturing capabilities originates from resource-based orientation of the firm. Therefore, it could be deduced that resource orientation is more likely to impact development of manufacturing strategy than market orientation.

Innovation orientation appears to be an important factor since it has a positively significant impact on manufacturing strategy. We did not find any study in operations management literature which had used innovation orientation as a factor which can influence manufacturing strategy. Thus, this is a very significant finding for manufacturing strategy.

Environmental dynamism, one of the factors of external environment, has been used extensively in business strategy literature. However, its use in the operations management literature has been limited. In our study it was found to have a statistically significant impact on manufacturing strategy.

There are a number of studies in the literature which examine the relationship between environmental dynamism and manufacturing strategy, though findings have been mixed. Ward et al. (1995) collected data from

manufacturing firms in Singapore to investigate relationship between business environment, operations strategy and performance. It was found that environmental dynamism leads to more emphasis on flexibility, delivery and quality. Ward and Duray (2000) conducted a study of manufacturing firms in USA and did not find any impact of environmental dynamism on manufacturing strategy though it was found to influence differentiation business strategy which in turn affected quality, delivery and flexibility dimensions of manufacturing strategy.

In the literature resource and market orientation have empirically been tested in relation to firm's manufacturing performance rather than financial and non-financial performance. For example, Paiva, Roth and Fensterseifer (2008) found that cross functional integration in manufacturing was positively related to resource orientation. Schroeder, Bates and Junttila (2002) found a positive relationship between resources and manufacturing performance. Thun (2008) grouped the plants into high and lower performers based on cluster analysis. The market-based group shows better performance in terms of product mix and volume flexibility while resource-based group shows high performance in inventory turnover and cycle time.

Our study found that resource orientation has no bearing on firm's performance but market orientation and innovation orientation lead to positive financial performance. Manufacturing capability, however, positively impacts non-financial performance. This is also a very

significant finding since market orientation does not influence manufacturing strategy directly but overall it has a positive impact on performance, thus highlighting the importance of market orientation.

The importance of developing an appropriate manufacturing strategy is emphasized by the fact that it has a positive and statistically significant impact on both financial and non-financial performance of the firm.

## THEORETICAL AND MANAGERIAL IMPLICATIONS

This is the first study which looks at comprehensive set of variables that can influence the development of manufacturing strategy as well as firm's performance. No other study has empirically tested more than two antecedents of manufacturing strategy within a single framework. This study also introduces a new construct, innovation orientation, which has not been previously deliberated in manufacturing strategy literature. Innovation orientation has a significant impact on both manufacturing strategy as well as firm's financial performance.

By identifying the factors taken into consideration by managers while developing manufacturing strategies, it leads to better understanding of what specific factors must be considered by the firms to develop successful manufacturing strategies. It will thus provide practical guidance to companies which wish to implement manufacturing strategies for their firms.

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*The importance of developing an appropriate manufacturing strategy is emphasized by the fact that it has a positive and statistically significant impact on both financial and non-financial performance of the firm.*

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*Single key informants were used as respondents in this study. Also single-item indicators were used to measure manufacturing strategy. Future studies could use multiple respondents in the firm and develop multi-item scales to measure manufacturing strategy.*

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## LIMITATIONS

Single key informants were used as respondents in this study. Also single-item indicators were used to measure manufacturing strategy. Future studies could use multiple respondents in the firm and develop multi-item scales to measure manufacturing strategy. Since this is the first study to use the constructs of manufacturing capability and manufacturing strategy within the same model, the nature of relationship between the two constructs needs to be further explored with quantitative and qualitative research.

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# THE NEED FOR STRATEGIC LEADERSHIP IN TIMES OF DYNAMIC GLOBAL CHANGE

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## **Abstract:**

*The focus of this paper is to examine the need for and role of strategic leadership in times of dynamic global change. Context is partially provided by the argument that, perhaps more so in times of economic instability, strategic management and leadership is the most important responsibility of senior management to position and relate an organisation to its environment in such a manner that assures its continued success and security from surprises. As the discourse is developed within the paper, the notion that, effective strategic leadership is essential for organizations to remain successful, will be argued and examined within the contextual element of a constantly changing and rapidly evolving business world that includes the emerging BRIC economies. It will be contended that a series of crises, including oil supply restrictions, energy and material shortages, rising inflation, economic stagnation, labour unrest, increased unemployment and then recession experienced thus far in the new millenia has caused many senior managers to search for a radically different approach to the running of their businesses.*

*Context is further provided with the acknowledgement that in a dynamic and strategically emergent business environment there is a continuous need to search for ways of: sustaining growth (profit) when faced with tough competition and pressure on the provision of goods and services; investing in the upgrading of product and service quality and customer service; focusing management energy on new market opportunities; improving responsiveness to market change and accelerating the delivery of new products and services. All against a backdrop of shorter product life cycles whilst recognizing the need to challenge internal cost structures and the price of bureaucracy. The real challenge of the dynamics of competition is that, battles are fought among firms taking different approaches, especially those that counter yesterday's ideas. The size of an organisation does not confer competitive advantage, the way things are done does. Market share (large) is the reward for vision, creativity, efficiency and effectiveness. If things can be done better, small (share) organisations could increase their share of the market and challenge the leaders. It will be argued these are the strategic challenges that raise major leadership issues.*

*Though the discourse will be generic, taking into consideration a range of theories, models and opinions, on strategic leadership, the central theme of the presentation will be the applicability of the concepts for any organization and/or sector. It is intended to synthesize the argument into a case for strategic leadership irrespective of the size and nature of the organization. This discussion will be both scholarly and empirical with the argument presented in the form of a paper. The research methods adopted were the personal experiences of the authors in working with successful senior managers in a range of industries and, desk top research of primary contemporary literature. This enabled the authors to draw from a range of documentary evidence and to take into account alternative views that have been written on the subject before.*

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**Introduction:** The focus of this paper is to deliberate and discuss the need for strategic leadership in times of dynamic global change. Conceptual underpinning of the paper is partially provided by the line of reasoning that, in times of economic instability, continuous and discontinuous change an essential aspect of strategic leadership is the responsibility of senior management to be able to position and relate their organisation within its environment in such a manner that assures its continued success and security from surprises (Ansoff 1996). Tichy and Bennis (2007, p.94) go further and state:

A leader's most important role in any organization is making good judgments – well informed, wise decisions that produce the desired outcomes. When a leader shows consistently good judgment, little else matters. When he or she shows poor judgment nothing else matters.

Adding (ibid, p.96) 'a judgment that is not successfully executed is a failed judgment no matter how smart the strategy'. Alternatively, Michael Bon, PDG, Carrefour SA, cited by Thompson and Martin (2005, p.445) points out in respect of strategic leadership:

Strategic awareness and change involves: becoming aware – listening, being on the shop floor more than in the office whilst , most important of all, staying humble – taking action – sharing with others

The contention being that effective strategic leadership, which is essential for organizations to remain successful, has to be grounded within the perspective of a constantly changing

and rapidly evolving business world that includes the emerging BRIC (Brazil, Russia, India and China) economies. And, as the nature of organizational leadership is changing because of the increasingly competitive global market, it is now also claimed that, 'organisations with only one leader are short on leadership' (People Management, Feb 2004). Adding support to the notion that effective leadership needs to be found at several levels within the organization. Lumby (2007, p.12) referring specifically to the education sector, commented:

The concept of leadership has moved from a process orchestrated primarily by the principal and to a lesser extent senior and middle management to a much more fluid construction by a whole host of players

Our experience suggests that Lumby's viewpoint is just as true within the business world.

The viewpoints and arguments made within this paper, take into consideration generic theories, models and the centrality of leadership from the point of view of applicability for any organization. As the paper is intended to be more scholarly than empirical, the research methods consisted mainly of desk top research of primary literature and contemporary articles. This enabled the authors to draw from a range of documentary evidence and to take into account alternative views that have been written on the subject before. The literature reviewed included: appropriate management, leadership and educational journals and case studies. The research was also triangulated with ethnographic

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**Keywords :**  
*Strategic  
Leadership, Global  
Competition,  
Business  
Environment,  
Economic context.*

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*'The most successful strategic leaders perform two key roles, a charismatic role and an architectural one.'*

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primary research by drawing from the authors personal experiences in working with successful senior managers in a range of industries.

### **Contextual Background**

Empirical evidence suggests that a series of crises, including oil supply restrictions, energy and material shortages, rising inflation, economic stagnation, labour unrest, increased unemployment and the recession experienced in the new millennia has resulted in senior managers having to search for innovative and radically different approaches to the running of their businesses. Ed Ludwig, CEO of Becton, Dickinson cited by Eisenstat, Beer et.al (2008) suggests, 'being a CEO is like answering a call to bring the organization to a better place than where you found it'. Within the dynamic and strategically emergent business environment there is a continuous need for strategic leaders of organizations to search for ways of: sustaining growth (profit) when faced with tough global competition and pressure on the provision of goods and services; investing in the upgrading of product and service quality and customer service; focusing management energy on new market opportunities; improving responsiveness to market change and accelerating the delivery of new products and services when product life cycles are shortening. Whilst at the same time recognizing the need to challenge internal cost structures and the price of bureaucracy. Thompson and Martin (2005, p443) referring to Kets De Vries (1996) conclude that, 'the most successful strategic leaders perform two key roles, a charismatic role and an architectural one'. The charismatic role

involves establishing and gaining support for a (winning) vision and direction by empowering and energizing employees. The architectural role concerns building an appropriate organization structure together with systems for controlling and rewarding people. As a result the strategies are owned, customers are satisfied, employees enjoy work and things can and do change rapidly. These arguments embrace visionary leaders, entrepreneurs and the process of intrapreneurship within the organization. Arguably then, the real challenge of the dynamics of competition is that, battles are fought among organisations taking different approaches, especially those that counter yesterday's ideas.

Irrespective of whether the environment is dynamic or stable, the size of an organisation does not confer competitive advantage. The way things get done, which reflects the leadership within the organization, does. According to Eisenstat, Beer et.al (2008) 'Finding and holding a firm's moral and strategic center in a competitive market is a calling and an art, not an engineering problem'. Literature, (Senge 1991; Swieringa and Wierdsma 1992; Thompson and Martin 2005) inter-alia, suggests that organisations have had to become learning organizations. Embracing the knowledge management paradigm results in the trend shifting from growing stronger, i.e. just acquiring tangible assets to growing smarter by acquiring transferable knowledge. Debatably, organisations can learn only through individuals who learn and, whilst individual learning does not guarantee organisational learning, it is accepted that without it,

no organisation learns. What part does innovative strategic leadership play within the learning organization process? Probst and Buchel (1997) suggests '...the process by which the organization's knowledge and value base changes, leading to improved problem solving ability and capacity for action'. Whereas Sloan (date unknown) argued from a business perspective that:

...the strategic aim of a business is to earn a return on capital, and if in any particular case in the long run is not satisfactory, then the deficiency should be corrected or the activity abandoned in favour of a more favourable one.

Probst et.al and Sloan appear to be suggesting organisational learning is no different to individual learning in that it is designed to bring about behavioural change. Doug Conant, CEO of Campbell Soup cited by Eisenstat, Beer et.al (2008) adds weight to this notion by contending, 'you can't talk your way out of something you have behaved your way into. You have to behave your way out of it'. A larger market share for example, may be the reward for strategic vision, creativity, efficiency and effectiveness of the organizations leadership in constantly bringing about organizational behavioural change. Allen and Hartman (2008, p.10) also support this notion of behavioural change by commenting 'Leadership is a relationship between leaders, followers and the situational context'. Alternatively, when asked what he had done to bring about the turn round of SAS Airlines, Jan Carlson (attributed) the CEO responded, 'we didn't do any one thing a 1000% better, we did 1000's of things 1% better'. Consequently, if

things can be done better, small (share) organisations could increase their share of the market and challenge the leaders. Porter (1997, p 4) points out 'Competitive strategy is about being different. It means deliberately choosing a different set of activities to deliver a unique mix of value.

### Strategic Leadership, Vision and Culture

Strategic leadership is being able to see and plan the way ahead through clear strategic goals and objectives. It is having a strategic understanding of the changing nature of the environment and being able to respond to the cues and signals which are constantly emerging from the general and competitive market environment. Furthermore it is an appreciation of the organisation's strengths, weaknesses, abilities and cultural paradigm. It is about understanding the organizations strategic ability to cope and contend with what is coming, metaphorical speaking, towards them. Strategic leaders, from an organizational perspective, according to Bloy (2007) have to 'stop looking in the mirror and being pleased with themselves and start looking out of the window'. Creating the conditions for a new culture to emerge to be able to manage these challenges as they are presented may be one of the most important tasks faced by the leadership (Johnson and Scholes et al 2006). Are leaders defined by what they say or what they do? Collinson and Collinson (2005, p. 4) provide a useful perspective with their contention that, 'Leadership is a dynamic, inter-actional but asymmetrical process between leaders and followers operating within particular shifting local, national and

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*'Competitive strategy is about being different. It means deliberately choosing a different set of activities to deliver a unique mix of value.*

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global contexts'.

Contemporary literature often simplifies leadership into a checklist style definition. The use of these and there are many variations, can become the means by which we judge effective leadership. The following is not untypical of how people describe leadership:

- D- direction; providing an overall sense of company goals
- R- respect; respecting employees
- I- inform; keeping employees informed on company performance
- V- values; articulating clear values
- E- energy moving quickly and flexibly
- R - role model; leaders are watched more than they realise

(Source Business and Education Training, October 2003)

The fact that the above checklist approach to define leadership is a play on the word 'driver' is not accidental or coincidental. Similar metaphors and imagery are regularly promoted; stirring the ship through turbulent times or the ship is rudderless if the leadership is perceived as ineffective or weak. Defining leadership in this manner can be overly simplistic one dimensional and emphasises a characteristic approach that may not reflect the bigger picture that takes context and situation into account.

With regard to the future, according to Warren Buffet (attributed) 'when we sit in the shade, we are grateful that someone had the vision to plant the

tree'. In a similar vein Oscar Wilde (date unknown) commented, 'there's nothing wrong with being a dreamer, as you will see the dawn before others'. Both of which, illustrate the point that vision is about the future, looking ahead and anticipating what will be required. Senge (1995) argues that the vision can provide the basis for creative tension...'Creative tension comes from clearly seeing where we want to be (our vision) and telling the truth about where we are'. Whereas, Hamel and Prahalad (1995) explicate that, 'the notion of strategic intent conveys a sense of ambitious change, a new direction, discovery and even profound destiny'. Clearly then, the increasingly changing context of the business environment suggests that strategic leadership is about the constant review of the organisations vision and *raison d'être*. Amazon.com provides an appropriate example of how the vision can change as the market or sector changes.

...to use the internet to transform book buying into the fastest, easiest and most enjoyable shopping experience possible (1995)

...is the place to discover anything you want to buy online (1999)

Amazon.com seeks to be the world's most customer-centric company, where customers can find and discover anything they may want to buy online at a great price (2006)

Source: Amazon.com Investor Relations website.

In addition to the responsibility for developing the vision, strategic direction and establishing the strategic business objectives of their

organization, leaders through their style and manner will impact on the culture and shared values of the organisation. Lumby (2001 p.12) points out:

Cultural change is not brought about by espoused values and actions but by interpretation of signals from the leader which may contradict publically promoted values and assumptions. Leadership may be an embodiment of what people do, not what they say

Whereas Pickett (2001, p.1) suggests that:

Organisational behaviours are adapted to the desired outcomes, based on individual organisational norms and mores and that each individual organisation will 'fit' their leadership and management needs to their desired outcomes.

Pickett's choice of the word 'fit' appears to be apt for it has long been contended that the style of leadership within any organisation can be the catalyst for the organisation's success or failure.

Good Leaders come in all shapes and sizes, with their own distinctive styles. Principled, unscrupulous, enlightened or egotistical, one thing marks them out for success – people follow them to great things (Source: *Driving Leadership and Management*, Sept 2005, p.17)

Much has been written on the subject of leadership with countless so called leadership and management 'gurus' expressing diverging views on the role, nature and styles of leadership and how they see leadership strategy and behaviour impacting on organisational performance. Numerous highly leader-centric models and explanations that

encourage us to make sense of the phenomenon of leadership have emerged. In essence, the praxis of effective strategic leadership will include a skillful synthesis and application of many leadership and management theories. In this regard, the strategic leader of today has to become both a scholar and a practitioner. A requisite of which is an epistemological integration of theory and practice. One cannot effectively apply theory without understanding.

In exploring the subject of strategic leadership it is useful to further establish a frame of reference from which, we can deliberate on what leaders actually do and what we expect them to do. Whilst it is reasonable to assume that what leaders do will vary considerably at different levels of an organisation and from situation to situation, it is our contention that the actual principles of effective leadership do not change from organization to organization or sector to sector.

In the past there has been, and maybe still is, a tendency for views on leadership and leaders to be 'fashionable'. For example, in the UK during the early 1990s the views on leadership of Sir John Harvey Jones the former Chairman of ICI were promoted as worthy of emulation in the business world. Now, his opinions are no longer fashionable, the argument being that he was trapped in a mindset that suited the giant corporation of ICI but was not transferable to smaller organizations or different sectors. Morgan (1986, p.200) offers a possible explanation, "People can get trapped by illusions hence the way they understand reality is limited and flawed".

In a similar vein, Pascale (1990) contended, "that as Managers (leaders) in an organisational context we are continually creating and the breaking paradigms before becoming imperiled by them". Our contention is, we learn how to see and subsequently can become blinkered. Collinson and Collinson (2005, p.7) in their research on the nature of leadership suggested:

The tendency to make sense of leadership issues through such individualistic models and assumptions is deeply embedded not only in research literature but in popular cultures particularly in western society.

Adding, "The context in which leadership operates is often neglected in the search for universal rules and laws".

If, as Collinson and Collinson (ibid) suggest, there is an inherent tendency to reduce explanations to models, it is relevant to examine whether the use of theories and models encourages us to consider leadership in the context of the situation or challenges; or to take into account the influence of personal characteristics. Moreover, from a cultural perspective we can question whether the culture is shaped by the leader or is the leader shaped by the culture. Johnson and Scholes (2005, p. 163) suggest that:

Organisational culture is the deeper level of basic assumptions that are shared by members of the organization and are built up over a period of time. Furthermore, managers (leaders) draw heavily from these frames of reference.

If leaders draw from established cultural frames of reference as observed by Johnson and Scholes, it is unlikely

then that models will have universal application per se, though they have some use as a basis for understanding leadership behaviour.

A further argument is, that the nature of leadership required at a time of major change in the sector/industry would certainly differ considerably from the nature of leadership required when there is long periods of stability and less turbulence within the sector's business environment. It must logically follow therefore that, as leaders we will use different models or theories to suit a particular situation or context, just as a craftsman uses a different tool for different jobs. Acceptance of which, reinforces the notion of the leader being a scholar – practitioner and the fact that one cannot effectively apply theory without understanding. Conceivably, what we expect from leaders and how we judge their performance will not vary that much from organisation to organisation or sector to sector. But, will most certainly vary from situation to situation. The challenge all leader's face is recognizing what type of leadership is required where and when. Thompson's et al (2005) contention of the dual role, charisma and architect supports the line of reasoning.

It is apt to consider whether leaders are men/women for all seasons (all situations or all challenges). In terms of effectiveness it could be the case that an individual's leadership style may have, metaphorically speaking, a shelf life, implying that there is a time dimension on the effectiveness of a leader. Ribbins (2005) suggests leadership is a complex social phenomenon that needs to be related to historically and culturally formed contexts which can change,

endure and/or modify over time. Ribbins also contends that context must always be considered to account for particular forms of leadership dominant in any one culture or historical epoch and why these forms of leadership persist or change. The cultural context adds an important dimension to the notion that leadership is a social construct and amplifies the point that what works in one country or culture may not work, or work as well in another.

The cultural can be the significant defining factor in what contemporary society considers and expects leadership to be. During the latter part of the twentieth century and into the new millennium, contemporary society of so called 'western cultures' appears to have become increasingly fascinated by the cult of celebrity. Consequently, the word leader has become an often used and hackneyed expression employed by the mass media and applied to a range of people and situations. Leaders in business – Bill Gates, Warren Bennis; Leaders in sport – David Beckham, Tiger Woods; Leaders in politics – Barack Obama, Gordon Brown and so on. The use of symbolic imagery supports Collinson and Collinson's (2005, p.7) view that, 'we develop romantic concepts of leadership and overly exaggerated views of what leaders do and are able to achieve'. Grint (2005, p.27) added, 'We put leaders on a pedestal, expect them to do amazing things and crucify them when they don't'. Much of the contemporary literature on leadership focuses on the effectiveness of leaders in terms of, key characteristics and personal qualities such as charisma, inspirational (etc) and functional abilities such as

planning, supporting coordinating and controlling.

Alternatively, according to Fiedler (1967) the situation will determine the leader. The situational approach to leadership is an insight into understanding leadership under certain conditions, which, is the main theme of this paper. Advocates of this approach argue that the effectiveness of leaders may vary from situation to situation. A leader may be highly effective in one situation and completely ineffective in another irrespective of the choice of leadership style they adopt or the inherent qualities and characteristics they possess. In the UK, Winston Churchill is regularly referred to as an example of the phenomenon of good situational leadership. Churchill was acknowledged as a good leader in the context and challenges of World War 2, but not so effective in other aspects of his political life.

Our understanding of the need for strategic leadership should not therefore be compromised by detaching the need for leadership, leadership style or characteristics from the actual situation in which leaders have to act. According to Ribbins (2005) we need to take a more multi dimensional perspective. Suggesting that we have to explore the dynamic moving picture which constitutes the leadership practice of an individual by taking into account context, culture and case to appreciate what strategic leadership really is. Ribbins's contention had support in an article in the People Management publication (February 2004, pgs. 36-38) which stated that there are three constituents to any leadership situation:

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*Leadership implies strategic thinking and establishing a vision, the need for high performance leadership competencies, recognition of the effect leadership style may have on motivation and, the need to create an organisation with high values.*

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Challenges – the critical tasks, problems and issues requiring action.

Context – the local situation in which any challenge arises and the environment and on-site conditions in which action and learning take place.

Characteristics – the qualities, abilities, skills and competencies of all the people involved in the situation.

As the very concept of leadership is variable, cultural and socially constructed, Ribbins (ibid) also questions whether literature can really inform how to do the job and points out that there are as many realities as there are individuals.

### **The need for Strategic leadership**

What emerges from the literature is a consensus, (Harris et al 1997, p.151), (Lumby 2001, p.11), (Ramsden 1998, pgs 131-157), (Adair 1983), (Bass 1990), inter-alia, that leadership is about the guidance of an organization and the creation of a vision that provides a sense of direction and focus in the pursuit of the organisation's goals and objectives and getting things done within the situational context.

On the one hand, the need to be focused on targets and accredited outcomes suggests that the leadership emphasis in times of economic turmoil is on the 'hard architectural' aspects of business such as developing strategic objectives, organising the structure, creating the systems, planning and survival - adopting a transactional leadership approach. Alternatively a transformational style of leadership contrasts quite markedly with the transactional approach. Whilst still being focused on hard edged business

challenges and context, the transformational approach takes into account the 'softer' issues of the business. Issues like super-ordinate goals, values, company style and behaviour norms; seeking as it does a deeper commitment within the organisation endorsed as achieving an envisaged motivated staff.

Within the situational context that of this paper, it is useful to reflect upon the concept of the transformational leadership paradigm being people and value centered. Ramsden (1998, p.110) points out, 'the idea of leadership as transformation and the leader as an agent for change is as old as time'. Whilst Kotter (1999) adds, 'transformational leadership is establishing direction, aligning and motivating people'. Burn (1978) cited by Ramsden (1998, p. 110), developed the idea of transformational leadership as a moral process whereby both followers and leaders were raised to higher levels of motivation and virtue. Until recently, the dynamics of leader/follower relationships and the need to develop an understanding of the psychological contract that exists between leaders and led appear to have been underestimated.

As a discussion on the need for strategic leadership, without making a reference to the associated concepts of follower-ship and partnership, it would be incomplete. It has been previously stated that leadership implies strategic thinking and establishing a vision, the need for high performance leadership competencies, recognition of the effect leadership style may have on motivation and, the need to create an organisation with high values

Within this context of follower-ship, leadership is about creating an organisational climate with an emphasis on values and behaviour, the act of delegating and empowering, building high performance teams and, coaching and mentoring. With regard to partnerships it is also about creating a climate for co-operation, cross boundary team working, networking and sharing information. Clearly then, the roles and responsibilities identified within this expanded definition will be needed throughout the organisation and therefore cannot be just confined to what we expect of the senior management team.

Leadership guru, Professor John Kotter (People Management; 26 February 2004, p. 36) has long viewed managers and leaders as two different species. He argues:

The difference between leadership and management has important implications. Management is to do with planning and organising something, coping with complexity, processes and procedures...

Leadership is to do with creating that thing in the first place. It is about coping with change and helping adapt to a volatile world.

The word 'lead' comes from an Anglo-Saxon word which means a road or a way. It's about knowing what the next step is. Theoretically leadership is different from managing in that leadership is about direction and providing a focus. Consequently what leaders should be good at is inspiring others to take that path.

Returning to the theme that leadership is about getting things done, it is appropriate to conclude by considering the *raison d'être* of the Grimsby Institute of Further and Higher Education which is expressed through the mission statement:

"To be a world class, customer focused and dynamic provider of learning and skills"

For this strategic objective to be achieved, it is necessary that people take ownership of the idea at all levels of the organisation and, that the talents and resources of all its employees are fully utilised. People need to be inspired to match and align their personal values with the organisational values. For this to happen, effective strategic leadership is required within the senior management of the organisation and, distributed leadership will be required throughout the whole structure of the organisation.

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# SUSTAINABLE PRODUCTION MANAGEMENT – A CASE STUDY OF A MAURITIUS COMPANY

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**Abstract:** Sustainable production management is a challenging task. The personnel at all levels of a production system tend to become stereotyped, unless challenged by internal or external forces. In this context creativity at work place is essential. Stereotyped working introduces mental blocks that hinder creativity. This paper discusses the case of a company under the category of Small and Medium Enterprises (SMEs) situated at Mauritius and involved in the manufacture of plastic products. The use of simple tools and the resulting benefits helped in removing the mental blocks and improving the production. The researchers have observed similar tendency (stereotyped working) with Indian SMEs. Awareness of mental blocks and associated remedies will help in sustaining the productivity.

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## Keywords :

Productivity,  
creativity, mental  
blocks, quality,  
production  
management.

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## INTRODUCTION

Production management has to tackle a plethora of problems irrespective of the nature or size of a production unit. Small and Medium Enterprises (SMEs) often buckle under problems such as marketing, finance and supplies. Globalization and recession have aggravated the degree of these problems. Not only productivity but also quality and sustainability can effectively be addressed by the efficient amalgamation of people and processes. Companies need to focus on the available resources and incorporate innovative decision thinking through value management. It is necessary to use the inherent creative powers of employees' minds for the progress of the system.

Creativity plays an important role in every walk of life. Many SMEs believe

that rejects and reworks in the system are unavoidable and is a part of the game. They are happy as long as they meet the schedules (which are planned and set loose) and customer demands. This is a hindrance for sustainable development and inhibits improvements in productivity. Effective understanding of creativity and elimination of mental blocks is essential.

Kao (1991) suggests that creativity may be defined as "a human process leading to a result which is novel (new), useful (solves an existing problem or satisfies an existing need), and understandable (can be reproduced)". Creativity can be associated with personal characteristics and attributes, intelligence (Barron and Harrington, 1981; Davis, 1989), conceptual skills, behaviors, abilities, organizational factors or external influences. Organizational factors such

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as empowerment, experience, job complexity and supervision style have a tremendous impact on creative performance. Effective organizations should be simultaneously efficient and creative. In this context, efficiency means optimizing, stabilizing, and polishing current methods and routines for highest quantity, quality, customer satisfaction, and at the lowest possible cost. Organizational creativity means deliberately changing current methods to reach new levels of quantity, quality, cost and customer satisfaction possible. New methods and new products result from creativity implying higher productivity, higher profitability, better quality and higher market share.

If managers want to benefit from the gains brought in by creativity, they should pinpoint the blockages to creativity and bring in a creative change to the benefit of the organization, the management, and the employees. Such a study has been made at Shamrock Plastic industry, categorized as an SME company involved in manufacturing consumer durable plastic products located at Mauritius.

At the beginning of the study, the shop floor personnel and managers have been asked to identify shop floor problems and their root causes. No doubt, problems were identified but many root causes were often quoted as "the usual behavior of the process". This has been challenged by the authors in the study presented below. This paper proves that simple analysis using scientific tools helps to improve the situation and overcome mental blocks. Some personnel admitted that 'fear of consequences' did not encourage them to attempt and solve problems.

Through simple discussions (mentioned below) the importance of elimination of mental blocks has been stressed.

### **Mental Blocks**

Mental blocks hinder creativity and value addition in many organizations; leading to the wastage of the intellectual ability of the employees. These can be Cultural (tradition, taboos, temptation of pure reasoning, lack of humor etc.), Environmental (interference by noise, smell etc.), Sentimental (fear of consequences, fear of taking risks (making a mistake)), irritations by uncomfortable sensual stimuli, pressure, stress etc), and Realization (thinking in stereotype, inability to change point of view, too narrow perception of the problem etc).

Mental blocks are usually created by ourselves; it is a perception discouraging people from moving ahead or taking actions or decisions. Octavio, 2008 shared that whenever rational thinking has been replaced with misconceptions, prejudices or dogmas, the detrimental effects and the persistent influence of mental blocks have blurred analytical capacities, distorted rational thinking and affected logical reasoning, with visible repercussions on professional performance and negative effects on engagement toward the workplace.

Hence for higher performance, effective decision making, and analytical thinking one should overcome all sorts of mental blocks. In this context, one should instil confidence, self-awareness, and improve the communication line to overcome one's limitations and constraints leading to growth and progress.

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*This paper proves that simple analysis using scientific tools helps to improve the situation and overcome mental blocks.*

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### **Lateral and Vertical thinking for idea generation**

The shared vision of the company can be achieved by promoting innovative and creative idea generation vertically through the ladder of management. Management should not work as an independent entity but it should be effectively supported by its employees. Employees should be inspired to be creative and incorporated in decision making. Fears like rejection of ideas should be eliminated with clear communication lines. Incentives and training can as well be provided to employees. Management can encourage and train employees to use simple tools such as cause and effect diagram and control charts to improve their processes. Control charts can be adopted in daily work to identify assignable causes and stop production to solve unaccepted conditions and continue production smoothly.

For lateral idea generation, one can introduce mechanisms to facilitate the transfer of knowledge between work teams. For example, quality circles can be created for idea generation in order to form part of a quality conscious organization. Interaction of different categories of employees can as well influence the learning capability of an organization, such as the interaction of mechanics and operatives to share the knowledge of effectively operating one's machine or even act as the owner of the machine with a philosophy of Total Productive Maintenance adopted.

### **Value engineering**

Value engineering (VE) is a technique in which the value of a system's output is optimized by crafting a mix of

productivity, quality and profitability. In majority of the cases this practice identifies and removes unnecessary costs and efforts, thereby increasing the value of the output delivered. VE is above all a structured problem solving practice whereby the focus is on critical analysis for generation of improvements in the process for better output with less waste.

Value analysis conducted in the company revealed inefficient use of materials. As such, alternative options of different material mix of polystyrene (virgin material) and regrind gave higher output and quality, and reduced waste.

Narayanaswamy 2009, advocating value engineering, emphasized on proactive involvement of every individual employee, rather than focusing exclusively on a specific department. To achieve value engineering and promote creativity, mental blocks of employees as well as managers have to be overcome.

One can focus on creativity and value engineering through means like advanced technology, automation but over viewing optimization of current processes and critical plant asset, manpower. Knowledge management and the potential of manpower remain untapped in many industries. To stimulate this creativity, barriers to creativity have to be explored and tackled and are enthused towards a learning organization. A learning organization is one skilled at creating, acquiring and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights (Garvin, 1993). Morrison and Rosenthal, 1997

opined that only true source of sustainable competitive advantage results by building learning organizations. Senge, 1991 states that "learning cannot exist apart from action. Learning is the process of enhancing our capacity for effective action."

Organizational learning is a long-term activity that will build competitive advantage over time and requires sustained management attention, commitment, and effort. A list of companies frequently cited as learning organizations confirms this fact. These companies include Motorola, Wal-Mart, British Petroleum (BP), Xerox, Shell, GE, Honda, Sony, Nortel, Harley-Davidson and Kodak.

Hence it is crucial to enthuse people at all levels of a company to learn and keep abreast with developments in knowledge and tools. Periodic brainstorming sessions should be conducted as well as training programs and soul searching even in the absence of sporadic or chronic problems. Knowledge should be well managed as an effective asset in companies, constant evaluation should be made and feedback obtained for continuous improvement.

#### CASE STUDY:

A survey of the SME under study showed increasing rates of defective injection molded products. The shop floor personnel and management considered them as 'fate accompli'. Pareto analysis revealed high occurrence of short shots, warpage followed by appearance defects, flashing, sprue sticking and products sticking to the mould. If quality consciousness is introduced, such

defects can be reduced or even eliminated with creative tact from management and creative ideas from the employees. The main hindrance towards this achievement is found to be mental blocks.

Repetitive work all day and all year throughout causes operators to become passive. Non value adding work like inspection causes demotivation. This attitude should be discouraged. Proactively, critical thinking should be boosted. Inspection was found to be a repeated activity in the company. Elimination of this activity was not considered due to failure to critically analyze shop floor activities from management and passiveness of employees. Since inspection is a non-value adding activity, involving repetitive work, errors, time and consequently an additional cost, we can conclude that detection of poor quality by post-production inspection is unreliable, wasteful and uneconomical. By controlling the quality at the point of manufacture, we can minimize the need to inspect. But due to fear of consequences, there is much reliance on post-production inspection in the company.

Such an attitude acts as a mental block. Management should firstly be self critical and also encourage the employees to develop their critical thinking. This will be a definite motivation factor and lead to higher value added work.

Defects identified in the injection molding process were analyzed and predominant defects explored to be reduced or even eliminated. It was observed that due to perceptual barriers

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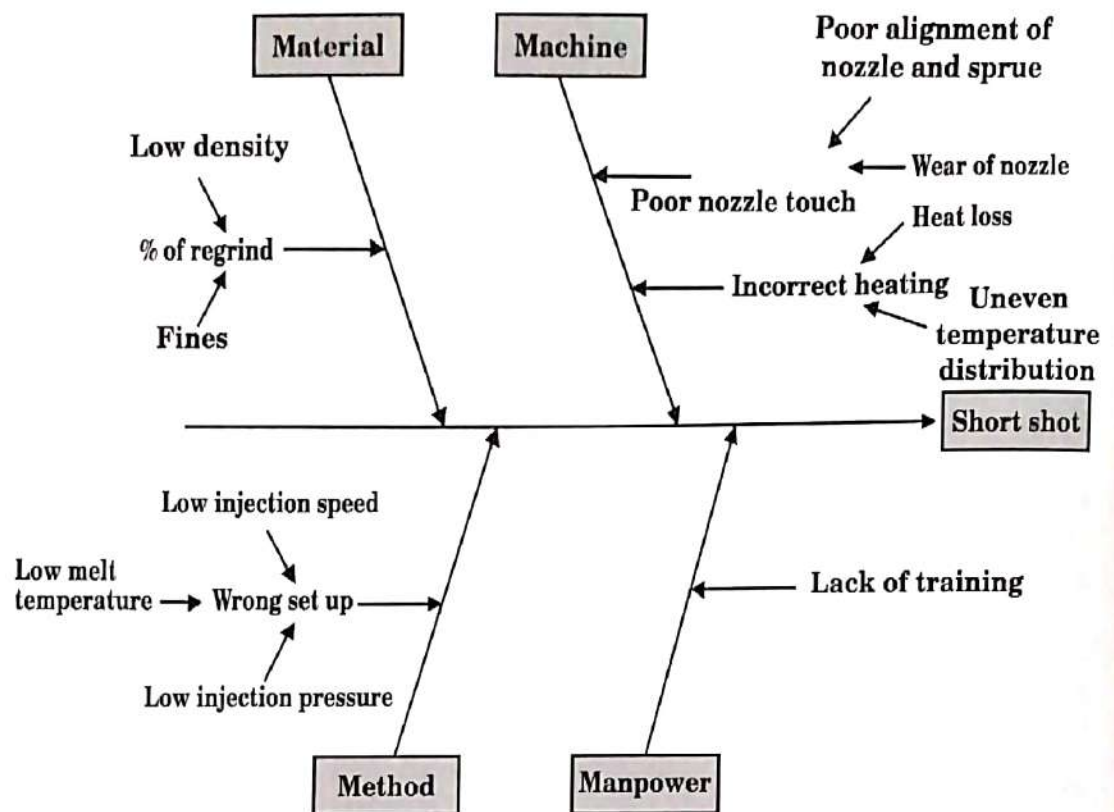
It was observed that due to perceptual barriers between management and operators, there was lack of communication and without any problem solving structure. If learning attitude was adopted in the organization, defects would certainly be reduced.

between management and operators, there was lack of communication and without any problem solving structure. If learning attitude was adopted in the organization, defects would certainly be reduced.

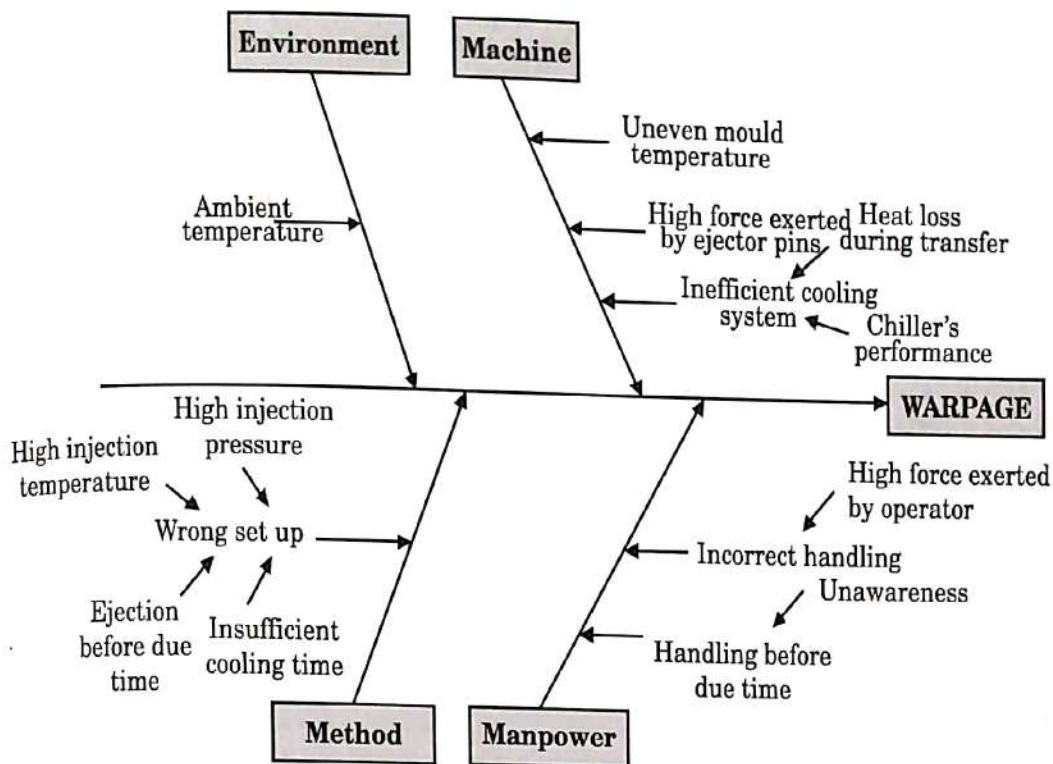
In such an attempt, we have analyzed the two predominant defects: short shots and warpage defects. Brainstorming sessions were held with

top management, the supervisors and the shop floor operators. The environment was ensured to be receptive to ideas from all ends and indeed the inherent powers of the people's mind proved to be beneficial by highlighting the causes of defects as in Figures 1 and 2.

**Figure 1 - Cause-and-Effect Diagram for Short Shot**



**Figure 2 - Cause-and-Effect Diagram for Warpage**



The causes of defects such as short shots, warpage etc were analysed. Melt freezing before reaching the ends of mould cavity and low mould temperature, uneven mould temperature were found to be the causes of short shots. Ambient temperature, high injection pressure, high injection speed, and incorrect handling were found to contribute to the warpage of products.

Two simple tools to help improve quality are described in the following lines. Cause and Effect diagram shows the effect at the head of a central spine along with the causes at the ends of the ribs that branch from it. The main factors or causes are listed first and then reduced to their sub-causes. This procedure is continued until all the causes have been included (using brain storming sessions). The factors are then critically

analysed from the angle of their probable contribution to the effect. These crucial factors are then subjected to experimentation and thus validation.

Pictorial check sheet is a simple tool to map the concentration of defects. A two dimensional sketch of the product is prepared and used as a template. Samples from production process are collected and analysed for defects. The location of the defect on each sample is noted on the sketch. If sufficient number of products is analysed for each type of defect, the defect concentration of each defect can be visualized on the sketch. The design/production office can then find out the reasons (technical as well as non-technical) and take corrective action. In the present case, the defects such as short shots and warpage have been analysed. The analysis showed that short shots occurred most

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*Pictorial check sheet is a simple tool to map the concentration of defects. A two dimensional sketch of the product is prepared and used as a template. Samples from production process are collected and analysed for defects.*

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The resources are already available, but we need to explore and channel them in the right direction. This is possible with the elimination of mental blocks by being receptive to innovative ideas for analysis and implementation.

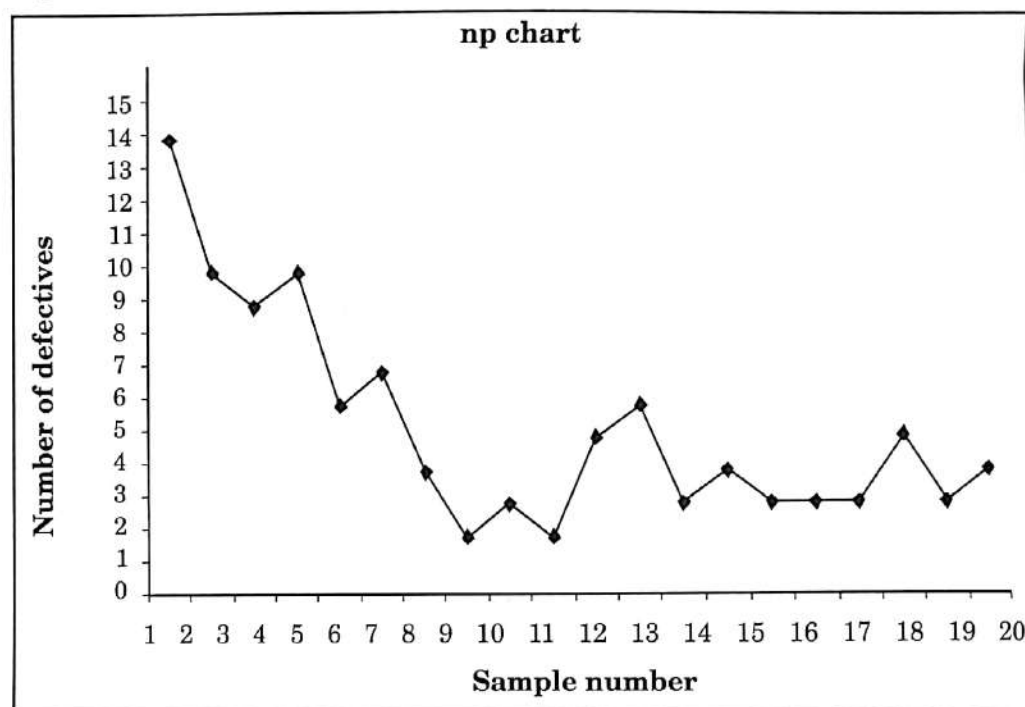
frequently at the start of the process and the missing areas were larger. This indicates an initial low mold temperature during the transient time, causing freezing of the melt before filling the entire mould cavity.

These simple techniques can be adopted in the everyday life of the company for problem identification and solving. The resources are already available, but we need to explore and channel them in the right direction. This is possible with the

elimination of mental blocks by being receptive to innovative ideas for analysis and implementation.

Real time data from the machine was collected to prepare the control charts and detect the presence of special (assignable) causes influencing the process. Only the machine element is considered in this phase. A sample is shown in Figure 3.

**Figure 3 - Control chart for machine element for Day**



From a series of such control charts, it was observed that the first few samples were responsible for most of the out of control points; reinforcing one of the causes identified in the cause and effect diagram, i.e. low initial mould temperature. This is due to an unstable temperature distribution at the start of the process (transient state).

Control charts for samples were also constructed for the case of machine as well as manual element. Samples were taken after the operator removed the runner of the product and separated it into two parts, depicted in Figure 4.

Figure 4 - Control chart for machine and manual element for Day 1

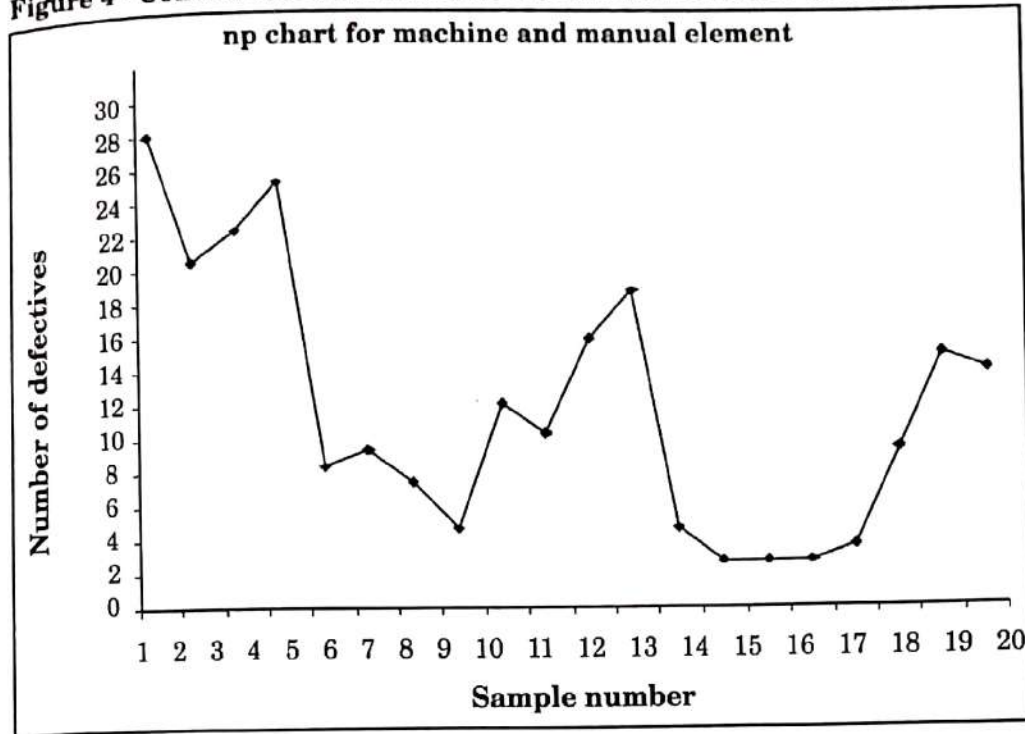


Figure 4 - Control chart for machine and manual element for Day 1

The subsequent set of control charts identified a drop in the number of defectives after the 4th sample (for subsequent six samples) and after the 12th sample (for all the remaining samples). This trend is associated with the operator's work as these samples were taken after the rest pause and lunch time. In the meantime when the operator was absent for collection and breaking of the parts, the ejected products would have more time for cooling before they were handled. Hence the cooled products have less probability of distortion when the operator resumes his work. Therefore, incorrect handling and/or handling before the due time is considered as the assignable causes for warpage of components.

Such assignable causes can be pinpointed if management wants to see it and the operators are critical to their

work. With thoughts like 'it is the way that things have always been done', we will only remain trapped in mental barriers and will not be able to perform better until the philosophy is changed to 'the best way of doing things' by being quality conscious, critical of our own system's deficiencies and the confidence in the power of our people.

The above case is one of the many SMEs belonging to Mauritius. Similar case studies have been observed by the researchers in Indian counterparts. In a typical case of SME in India, the industry had considerable scrap resulting from a machining operation. A simple analysis using cause and effect diagram showed that the mental blocks of the designer coupled with that of shop floor manager have introduced redundancy in location of the parts resulting in oversized and undersized

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products. These cases indicate that mental blocks do occur with stereotyped working.

### Conclusion

For a sustainable production management, it is essential to eliminate mental blocks and be creative. A regular focus on the production through the window of creativity will lead to an efficient and effective system. Games and other avenues such as improved training that enhance creativity must be built into the system.

The present case study involving an SME situated at Mauritius proves that a well directed plan and the use of simple, common sense approaches, effective quality tools, and procedures could lead to effective and efficient manufacturing. It would also imply minimum investment, a change in the management philosophy, and working attitude. Sporadic or chronic causes existing in the system could be easily brought to fore and avoided mental block formation. The savings resulting out of this study amounted to 10.62% reduction in time and a 5.62% reduction in defects. The experience of the researchers has indicated similar mental blocks with Indian SMEs and is attributed to stereotyped working.

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# ENHANCING GLOBAL COMPETITIVENESS THROUGH INTEGRATION OF INTELLIGENCE QUOTIENT (IQ), EMOTIONAL QUOTIENT (EQ) AND SPIRITUAL QUOTIENT (SQ) : A CASE STUDY AT TATA STEEL

Smita Dash Sahoo \*  
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**Abstract:** Management, in the new world order, with globalisation and liberalisation at the helm of affairs, has been very challenging. Every organisation is measured by the value that it possesses and creates while doing business. Proper, efficient and effective resource management is the name of the game in today's cut throat competitive environment. Every organisation has to have a unique cutting edge over its competitor for competitive advantage. A continuous effort to remain unique in every aspect and, foster an organisational climate of innovation, decides the frontrunners. This results in a continuously evolving global competitiveness-optimum utilisation of resources, new product launch, value added services etc. All the resources in an organisation are driven by the most dynamic and complex resource- the human resource. In earlier times, human resources were measured by their IQ. As the complexities in the organisational climate increased, they needed to possess IQ & EQ and now, in the present times, Spiritual Quotient (SQ). This integration brings out a unique skill which not only addresses the human individual difference better, but also provides solace to the depressed, frustrated and the stressed and helps those who have got stuck in an erroneous mindset. This special skill in leaders and employees is catching up because of its positive results and has thus, enhanced the global competitiveness. This paper is a case study on Tata Steel, Jamshedpur, India, aimed to find out whether it has such leaders and employees, whether it has introduced initiatives to build SQ and if so how is it being disseminated and how is it helping the employees. The methodology adopted is that of reference to relevant literature on this specific subject, case study at Tata Steel and primary data through a qualitative survey to assess its effectiveness. From the study it was found that though TSL has leaders and employees with high SQ, TSL has not introduced formal initiatives to build SQ. It was also found that the vehicle for helping build positive attitude and improve the quality of life is KNOWLEDGE MANAGEMENT. However, TSL needs to design appropriate programs to meet the needs of its employees and the organisation. Many other interesting trend in leadership were found through this study.

**Keywords :** IQ, EQ, SQ, TQ, HRM, Global Competitiveness, value creation, innovative strategies

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**INTRODUCTION :** With Liberalisation and Globalisation, business dynamics have become more complex. Proper, efficient and effective resource management, improvement and innovation decide the front-runners in today's cut throat competitive environment. A business entity has to adopt innovative strategies for value creation and management. Innovation may be doing different things and things differently or both. Human Resources drive all the other resources to productivity. It is the most dynamic resource where Input is not equal to Output. And so, Human Resource Management (HRM) has always tried to achieve Output is more than Input position. However, each of this queer resource seeks different things differently at different times. But experienced HR professionals opine that satisfaction of love/care need reduces the fixation to other, especially lower order (Maslow) or maintenance (Herzberg) needs. To be able to expend higher order love and care, an organisation needs to have leaders who are not only high on IQ but also in EQ and SQ, and have the skills to apply it in an integrated form in any given situation. This calls for unwavering intention and integration of Intelligence building into the leadership developmental programs for a start until wholesome programs are developed.

### Literature Review

Organisations evolve because of interactions (Kumar C.V. and Sreenath K., eds, 2005). These interactions occur among subordinate, superior, and peers within, and between employees and stakeholders outside the organisation.

For better utilisation of IQ, Daniel Coleman introduced EQ which gives awareness of self and other people's feelings and enables most appropriate response to situations. Towards the end of twentieth century, Danah Zohar and Ian Marshall, 2000 introduced the concept of Spiritual Intelligence (SI) as the ultimate one. Spirituality comes from the Latin word spiritus meaning "breath of life."

### Definitions

Intelligence – Rational Intelligence, Material Capital, 'What I think' function and 'follow rules without feelings' mindset.

"Intelligence is the ability to solve problems or to create products that are valued within one or more cultural settings (Gardner, 1983/2003)

"Intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment" reflects this broader view (Google Search 2009; Wechsler, 1940).

Emotional Intelligence – Emotional Intelligence, Social Capital, 'What I feel' function and 'Judge and behave accordingly' mindset.

"Refers to the capacity for recognising our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships." (Daniel Goleman, 1998)

"Ability to monitor one's own and others" feelings and emotions, to discriminate among them and to use this information to guide one's own thinking and actions" (Salovey and Mayer, 1990)

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*An organisation needs to have leaders who are not only high on IQ but also in EQ and SQ, and have the skills to apply it in an integrated form in any given situation.*

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*The seven steps to achieve SQ are become aware of where one is now, feel strongly to change, reflect on one's deepest motivations, discover and dissolve obstacles, explore all possibilities to go forward, commit to a path and remain aware that there are many paths.*

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Spiritual Intelligence – Spiritual Intelligence, Spiritual Capital, 'What I am' function and 'Question and change' mindset.

"means the intelligence with which we address and solve problems of meaning and value, the intelligence with which we can place our actions and our lives in a wider, richer, meaning-giving context, the intelligence with which we can assess that one course of action or one life-path is more meaningful than another." (Danah Zohar and Ian Marshall, 2000).

### **Integration of IQ, EQ and SQ**

It is human being alone who can possess and apply SQ along with IQ and EQ. The High performance pyramid of Loehr J. and Schwartz T. (2001) advocates that all four capacities-Physical, Emotional, Mental and Spiritual- should work together. The six paths to achieve SQ are path of duty, nurturing, knowledge, personal transformation, brotherhood and servant leadership. The seven steps to achieve SQ are become aware of where one is now, feel strongly to change, reflect on one's deepest motivations, discover and dissolve obstacles, explore all possibilities to go forward, commit to a path and remain aware that there are many paths.

An individual in Junior Management level can manage with high IQ and lower EQ and SQ, but as he moves up the ladder, it is imperative that he improves his EQ and SQ substantially to be able to manage teams and lead them to achieve the organisational and individual goals. Do the employees of an organisation think so?

One of the best organisations for such a study is Tata Steel, the 8th largest steel producer of the world and the first in India to have established a Personnel Department in 1947. This study is aimed to find out the behavioural traits of leaders and role models in TSL and whether SQ building is a part of their developmental activities? What do the Giant's „Eyes" see and „Heart" feel?

### **Tata Steel - The Giant**

TISCO, rechristened Tata Steel Ltd. (TSL) from 1st April 2005, just over hundred years old, is the crown of Tata Group, one of the oldest companies of India and the first integrated steel plant in Asia. It has emerged a winner in spite of several adversaries. Its technology today is globopolitan, processes are highly qualityconscious, its systems flow uninterruptedly and it has a loyal, committed and even generations of knowledge force. In the new world order it is a difficult game for Tata Steel as it has to excel inspite of its exemplary values, high ethical standards and detailed systems and processes. The consolidation of top ten steel industries is given below :-

15 IL positions were restructured to 5 in 2001. In 2008, further restructuring was done and an IL 6 position was created. The strength of officers is 4372. The 6 Impact Levels (IL) are designated in descending order as Assistant Manager, Manager, Senior Manager, Head, Chief and Vice President. Personnel Department became Human Resources division in 2001. In 2004-05, in line with the company's growth and globalisation plans, two divisions were created – Human Resources (HR) for officers and Industrial Relations (IR) for unionised employees. The broad HR functions are

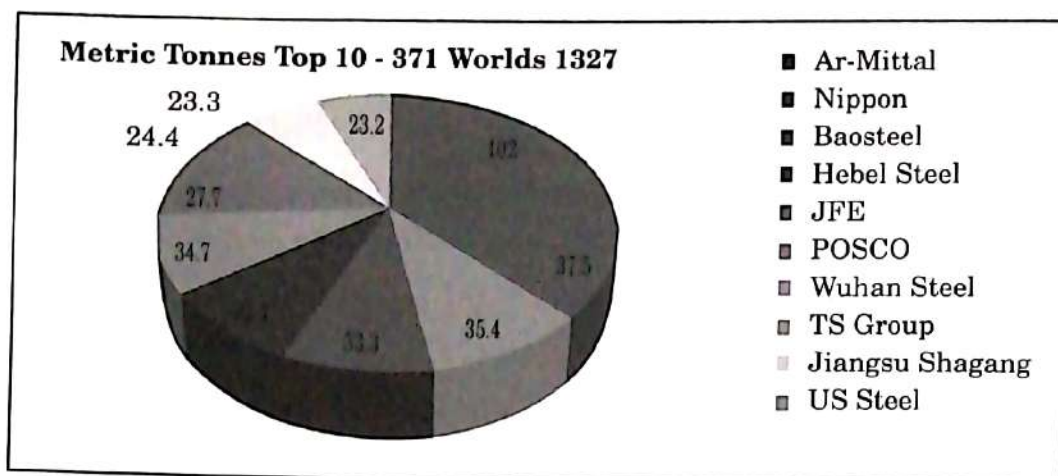


Fig 1 : Top Ten Steel Industry Consolidation 2008

Table 2 - HR Objectives of various Policies

Sl. No.	Policy	Objective
1.	Group Vision	Value creation and corporate citizenship through the people, by fostering team work, nurturing talent, enhancing leaders hip capability and acting with pace, pride and passion.
2.	Group	Effective utilization of staff and Materials.
3.	TSL Values	Integrity, Respect for individual, Credibility & Excellence.
4.	Goals 2012	Value Creation, Safety, Environment & Employer of Choice
5.	HR Policy	people are the primary source of its competitiveness; equal employment opportunities; enrich quality of life, develop potential and maximize productivity; transparency, fairness and equity in all its dealings with its employees; foster a climate of openness, mutual trust and team work.
6.	TQM Objectives	Attraction of Talent, Retention of high Performers &
7.	Consultant's Report	Developing people to take up leadership positions

Talent Management (Manpower Planning, Recruitment, Career Planning, Performance Management System), Leadership Development & Succession Planning, Learning & Development, Compensation & Benefits, HR Services and Continuous

Improvement. The broad IR functions are Organisation Design, Recruitment, Employee development, Wage design, management of Industrial Relations, Managing Separation, Liason with government agencies and continuous improvement. HR objectives in various

*Value creation and corporate citizenship through the people, by fostering team work, nurturing talent, enhancing leaders hip capability and acting with pace, pride and passion.*

policies in TSL are given in Table 2 below :-

### Research Questions and Methodology

1. Whether Tata Steel has leaders and employees with high SQ – A questionnaire to officer (IL3 to IL6)
2. Whether it has introduced initiatives to build SQ – Discussions with HR Officers. If YES,
  - a. How is it being disseminated – Discussions with the HR Officers
  - b. How is it helping the employees – Questionnaire to employees who have attended the program?

Discussions – People's Voice

### Research Question 1

To track down whether Tata Steel has leaders and employees with high SQ, officers from IL 6 to IL 3 were given a questionnaire to respond to questions having various behavioural traits of SI, EI and IQ. The twelve indicators of SQ by Danah Zohar are Self Awareness, Compassion, Vision and value led, Humility, Positive use of Adversity, Holism, Spontaneity, Field Independence, celebration of diversity, Tendency to ask why, ability to reframe and sence of vocation. The sample size was 114 and Data Analysis (DA) of their response is as under:

#### 1. The degree in which the bosses in TSL possess the listed behavioural traits is as under :

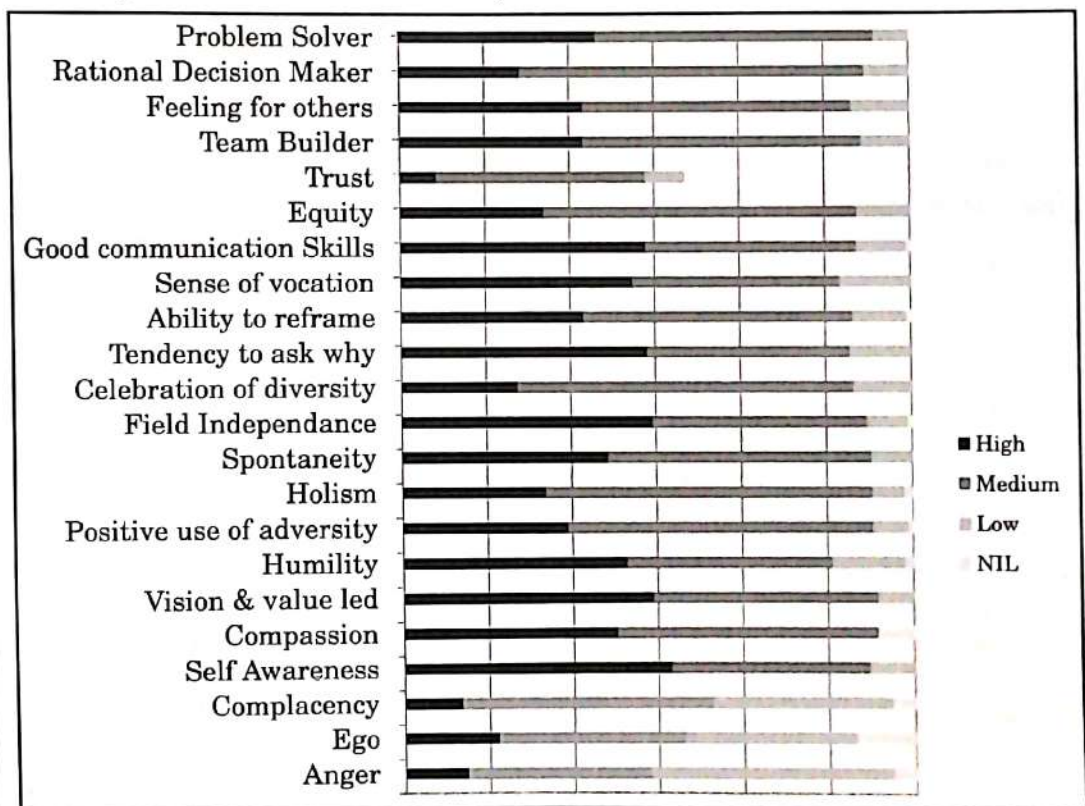


Fig 2 : Percentage of response for importance of IQ, EQ and SQ to be an effective leader.

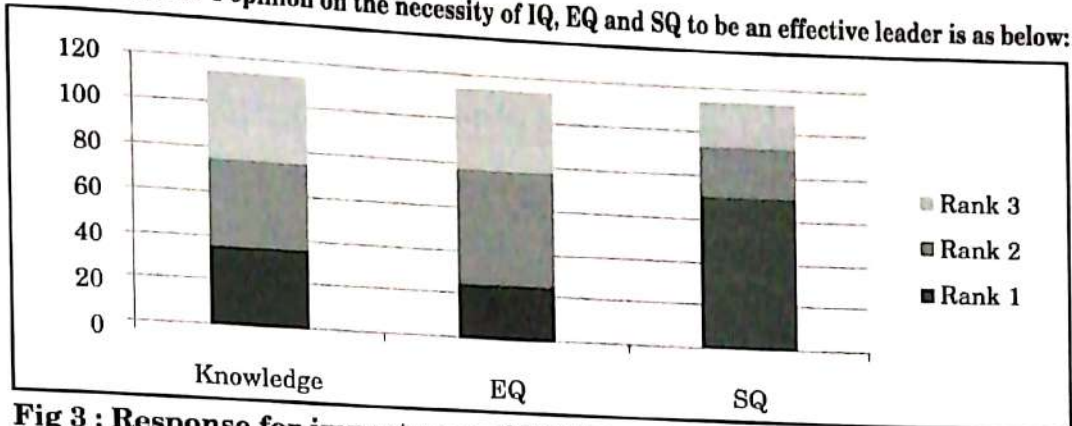
**Table 3: Degree in which traits are possessed by leaders in TSL**

Sr. No.	Degree Highest Score	High	Medium	Low
1	NEGATIVE TRAITS	-----	Ego Complacency	Anger
2	SQ TRAITS	Self Awareness Vision & Value led Humility  Field Independence Tendency to ask why Sense of vocation	Compassion Positive use of Adversity Holism  Spontaneity Celebration of diversity Ability to reframe	-----
3	EQ TRAITS	Communication Skills Trust	Equity Team Builder  Feeling for others  Rational Decision Maker Problem Solver	-----

#### Data Analysis –

1. Leaders do possess Ego and Complacency in medium degree but 'Anger' trait is low. Out of the three negative traits, Ego was found to be most absent among the leaders. Priority would have to be given to bring down complacency from medium to nil urgently.
2. Out of 12 SQ traits, 6 scored medium and 6 scored high. The traits which scored high are those which are self oriented whereas those 6 which scored medium are more required to manage teams and targets. Priority would have to be given to develop these 6 SQ traits into high.
3. Out of 7 EQ traits 2 i.e. Communication skills and trust, have scored high. However, these two would serve better purpose only when the other five EQ traits match them. If TSL leaders become high on Team building. Feeling for others, rational decision making and problem solving, TSL's path to Number One position would become flower-laid.
4. Thus, TSL leaders are medium in the most important traits of EQ and SQ.
2. The TSL officer's opinion on the necessity of IQ, EQ and SQ to be an effective leader is as below:

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**Fig 3 : Response for importance of IQ, EQ and SQ to be an effective leader.**

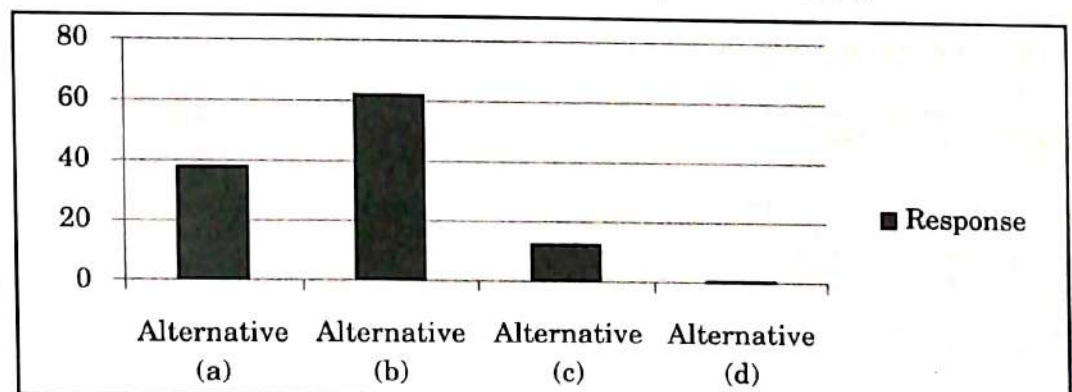
**Table 4 : Maximum score in the Rank by SQ, EQ and IQ**

Sr. No.	Ranks	Highest score in the Rank - Winner
1	Rank 1	SQ
2	Rank 2	EQ
3	Rank 3	Knowledge

#### Data Analysis -

- The Officers of TSL opine that to be an effective leader Spiritual Quotient is extremely and most necessary, followed by EQ and then Knowledge.
- However, in DA 1.4 above the leaders are not found high in the important traits of EQ and SQ.
- The question asked to respondents was when a mistake is committed, your boss
  - Protects you, analyses and discusses the learning with the team, amends the systems and processes to ensure that no one gets to repeat such mistake
  - Listens to your side of the story, is compassionate, explains your mistake and reports the matter in understanding with the whole situation
  - Gets angry, addresses the mistake against the set systems and processes and recommends action according to the laid down rules.
  - Gets too angry and reports to everyone possible about your mistake

The response is as below.



**Fig 4: Percentage of response for behaviour of boss when a mistake is committed.**

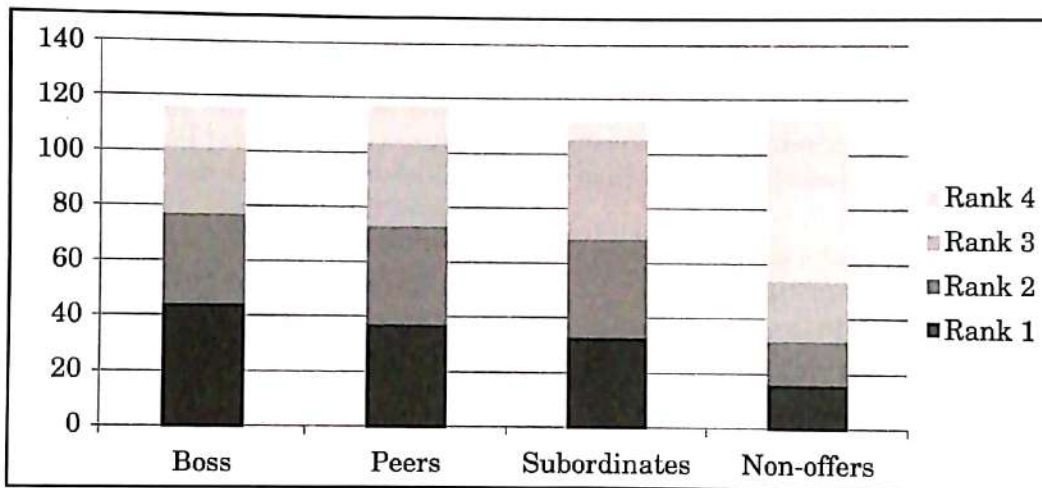
**Table 5: Percentage of Response for Alternative (a), (b), (c) and (d)**

Sr. No.	Alternative	Percentage of Response
1	(a)	33
2	(b)	62
3	(c)	13
4	(d)	01

#### Data Analysis -

- 1 When a mistake is committed, leaders/bosses were found to behave as a high EQ leader would do. However, there was good number of leaders who behaved like leaders with high SQ also.
2. Anger was again found to be low in the leader's behaviour and so the responses over the questions are found to be consistent.

#### 4. The ranking of rapport shared by the respondents with the boss, peers, subordinates and non-officers was ranked as under:



**Fig 5: Response for rapport shared with boss, peers, subordinates and non-officers**

**Table 6: Maximum score in the Rank by Boss, Peers, Subordinates and Non-officers**

Sr. No.	Ranks	Highest score in the Rank - Winner
1	Rank 1	Boss and Peers
2	Rank 2	Subordinates
3	Rank 3	Non-officers
4	Rank 4	Vacant

### Data Analysis –

Rank 1 and 2.

1. There is a tie-up for Rank 1 between Boss and Peers for best rapport.
2. Peers have scored almost the same for
3. Rapport with subordinate doesn't is not found to be strong and in focus thus, indicating weaker team-work.
5. Number of persons- role models- from within TSL who have influenced the respondents

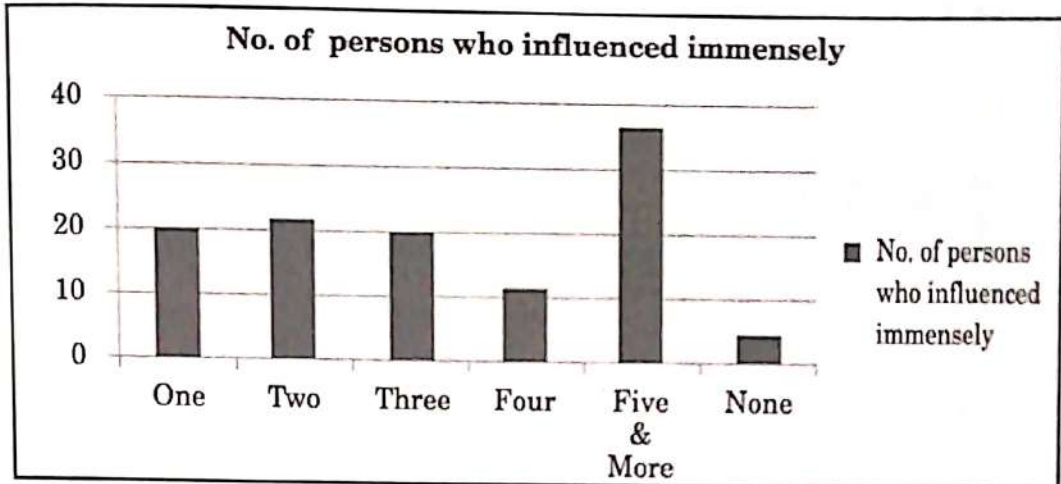


Fig 6: Response on number of persons who immensely influenced the respondent.

### Data Analysis –

1. Considerable number of respondents, some having been in TSL for quite some time, said that they were not influenced by anyone in TSL which is slightly surprising.
2. More numbers of respondents were influenced by 5 and more persons.
3. Equal numbers of respondents were influenced by one, two and three persons.

6. One person within TSL who has profoundly influenced the respondent in all aspects

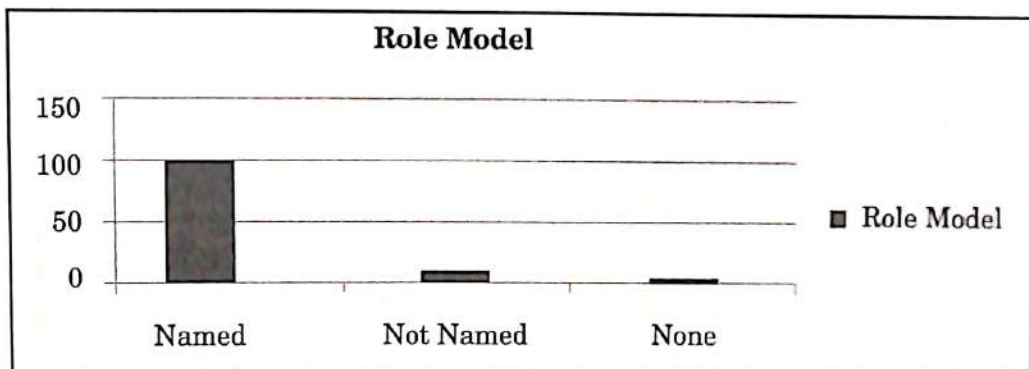


Fig 7: Name of the Role Model

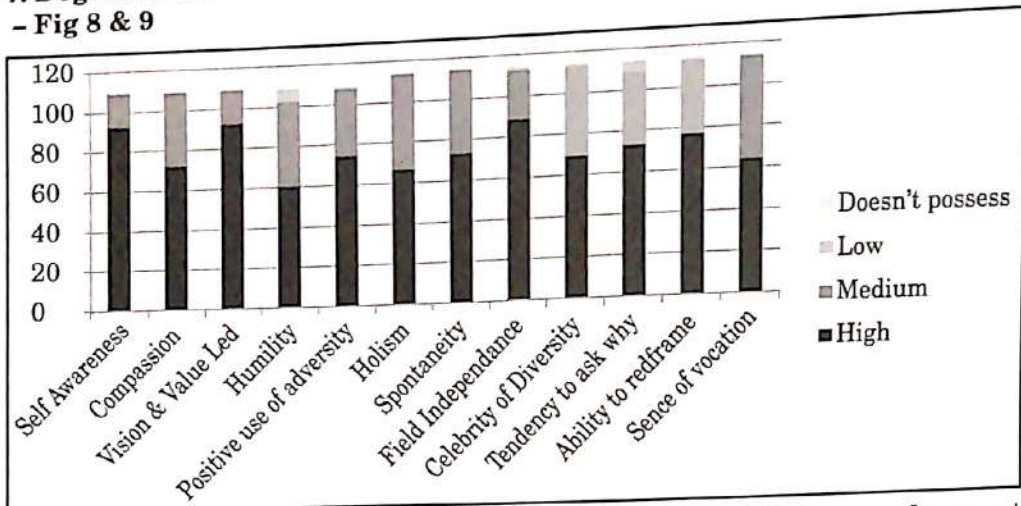
### Data Analysis –

1. 87% were comfortable naming the Role Model. However, many of them named their departmental or division head as the role model.

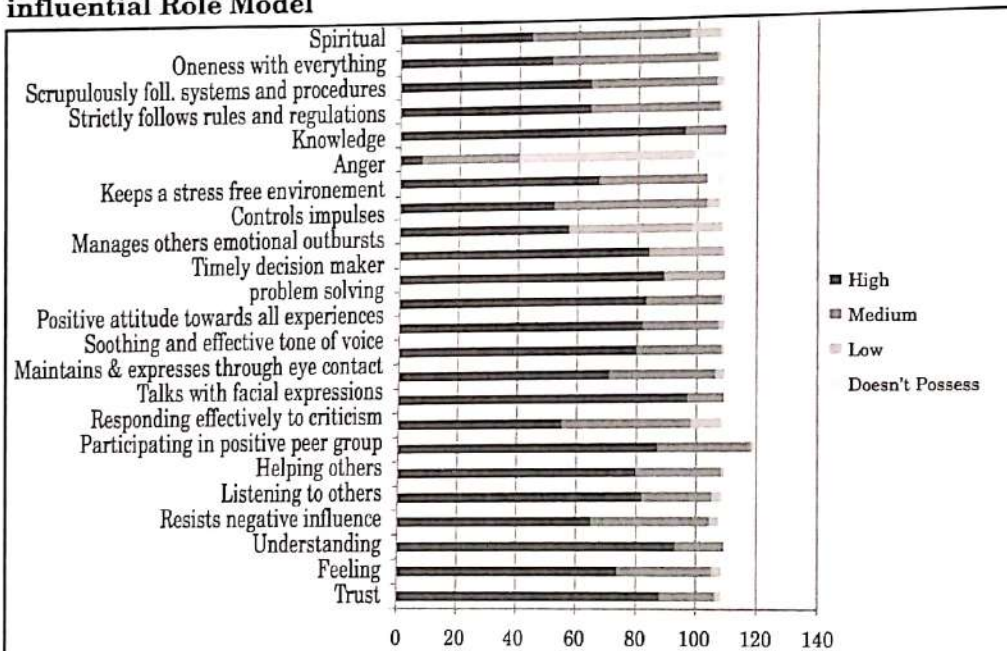
2. 9% were not comfortable naming their Role Model but filled in the traits that the rolemodel possessed.

3. 4% of the respondents did not have any role model within TSL which is slightly surprising.

### 7. Degree in which the role model posses the listed 36 behavioural traits – Fig 8 & 9



**Fig 8: Response on possession of the 12 SQ behavioural traits by the most influential Role Model**



### Data Analysis –

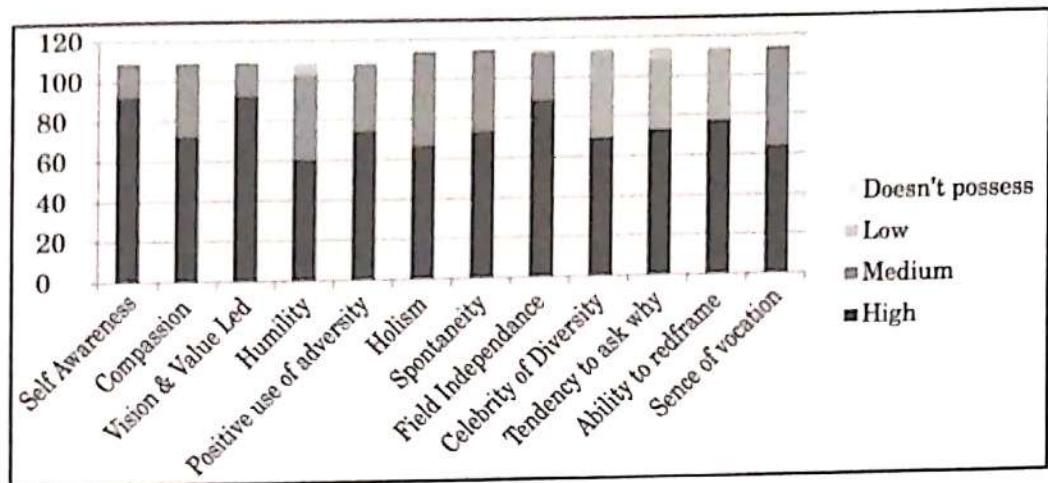
1. The Role Models scored high and medium in the 12 SQ traits.

2. They also scored Nil in humility, Tendency to ask why and spiritual.

**Fig 9: Response on possession of EQ and IQ behavioural traits by the most influential Role Model**

**Data Analysis –**

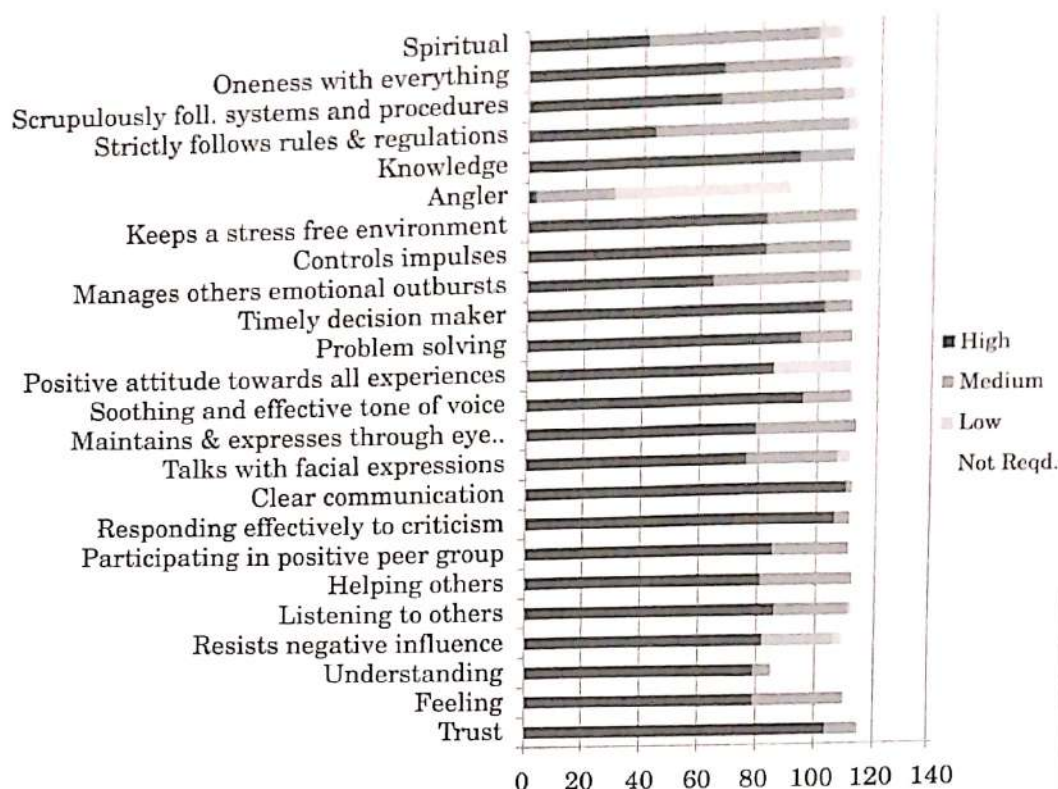
1. The Role Models scored high or medium on EQ and IQ traits.
2. The negative trait 'Anger' was found to be low in the role models.
8. Degree in which the respondent opine that a leader should possess the listed 36 behavioural traits.



**Fig 10: Response on necessity to possess the 12 SQ behavioural traits by a Leader**

**Data Analysis –**

1. The Respondents opined that a leader should possess high SQ traits. Even medium was acceptable. But low and nil were not acceptable except in the case of 'Humility'.
2. 'Celebration of diversity' and 'Tendency to ask why'.
2. 'Vision and value led' and 'Self Awareness' were most required as per their opinion.



**Fig 11: Response on necessity to possess EQ and IQ behavioural traits by a Leader**

#### Data Analysis –

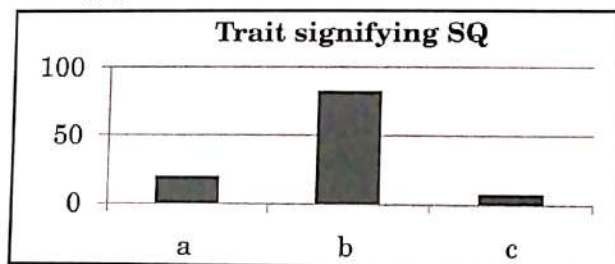
1. The Respondents opined that a leader should possess high or medium EI and IQ traits. Even medium was acceptable. But low and

nil were not acceptable in most traits.

2. The negative trait 'Anger' should be low in degree in the leaders as per their opinion.

#### 9. Which alternative is SQ as per the respondents understanding

- a) A state where one understands others feelings and considers everything in the light of the situation
- b) A state where one is aware of self and others is absolutely positive about every experience and believes in the theory of oneness of all beings.
- c) When one is absolutely God-fearing and follows all the rituals laid down in the religion.



**Fig 12 : Response for trait signifying SQ**

### Data Analysis –

1. Most of the respondents correctly opined (b) to be the trait signifying SQ.
2. Some of them opined EQ trait to be SQ trait.
3. Most of the respondents understand the EQ and SQ as they mean.
4. However, employees will need better understanding of the concepts and traits.

10. What attracts Steel People to TSL?

### Table 7 : Tata Steel - Attraction Index – Steel People say

- Freedom of expression and career opportunities
- Ethical values
- Trust
- Competitiveness
- Innovation
- Respect for individuals
- Learning opportunities
- Brand image
- Experienced leaders
- Safety
- Transparency Empowerment fairness
- Corporate Social Responsibilities
- Work Environment
- Company history
- Attractive policies
- Performance culture
- Stability
- Values
- Care for people

#### **HIGH CONCERN HIGH IMPACT**

- Global benchmarking
- Growth projects
- Leadership Development
- Globalization and managing challenges
- Products Innovation
- Raw material security for sustainable development
- Capability building
- Productivity

#### **HIGH CONCERN LOW IMPACT**

- Cooperation from govt agencies
- Bureaucracy
- Systems and processes
- Standard Operating Procedure
- Institutionalization of VMV to bottom level
- Sustainability
- Managing Performance
- Work life balance
- Focus on delivery

#### **HIGH IMPACT LOW CONCERN**

- Goal orientation, means
- Talent Retention
- Manpower quality
- Create benchmark
- Managing political environment
- Union activities
- Employee morale
- Delay in decision
- Quick strategic decision
- Ethics

#### **LOW CONCERN LOW IMPACT**

Balancing CSR and Profitability  
Compensation  
Behavioural professionalism  
Modernization  
Cultural integration Ethics  
Vs Economics

**Fig. 13: CONCERN - IMPACT INDEX - STEEL SPEAK ON FUTURE CHALLENGES**

#### **Analysis of Dilemma**

It is found that on one hand certain factors attract employees to TSL and on the other hand the same factors pose dilemmas for the organisation. A list is given below:

- Leadership development – current vs. future needs
- Global competitiveness – competition from local and multinational players
- Integration of multi-dimensional cultures – Tata Steel going global
- Ethical values vs. business economics - principles vs. profitability

Through KM function, initiatives are taken by inviting Senior Management officials perceived to possess high SQ, to speak to Middle and Senior Management officials. „Living Life Happily“ is one such effort for its employees and their spouses.

- Product innovation – retaining leadership in existing products vs. developing new products.
- Global benchmarking – benchmarking globally vs. creating own benchmark
- Strategic decision making – speed vs. Quality

## Research Q 2

To track down whether Tata Steel has introduced initiatives to build SQ, if yes how is it disseminated and how it helping the employees, discussions with the HR officers was held and it was found that TSL has not introduced any formal initiatives to build SQ. However, through KM function, initiatives are taken by inviting Senior Management officials perceived to possess high SQ, to speak to Middle and Senior Management officials. „Living Life Happily“ is one such effort for its employees and their spouses. A questionnaire was given to 21 officers who attended this program. 11 responses were received and after Data Analysis (DA) the following were the findings:

1. 60% opined the program was highly beneficial.
2. Though it was a program meant to be attended with spouse, only 10% attended it with their spouse.
3. After attending the program, they were able to look at situations in a positive perspective. However, they felt a need for the program to be designed properly to make it more effective and beneficial for the organisation.
4. 70% opined that such programs should form a part of the annual

HRD initiatives for all employees.

5. 50% felt that this program would increase the positive energy levels, improve work culture and the overall quality of life of officers and in case of workers even productivity.
6. Suggestions for organisational measures to make the employees of TSL a greater strength, than it is now, were called which are as under:-
  - a) Create promotional avenues to avoid stagnation
  - b) KRAs should be laid down without overlapping
  - c) Exposure to quality external behavioural workshops
  - d) Help to become better human beings
  - e) Greater respect for individuals
  - f) Trickling down of the bigger objective of the company
  - g) Family oriented programs
  - h) Reward for performance based on team work
  - i) A better work life balance.

## Findings

1. Yes, TSL has leaders and employees with high SQ.
2. No, TSL has not introduced formal initiatives to build SQ. However, through KM function, initiatives are taken by inviting Senior Management officials perceived to possess high SQ, to share with officers. „Living Life Happily“ is one such effort for its employees and their spouses.
  - a) The vehicle for helping build positive

attitude and improve the quality of life is KNOWLEDGE MANAGEMENT.

- b) It is found that such programs have helped employees in positive thinking. However, the initiative is too small for a measure. A program needs to be designed appropriately to meet the needs of its employees. Many other interesting finding in the trend of leadership.

### Limitations -

The study would have brought out further dimensions if sample from only IL3 and IL 4 could have been taken. However, due to limited time, the response from this group was very small for data analysis.

### Conclusion

Tata Steel has been a fighter all through. Its workforce is its strength. Equipping this workforce with the accepted intelligences is the need of the hour more so because most aspects of a business are imitable but a dynamic human resource undoubtedly gives the competitive edge. By initiating intelligence building efforts of higher order, it will not only enable them to play effectively the modern competitive roles but also help them ward off negative energies so as to bring about a sense of oneness of existence with the organisation.

As Mahatma Gandhi has said, "Service which is rendered without joy helps neither the one who serves nor the served, but all pleasures and possessions pale into nothingness before service which is rendered in a spirit of joy". In the present competitive environment it is necessary on the part of Tata Steel to equip its loyal and highly

committed employees, with acquirable intelligence such as rational, emotional as well as spiritual intelligence, and transform them into the greatest unique strength of the company. This will ensure achievement of its vision, mission, goals and objectives all of which aspire for leadership development. So, to take what Kenneth E. Clark and Miriam B. Clark (1990) have said, a little further, if employees do not prepare for positions of leadership, the organisation will suffer, and if the organisation doesn't strategise to develop its employees into leaders at all levels, the society will suffer. Every Manager has a leadership role to play, and hence, no employee can be excluded from leadership development program and succession planning efforts. The challenges that stare at Tata Steel can best be overcome by sustainable development of the employees. Apart from specific findings we can generalise as under:

1. **KNOWLEDGE MANAGEMENT** (KM) function is a good vehicle of building SQ, EQ and IQ.
2. Through an individual effort by the then Head- Technical Education at Shavak Nanavati Technical Institute (SNTI), Jamshedpur, 2862 employees were shown how to think positive through developmental program called „Life Positive" and „Positive Thinking and your Work" a few years back, due credit goes to the organisation for never having discouraged this initiative. Not discouraging positive efforts make a big difference to the total effort.
3. Leadership Development and Succession Planning has been initiated in TSL and is proposed to extend to all levels. Leadership

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*Every Manager has a leadership role to play, and hence, no employee can be excluded from leadership development program and succession planning efforts.*

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Development and Succession Planning should cover all levels in an organisation in a chain from bottom to top.

4. Employees understand the role of EQ and SQ in effective leadership and think it necessary to be a part of HRD initiatives.
5. EQ and SQ are important skills for effectiveness at all levels. Similarly, EQ and SQ is necessary in leaders in all organisations- big or small.
6. SQ can be built and preserved only in an environment of spirituality. Hence, SI should simultaneously target organisation culture raising it into a spiritual organisation, so as to make it easier for EQ and SQ building efforts to become effective.

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# AN OVERVIEW OF EMPLOYEE EMPOWERMENT INITIATIVE FOR TQM-AN HR PERSPECTIVE

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Ms. Mihika Kulkarni \*\*

**Abstract:** Employee empowerment is an addition to the involvement and participation initiatives that have been employed in Management practices. It is a management response to an increasingly complex and competitive external environment and its popularity has been enhanced by the quality movement in general, and by TQM in particular. The principles of TQM

- Customer focus
- Leadership
- Empowerment
- Process approach
- Systemic approach
- Continuous improvement
- Decisions based on facts
- Relationship with suppliers mutually beneficiary

Empowerment is currently a popular topic on which consultants and management have focused in their desire to bring about increases in employee pro-activity, responsible self-organizing and self-management. The hypothesis has been that these changes in behavior will assist organizations in achieving their financial goals.

Top management leadership and employee empowerment are considered two of the most important principles of total quality management (TQM) because of their assumed relationship with customer satisfaction. As a result, many top management leadership and employee empowerment strategies and practices have been suggested in the management literature.

This is an empirical research which talks about TQM principles-

- Leadership
- Empowerment
- Continuous improvement

This research paper presents a simplistic understanding of the implementation of employee empowerment in IT companies. The article summarizes general views of management regarding employee empowerment. It also talks about the trends in employee empowerment. The aim of this research is to understand managers perception of the concept of empowerment. The paper is an attempt to understand the importance of empowerment in service sector like IT companies.

## Keywords :

TQM and employee empowerment.

**INTRODUCTION :** Nowadays empowerment has occupied a central point in many organizations in the 21st century. There is need for employee empowerment in order to enable the organization to respond quickly to any changes in macro-environment. In a

competitive environment in which organizations must be faster, leaner, provide better service quality, be more efficient, and more profitable, an empowered and proactive service worker is thought to be essential.

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However, delegation of authority for a long period of time in the past, dominated the management field. In fact, this view changed into the "empowerment" concept as it covers the participation and delegation of authority along with the motivation of the employees. Managers began to prefer a style, which liberates the creative and innovative "energies" and potentials of employees while benefiting shareholders, suppliers and customers as well.

Thus, the past three decades have been full of empirical and conceptual research dealing specifically with employee empowerment and autonomy. More than a decade ago, it was noted that the practice of empowering subordinates is a principal component of managerial and organizational effectiveness. Most of the researchers argue that empowerment need to be supported and nurtured by some prerequisites like incentives, skill, knowledge, communication and flow of information within an organization. The climate is to be conducive to employee empowerment in order to attain employee effective performance and job satisfaction.

In the 1990s empowerment became extensively discussed as the new business issue. The traditional view of leadership management is consistent of control and employees waiting to be directed. The new and more effective leadership is setting limits of authority and delegating responsibility.

### **Evolution of Employee Empowerment-**

Empowerment is a concept that has been around since the dawn of mankind.

However, the role it plays in organizations and its quest for understanding American business implementation has only been evolving for the past 50 years

#### **1.3.1 The early 1950's-**

In the early 1950's, Dr. W. Edwards Deming and Dr. Joseph M. Juran of the United States visited Japan to coach and mentor leaders, emphasizing quality of all the workers and not just of the people at the top of the organization. Through Quality Circles effective teamwork, empowerment and continuous improvement were enhanced. Building the quality in, was a core value change.

The call for Deming and Juran to help the Japanese was initiated because of the power the American economy held. In order to, Japan to be competitive, either the common American business practice of mass production and competition based on pricing could be implemented or some other competitive advantage must be discovered.

The Japanese found another way, compete on quality. In the American automotive manufacturing plants, assembly workers pushed themselves to complete as many products as possible with no concern of Quality. The assembly line only stopped when the supervisor found a sufficient cause, which was very rare. No employee on the assembly line had the authority to stop the line<sup>3</sup>

#### **Worker Empowerment-**

One of the significant differences, of the Japanese automotive manufacturers was the ability for any employee on the floor to stop the assembly line at any

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*Empowerment is a concept that has been around since the dawn of mankind.*

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*In 1980s a sense of a new awakening and resurgence in American businesses on the topic of quality was created. Deming and Juran were brought to the forefront to teach some companies in the United States what they had taught Japanese companies decades before.*

time. The idea was that when a problem was discovered in the product being assembled, the nonconforming piece of the product would be analyzed and fixed at the source so successive automobiles would not have the same problem.

The employees on the floor were empowered to ensure that the finished product met the standards of quality. By the 1960's, another distinction separated U.S. and Japanese businesses. Japan encouraged a more careful utilization of human capital and a more aggressive focus on learning at school and on the job. Japanese employees became part of the organization. They were considered fixed assets, and investments in training were expensed on the employees. The Japanese could not compete with the U.S. in the development of major innovations. Instead, great trust was given to the employees for the exploitation of new ideas.

By the 1970s the U.S. was losing market share in many industries and product lines despite superior productivity. By now the Japanese had turned their weaknesses into strengths. By pursuing quality, worker empowerment, variety, customization, convenience, and speed in getting to the market, they not only expanded the terms of competition beyond productivity but also found new routes to products as they were made.

In 1980's a sense of a new awakening and resurgence in American businesses on the topic of quality was created. Deming and Juran were brought to the forefront to teach some companies in the United States what they had taught Japanese companies decades before.

The training consisted of "making all management employees trained and aware of people and processes that made quality happen" The 1990's began to show a marriage of both the old and new economy. Innovative organizations captured the benefits from mass production (United States) and lean production (Japan). Organizations sought for volume and productivity as well as quality, variety, customization, convenience, and timeliness. The most noticeable difference in these new innovative organizations was that artisans and mass production workers were replaced by "empowered interdependent work teams."

#### **1.4. Employee Empowerment in India-**

Due to its sound foundation in Indian culture, empowerment has immense potential for effective implementation in the Indian context. It was practiced for the first time in the world by Homi Bhabha as early as 1944 at the Tata Institute of Fundamental Research. He also practiced it subsequently at the Atomic Energy Commission (1948) and the Atomic Energy Establishment (1954). Thus Employee empowerment has been practiced for the first time in India both in scientific (1940s) and industrial (1950s) work settings.

The reason why employee empowerment is becoming so popular is simple. It makes good business sense. India ensures an environment of freedom, flexibility and trust and this is what engenders loyalty.

#### **Objectives of Employee**

## **Empowerment-**

The Objectives Of Employee Empowerment Are:-

- To create an environment where people can work with freedom, within a framework of empowerment and accountability, vested with unparalleled powers to imagine, create and implement ideas-fully supplemented by investments in knowledge and technology
- To increase managerial and organizational effectiveness, job satisfaction and work productivity
- To facilitate application of advanced technology.
- To serve as prerequisite to quality focused organization, a core value of TQM effort.
- To act as a source of intrinsic motivator.
- To achieve full potential by allowing employees to stretch their minds, ingenuity and abilities.
- To generate entrepreneurship by driving decision making to self managed teams.
- To derive growth from all opportunities over time by fully allowing employees to increase their speed and enhance their creativity.
- To create value system for the organization.
- To provide platform for creation of intellectual property.

## **2.3. Definition of Employee empowerment-**

The common dictionary definition of empowerment is "to give official authority to: delegate legal power to: commission, authorize".

Gandz (1990) writes, "Empowerment means that management vests decision-making or approval authority in employees where, traditionally, such authority was a managerial prerogative."

**For the research purpose we will consider the following definition-**

Empowerment is defined as a process whereby: a culture of empowerment is developed, information is shared, competency is developed, and resources and support are provided. Each of the components of empowerment—culture, information sharing, competency development, resource provision, and support.

### **Objectives of Research.**

- To study the present status of employee empowerment in IT companies.
- To study current key trends of employee empowerment.
- To understand general views of management regarding employee empowerment and its contribution to organization development.
- To get opinion of management about whether "The study of status of employee empowerment in IT companies will be worthwhile".

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*Empowerment is defined as a process whereby: a culture of empowerment is developed, information is shared, competency is developed, and resources and support are provided.*

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IT companies  
perceive the concept  
of employee  
empowerment as one  
of the methods of  
delegation and  
motivation.

### Hypothesis-

1. There is a confusion amongst IT professionals about the concepts of employee empowerment and objectives of employee empowerment.
2. IT companies perceive the concept of employee empowerment as one of the methods of delegation and motivation.

Q.1.Does your company has employee empowerment initiatives?

Responses	Percentage	Total
YES	100	100
NO	0	0

### Research methodology-

The researcher has used the information given by the respondents for fulfilling the objectives of the research. The data is collected through personal interview and questionnaire and is recorded, organized, analyzed and presented in a systematic way. The result is expected to be valid and accurate.

There were eight questions framed which covered importance of employee empowerment, meaning of employee empowerment, various employee empowerment initiatives, perception of management regarding employee empowerment and status of employee empowerment in the organization.

#### A) Research method mix-

- I) Survey through questionnaire
- II) Interviews

#### B) Sample size-

The sample size for the pilot study was 51 HR heads and CEOs of IT companies in Pune.

#### C) Tools used for analysis-

Weighted Average and percentages

**Interpretation-** It can be observed from the responses that all the IT companies have employee empowerment initiatives.

## Q.2 The Objectives of Employee Empowerment

Objectives of Employee empowerment	RANK					Total
	1	2	3	4	5	
To make best use of present potential	4	9	2	8	28	51
To unleash hidden potential	7	16	18	6	4	51
To show that we are concerned	13	7	9	16	6	51
To Increase productivity	10	16	11	10	4	51
To be able to the Face challenges of tomorrow	17	3	11	13	7	51

In order to know which objective of empowerment has the highest priority in IT sector, it was decided to find weighted totals. These are calculated as below. The weights are given as below.

Reponses/Rank	Weight
Not responded	0
5	1
4	2
3	3
2	4
1	5

Now from the responses the weighted totals are as below.

Objectives of Employee	Weights
To make best use of present potential	106
To unleash hidden potential	169
To show that we are concerned	158
To increase productivity	171
To be able to the face challenges of tomorrow	163

*It can be observed from the responses that all the IT companies have employee empowerment initiatives.*

It can be observed that according to the respondents the best thing about working IT sector in preference order is as below

Preference	Parameters
First	To increase productivity
Second	To unleash hidden potential
Third	To be able to the ace challenges
Fourth	To show that we are concern
Fifth	To make best use of potential

**Interpretation** - From the priority ranking it can be inferred that the IT companies look towards empowerment as a short cut to increase productivity. And there is confusion in the minds of IT professionals about the objectives of employee empowerment.

### Q. 3. Empowerment means-

Responses	Empowerment equals anarchy	delegation of authority is superior to employee	Employees can be empowered by simply	Empowerment means Manager advocates his	If a manager empowers his subordinates, he will be	Employee empowerment means flexible job design	Employee empowerment means Coaching, mentoring	Employee empowerment initiatives cannot be started
no answer						3		
strongly agree		3				11	18	
agree	3	2	10	2		16	16	14
neutral	15	25	9	11	8	8	12	
disagree	10	17	30	12	22	11	3	11
strongly disagree	23	4	2	26	21	2	2	18
<b>Total</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>

From the priority ranking it can be inferred that the IT companies look towards empowerment as a short cut to increase productivity.

-It can be observed that the respondents-

1. Strongly disagree on the following statements-

1. Empowerment means manager abdicates his responsibility,

2. Empowerment equals anarchy,

3. If a manager empowers his subordinates, he will be doing himself out of a job and

4. Employee empowerment initiatives cannot be started as Employees are not competent

2. Strongly agree on the following statements-

1. Employee empowerment means Coaching, mentoring, counseling and

2. Employee empowerment means flexible job design

3. They are neutral on the following statements -

1. Delegation of authority is superior to employee empowerment and

2. Employees can be empowered by simply Communicating with them

**Interpretation-**Though managers are neutral on the statement "Delegation of authority is superior to employee empowerment", they do not strongly disagree on this statement. This connotes that there is confusion even in the minds of the top management about the concept of employee empowerment.

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*Though managers are neutral on the statement "Delegation of authority is superior to employee empowerment", they do not strongly disagree on this statement.*

---

Q.4.Which of the following empowerment strategies you have in your organization?

Empowerment strategies	RESPONSES			
	(%) YES	(%) No	(%) Not Answered	Total
Suggestion Schemes	60.78	35.29	3.92	100
Formal recognition & reward system	88.24	11.76	0	100
Formal dispute, complaint, grievance system	56.86	43.14	0	100
Task Force	41.17	58.83	0	100
Self-directed teams	60.78	39.22	0	100
Joint labor management committee	5.88	88.24	5.88	100
Self -directed groups	33.33	66.66	0	100
Quality Circles	35.29	64.71	0	100
Small group activity	43.14	56.86	0	100
Kaizen	7.84	92.15	0	100
Six Sigma	21.56	78.43	0	100
Others	7.84	7.84	84.31	100

It can be observed that and there exists-

- Suggestion Schemes, Formal recognition & reward system, Formal dispute, complaint, grievance system, and Self-directed teams are perceived and practiced as empowerment.
- Task Force and Small group activity are practiced in lesser number.
- The least- Joint labor management committee, Self-directed groups, Quality Circles, Kaizen and Six Sigma

Interpretation- Formal recognition & reward system, Formal dispute, complaint, grievance system and Joint labor management committee are not empowerment initiatives but no objection was taken on these parameters by the HR heads and CEOs and they treat these initiatives as empowerment initiatives. It can be said that there is no clarity on the empowerment strategies and no conceptual clarity on empowerment.

#### Q.5- Management's Perception about Employee Empowerment

(a) Employee empowerment is a passing fad

Response	Percentage
True	0
False	84.3
Can,t Say	15.7
Total	100.

(b) Empowerment is just a destination

Response	Percentage
True	7.8
False	78.4
Can,t Say	13.7
Total	100.0

© Empowerment is a journey.

Response	Percentage
True	88.2
False	00
Can,t Say	11.8
Total	100.0

(d) Employee Empowerment initiatives will be able to face the challenges of tomorrow

Response	Percentage
True	92.2
False	00
Can,t Say	7.8
Total	100.0

It can be observed that majority of the respondents feel that there is need for research on employee empowerment in IT sector. Hence the relevance of the study is justified.

**Interpretation-** The respondents feel that empowerment is not a passing fad or a destination but it is a journey which will help face the challenges of tomorrow. This data gives the hope that at least the IT professionals understand the philosophy of employee empowerment.

**Q.6. Is there need for research on employee empowerment?**

Response	Percentage
No Answer	3.92
Yes	82.35
Can,t Say	13.72
Total	100

**Interpretation-** It can be observed that majority of the respondents feel that there is need for research on employee empowerment in IT sector. Hence the relevance of the study is justified.

**Q.7. Permission for research**

Response	Percentage
No	82.35
Yes	3.92
Can,t Say	13.72
Total	100

**Interpretation-** The companies were not interested in the survey due to other priorities because of the initial inflation (retention challenges) and gradual slow

down (cost reduction challenges).

**Q.9. Current status of employee empowerment in the organization**

The current status is 7.

## LIMITATIONS

Considering the vast application of the topic and the efforts made by the researchers to have accurate and precise attitude towards different angles of the study, they had to restrict themselves to specific sector in order to complete the research project within a reasonable time. The research work, however has following limitations:

- Some data and statistics were found contradictory in different references. The researcher had to spend plenty of time to clear the contradictions.
- Small size MNCs are covered.
- Sample size is limited to 51.
- IT companies in Pune region are covered.
- As the research was carried out during the period of recession (2007-2009), organizations were reluctant to allow surveys as they faced different challenges of survival and had more important priorities

## FINDINGS

1. All the IT companies have Employee empowerment initiatives.
2. Employee empowerment has been in these companies with the main objectives of increasing productivity..
3. There is confusion even in the minds

of the top management about the concept of employee empowerment.

4. Formal recognition & reward system, Formal dispute, complaint, grievance system and Joint labor management committee are not empowerment initiatives but no objection was taken on these parameters by the HR heads and CEOs. It can be said that there is no clarity on the empowerment strategies and no conceptual clarity on empowerment.

5. The management is of the opinion that employee empowerment is not a passing fad or is just a destination but it is a journey. The management agrees that Employee Empowerment initiatives will help to face the challenges of tomorrow.

#### Recommendations

1. The concept of empowerment needs to be polished and re discussed by the management of IT companies.
2. Managers and team leaders should look at empowerment not only as delegation of routine work but as the process which is directed towards self directed teams that take ownership of the process.
3. Managers and team leaders should be trained on philosophy and practice of empowerment so that they can act as coach and mentor and be involved in the process of empowerment.
4. Management should define empowerment properly for managers, team leaders and team

members so that they get proper guidance while doing implementation.

5. (a) Management should form a steering committee for giving directions about empowerment initiatives and their implementation.
- (b) A proper monitoring system should be laid down for the empowerment process. (c) Internal and external audits should be conducted.

#### CONCLUSION-

It can be concluded that the traditional empowerment initiatives which exists in manufacturing sector are missing in IT sector.

The philosophy of employee empowerment is known to the IT professional but it is not deep rooted in the IT companies. Hence is no conceptual clarity about employee empowerment at the top management level in IT sector. A discussion is essential on one common platform regarding employee empowerment philosophy and practice in IT industry

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*It can be concluded that the traditional empowerment initiatives which exists in manufacturing sector are missing in IT sector.*

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# THE EFFECT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) AND TRADITIONAL METHOD OF TEACHING SCIENCE ON LEARNING LEVEL OF GUIDANCE SCHOOL STUDENTS IN SARI (IRAN)

Alireza Baderleh \*

**Abstract:** The present research intends to investigate, the effect of Information and Communication Technology (ICT) and Traditional Method of Teaching Science on Learning level of Guidance School in Sari ( a city in the north of Iran), considering the unique role of ICT in the educational system and its importance at the present age. It was carried out in the city of Sari within two daily Male-State-run Guidance School. 100 students had been selected as the sample size, 50 were in the experiment group and 50 in control group. The paper tries to make an assessment of the effect of an independent variable on dependent variable, implemented with a pilot design of pre-test and post-test within the control group. The researcher has implemented a pre-test for both groups and used independent T test. The results showed that two groups of the students do not differ in terms of the marks they gain. Then, new methods of education using the (ICT) techniques, like Atlas and power point software, Internet and other new techniques have been used in four sessions, each having a 90 minute duration in experiment group. Simultaneously, the traditional methods have been used in the control group during these four sessions. After one week, a test was conducted for both groups and after an analysis of the pre- test and post test in the experiment group using the independent T test, it was found that ICT has positive effect on the learning capacity of the experimental group. Moreover, using the independent T test the post test of two groups show that there is a significant difference between the marks gained by the control group, taught by traditional method of teaching and experimental group, taught by ICT in education.

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## Keywords :

Information and Communications Technology, Student, Learning, Teaching Methods, Traditional Method

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## INTRODUCTION

In the era of information explosion, vast amount of information in different forms and categories are transferred to different destinations, making huge and rapid changes in the world of science, creating new results. In the present era, awareness of the new knowledge is one of the most important life necessities, since the advancements has such an accelerating pace that every day the essence of the issues we face is changing. Hence for understanding the issues, knowledge of special skills is required, and it is not possible to face these new technological advances by the

traditional knowledge. In such society, Information and Communication Technology (ICT) has become one of the main factors in making a modern society in short period of time. Nowadays, most of the countries have recognized the importance of ICT as it plays a major role in reading, writing, and calculating in the nucleus of the education system (UNESCO). People everywhere in the world can receive the latest news and information by using ICT. Moreover, it is possible to have fast and easy connection and transfer of data. Yet, it was the effect of educational systems that has created such huge advances.

\* Research Scholar, University of Mysore

Learners, enjoying such technology, which want to receive data, should be equipped with the features like efforts and curiosity so that they could change the information transfer as well and the learning process from traditional ways to the advanced ways. The importance of using Information and Communication Technology, as the most powerful, cheapest, and most confident way of attaining data and information is obvious. Yet, it has been observed that ICT is less used in educational system in Iran's schools compared to the schools in other countries. In other words, ICT is the newest technology which is capable of gathering, organizing, saving, and reflecting the data in the forms of voices, images, written texts and numbers, which can be presented by the computer systems and by using the transferring systems (Yazdani, 2002).

Ministry of Education is one of the biggest producers of information, and undoubtedly, the most important consumers and savors of the information and knowledge, (which has more spread and value in Iran, because of the national and religious factors and the quantitative development of the education). Knowledge creation and its optimum use will increase the wisdom and capability of the learners as well as those of the teachers, and help the education system in training capable and efficient Human Resource which is the most important mission of any educational system. On the other hand, the backwardness and lack of development in knowledge and technology are the main reason of different problems in social, behavioral, cultural, and economic spheres.

### 1.1. Definition of Information and Communication Technology (ICT)

Information and communication technology (ICT) is a means of storing, processing and presenting information electronically through a number of media. Computers and microelectronic devices are built into a variety of everyday objects. However, the types of technologies incorporated in the educational context tend to focus around the delivery of content and information to support formal learning processes.

Information and communication technologies (ICTs)-which include radio and television, as well as newer digital technologies such as computers and the Internet-have been touted as potentially powerful enabling tools for educational change and reform (Tinio, 2003).

ICTs stand for information and communication technologies and are defined, for the purposes of this primer, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information." Technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony (Blurton, 2002).

However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICTs is not automatic. The effective integration of ICTs into the educational system is a complex, multifaceted process that involves not just technology—indeed, given enough initial capital, getting the technology is the easiest part!-but also

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*Knowledge creation and its optimum use will increase the wisdom and capability of the learners as well as those of the teachers, and help the education system in training capable and efficient Human Resource which is the most important mission of any educational system.*

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*From the earliest times when computers were commercially available, they could be found in use in educational institutions, and educators argued that computers should be used to support learning.*

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curriculum and pedagogy, institutional readiness, teacher competencies, and longterm financing, among others (Tinio, 2003).

### **1.2. Teaching Method of ICT**

ICT is a modern method that is used in schools and it can empower teachers and learners, transforming teaching and learning processes from being highly teacher-dominated to studentcentered.

This transformation will result in increased learning gains for students, creating and allowing for opportunities for learners to develop their creativity, problem-solving abilities, informational reasoning, communication skills, and other higher-order thinking skills.

During the last few decades the availability of increasingly sophisticated software has grown steadily. Throughout the world personal computers (PCs) and the internet have become part of childhood and adolescence. The rapid development in hardware technology has led to enhanced software opportunities. A similar development took place in educational software since the dominance of hypertext systems changed to a predominance of hypermedia systems in the last decade. These hypermedia learning environments usually contain a broad band width of media, e.g., text, graphics, animations, simulations, video, narration and sound.

Information and communication technology (ICT) is a force that has changed many aspects of our living way. If one was to compare such fields as medicine, tourism, travel business, law, banking, engineering and architecture,

the impact of ICT across the past two or three decades has been enormous. The way these fields operate today is vastly different from the way they operated in the past. But when one looks at education, there seems to have been an uncanny lack of influence and far less change than other fields have experienced (Soloway and Prior, 1996; Collis, 2002).

From the earliest times when computers were commercially available, they could be found in use in educational institutions, and educators (e.g. Bork, 1980; Carnegie Commission on Higher Education, 1977; Papert, 1980) argued that computers should be used to support learning. There has always been huge community support for this as illustrated recently in a survey of voters in the USA which indicated greatest support for expenditure on ICT in schools when compared with a list of alternative expenditures in education (Lemke, 1999). However, there has always been debate among educators on how the technology should be used and the importance of using Information and Communication Technology, as the most powerful, cheapest, and most confident way of attaining data and information is obvious. Yet, it has been observed that ICT is less used in educational system in Iran's schools compared to the schools in other countries. In other words, ICT is the newest technology which is capable of gathering, organizing, saving ... and reflecting the data in the forms of voices, images, written texts and numbers, which can be presented by the computer systems and using the transferring systems (Yazdani, 2002).

Ministry of Education is one of the

biggest producers of information, and undoubtedly, the most important consumers and savors of the information and knowledge, (which has more spread and value in the country, because of the national and religious factors and the quantitative development of the education). Knowledge creation and its optimum use will increase the wisdom and capability of the learners as well as the teachers, and help the educational system in training capable and efficient Human Resource which is the most important mission of any educational system. On the other hand, the backwardness and lack of development in knowledge and technology are the main reasons for different problems like social, behavioral, cultural, and economic problems.

## 2. OBJECTIVES OF THE STUDY

The following objectives guided the present study:

1. To study the mean scores of the control and experimental groups at the pre test level.
2. To study the mean scores of the students taught by ICT and those taught by traditional method

after the treatment.

## 3. RESEARCH HYPOTHESES

Ho.1: There is no significant difference between mean score of the control and experimental groups at the pre test level.

Ho.2: There is no significant difference between the mean scores of the students taught by ICT and those taught by traditional method after the treatment.

## 4. METHODOLOGY

### 4.1. SAMPLE

The sampling method in this research is of simple probabilistic sampling method. 8 governmental Guidance Schools in distinct no. 1 in the city of Sari have been selected. Out of these 8 schools, 2 schools were selected randomly, one of which was selected as experimental group and the other one selected as control group. 100 students have been included in this study, out of which 50 of them were in experimental group and 50 of them were in control group.

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*Human Resource is the most important mission of any educational system.*

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TABLE 1: DETAILS OF STUDENTS FOR THE SAMPLE SELECTED FOR THE STUDY

Independent variable	Teaching Method		
	ICT Method	Traditional Method	TOTAL
No. of Students	50	50	100

Note= ICT: Information and Communication Technology

There is no significant difference between mean of the pre-test of experimental group and control group".

#### 4.2. PROCEDURE

At the beginning of the study, both experimental and control groups were asked to respond to a test to measure their prior achievement in the selected units 5. Before starting of the intervention, the experimental group was given one introductory session to know how to use the ICT learning material prepared for this study. Then the science teacher gave lectures to introduce the units in general to both groups together. After the introduction, the control group continued learning the units through regular classroom instruction science. Regular classroom instruction included mainly lecture and recitation methods supported by reading assignments. The experimental group studied the units using the ICT learning in the computer laboratory.

#### 5. STATISTICAL ANALYSIS

Independent sample "t" test was employed to find out the significance difference between

students taught by ICT and those taught by traditional method after the treatment SPSS for Windows (version 16.0) was used for statistical analysis.

#### 6. RESULTS

1. Difference between experimental group and control group at the pretest level According to the first null hypothesis "There is no significant difference between mean of the pre-test of experimental group and control group". The obtained results indicate that, there is significant difference between ICT and Traditional groups of students at pre-test of science subject in guidance school ( $t = 17.15$ ,  $P > 0.01$ ). The mean of Control group (mean = 4.72) is higher than the experimental group (mean = 4.51). Thus, rejecting the null hypothesis, it is inferred students that there is significant difference between ICT and Traditional groups of guidance school.

**Table 2: Results of "T" Test between Means of ICT and Traditional Methods at the Pre-Test Level**

Post-test	Group				
		Mean	S. D.	t-Test	Sig
	ICT	17.48	1.37	39.97	0.000
	TRADITIONAL	12.76	2.25		

#### 7. DISCUSSION

In recent years there has been a groundswell of interest in how computers and the Internet can be harnessed to improve the efficiency and effectiveness of education at all levels

and in both formal and non-formal settings. Teachers and learners no longer have to rely solely on printed books and other materials in physical media housed in libraries for their educational needs. With the Internet and the World Wide Web, a wealth of

learning materials in almost every subject and in a variety of media can now be accessed from anywhere at any time of the day and by an unlimited number of people. This is particularly significant for many schools in developing countries, and even some in developed countries, that have limited and outdated library resources. ICTs also facilitate access to resource persons—mentors, experts, researchers, professionals, business leaders, and peers—all over the world.

Improving the quality of education and training is a critical issue, particularly at a time of educational expansion. ICTs can enhance the quality of education in several ways: by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner-centered environment.

ICTs such as videos, television and multimedia computer software that combine text, sound, and colorful, moving images can be used to provide challenging and authentic content that will engage the student in the learning process.

The researcher found that Interactive computers likewise make use of Macromedia flash, Camtasia, Internet, Microsoft office and other performance conventions to compel the students to listen and become involved in the lessons being delivered. More so than any other type of ICT, networked computers with Internet connectivity could increase learner motivation as it combines the media richness and

interactivity of other ICTs with the opportunity to connect with real people and to participate in real world events. ICTs have also been used to improve access to and the quality of teachers.

The researcher observed that if the schools in Sari city equip with the electronical equipments, and teacher's opinion is changed about ICT by ICT training course, we can achieve to our purpose easily.

The main findings from the survey are summarized below.

- In only a small minority of schools in Sari, there is regular coherent use of ICT to support learning.
- Many schools in Sari have some limited involvement in ICT use with opportunities identified in schemes of work, but most often pupils' experience was erratic and there is no entitlement to work in using ICT.
- In some schools in Sari there is improving access to accommodation, but often this is not the case as overall demand outstrips supply.
- Many teachers in Sari are now competent personal users of ICT, but some remain reluctant, and do not see the potential benefits of ICT.
- There have been difficulties in the early stages of training, but increasingly teachers are using training materials for experiment in the classroom and transferring ideas from the training to new situations.

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*Improving the quality of education and training is a critical issue, particularly at a time of educational expansion. ICTs can enhance the quality of education in several ways: by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training.*

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*The obtained results indicate that there is significant difference between ICT and Traditional groups of students at pre-test of science subject in guidance school and there is significant difference between the students taught by ICT in the course of Basic Science and those taught by traditional methods of learning after the treatment.*

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Finally the researcher found out by using ICT a deep change will be caused in learning inschools. ICT method indicate that (mean = 17.48) is higher than that of Traditional method mean= 12.76).

## 8. SUMMARY

The present research intends to investigate the, The Effect of Information and Communication Technology (ICT) and Traditional Method of Teaching Science on Learning level of Guidance School in Sari (Iran), Guidance School. The objectives of the research were to study the mean test scores of the control and experimental groups of the pre test level. And to study the mean test scores of the students taught by ICT and those taught by traditional method after the treatment. 2 schools were selected randomly out of 8 governmental schools. 100 students in this research divided into experimental group and control group. Both groups were asked to respond to a test to measure their prior achievement in the selected units. After the introduction the experimental group studied the units using the ICT learning in the computer laboratory but the control group continued learning the units through regular classroom instruction science. Independent sample "t" test was employed to find out the significance of difference between ICT and Traditional methods. SPSS for Windows (version 16.0) was used for statistical analysis. The obtained results indicate that there is significant difference between ICT and Traditional groups of students at pre-test of science subject in guidance school and there is significant difference between the students taught by ICT in the course of

Basic Science and those taught by traditional methods of learning after the treatment.

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