Industrial Revival by Strategic Implementation of Total Quality Management (TQM): An Empirical Examination

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Abstract: Turnaround of sick industrial units is always a complex issue and there is no tailor-made solution for this. Strategies need to be carefully examined for each case, as the reason of sickness are more than one, and need treatment at different level. Management of organization plays important role in success of industrial venture. A committed management by Strategic Planning / Cost Management/ Daily Work Management /Employee involvement, can revive any plant. Customer satisfaction and cost reductions are two issues but its joint impact increases the market share and it is a key of survival, as per Deming Chain. Making employee more useful by cross functional training and motivating by their involvement in management and operational decisions can do wonders. Employee co-operative type of management is also a successful model in revival of ailing plants. Strategic alliances/ Insourcing/Toll manufacturing and other models prevail in industrial scenario and need careful selection for revival. TQM implementation along with these strategies can be a good combination. A case of such revival is discussed and tested here empirically for some selected strategies applied.

Key words: Turnaround, Strategic Alliance, Toll manufacturing, Insourcing, TQM, Cross functional Training, Cost Management.

1. Introduction

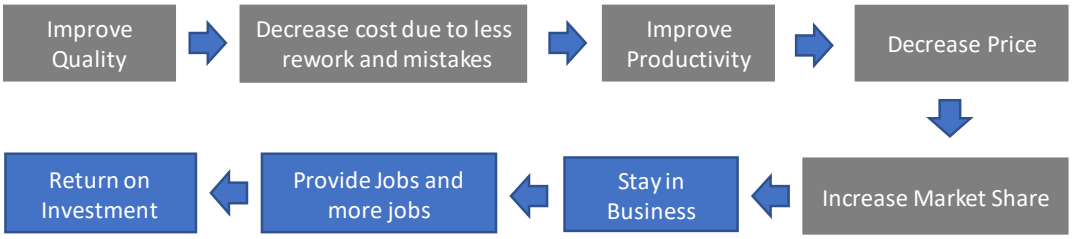
One of the aims of establishment of Industry is profit generation. Indus tries are growth vehicles for society. But due to certain reasons (Table :1) analyzed by **Pradeep N. Khandwalla (1986)** some of the industries becomes sick. The reduced working capital, profit stagnation and increasing expenses gives signal of sickness in the earlier stage. These signals are vital and timely taken steps can arrest the downfall of company. Increasing competition, dynamic product life cycle, expectations of employees and stakeholders demand a vigilant and committed management team. A balance between product quality and market shareis prime importance. Private sector and public sector both have problems of sickness. Comparatively private sector companies have limited resources and hence face more danger of falling sick. Public sector companies run on government support and many times run for years under loss and finally become sick.In India, till 2015-16, total 4,86,291 MSME's were reported to be under sick category **(The Hindu Business Line, 11th April 2017, https://thehindubusinessline.com/news).** Also, total 64 PSU's were earmarked in the list of sick companies list**(www.ncoaindia.com/article.php)**by government of India as per reply of government and out of that 17 has been closed down till financial year 2017-18 **(https://www.business-standard.com/article/economy-policy/17-sick-psu-set-to-be-closed-down).** Private sector units are prompt in reading sickness signal and actingon revival plans. **Khandwalla's (1992)** study of revival measures lead to four broad strategies, **Human Resource, Product &Market, Financial and Production/Operation strategies.** The strategies adoption depends on circumstances, but normally all four are used in revival of a unit. TQM provides a combined solution of revival through its implementation. Team work, employee participation, market strategy and customer satisfaction and participation can give new life to the companies facing tough time.

In India there are various examples of automobile / components making companies e.g. **TVS, Sundaram Clayton, Lucas TVS, Mahindra Swaraj Tractors, Tata Steel, Rane Group** of companies which achieved competitive advantage with the implementation of TQM. **KEC International Ltd,** is an example of reviving itself from old sick Kamani Engineering to new world level power transmission company. After its takeover, RPG group revived this company, benchmarked it for best. Merger and Acquisition of SAE India Ltd, RPG Cables and SAE Towers were also helpful in the development of this company in successive stages. Continuous improvement and implementation of TQM strategies was adopted in KEC in the year of 1996 in all units of this company and its impact is visible now by its turnover, which isRs. 100 billionpower transmission company of India and one of seven companies in the world. TQM strategies were implemented here. **(https://wikivividlly.com/wiki/kec_international#cite_note).Healy, P.M. et.al. (1990)** concluded in their working paper that post acquisition operating cash flows increases and also stock value increases due to announcement of mergers **(www.dspace.mit.edu/bitstream/handle/1721.1/47262/doescorporateper00heal.pdf).**

TQM Relevance:

W. E. Deming (1982) in his book "Out of Crisis" suggests a chain reaction (Figure:1) and indicates that the quality is the path of business excellence. Deming offers a theory of management based on his famous 14 points of management. Management's failure to plan for the future, brings about loss of market, which brings about loss of job. Management must be judged not only by the quarterly dividend, but by innovative plans to stay in business, protect investment, ensure future dividends, and provide more jobs through improved product and service.

Figure: 1: Deming Chain Reaction Diagram



TQM is a combination of techniques used by organizations for bringing manufacturing excellence through a team of workman and managers. The leadership is given by management to implement TQM successfully. Usually a good performing management team takes initiative to bring in the TQM efforts for even better results. The process of achieving something better or excellent makes this journey of TQM implementation endless. The developments and improvements continue in TQM regime. Year by year new milestones are achieved by companies and bring happiness for their employees and management.

TQM is relevant for companies desirous of bringing business excellence, but it is more relevant and important tool for ailing and sick companiesalso. It is a multi-tool strategy, which can revive the ailing plants and sick companies by its application. Pradeep N. Khandwalla (1986) in his working paper (Table :1) gives the Causes of sickness. The major causes of sickness arecreated by management only. TQM suggests management methods to create an environment of revival. The problems of individual industry shall be diagnosed and remedial actions shall be planned as per need. Accordingly, plans are implemented.

2. Literature Survey

Datta, Dilip Kumar (2013) mentions that sine qua non of industrial sickness is that production fails to maintain cost-effectiveness, so much so that the firm fails to meet the sunk cost. Firms that can't maintain competitive efficiency face the reality of getting sick. It is therefore necessary for firms to get signal that there is threat to the existing business so that they take up strategies for a turnaround. Pradeep N. Khandwalla, (1986) in his working paperon the basis of his research gave major perceived causes of sickness (Table:1). It is eye opener. It alsogenerates hope of revival and restructuring of sick plants, by use of advance strategies of TQM. TQM practices can certainly help in cost management, enhancing efficiency, continuous improvement in product, process by way of employee participation, customer input and implementation. Most of the problems noted for sickness, as per can be addressed by effective management process. The revival of organizations which are facing survival threat due to cost effectiveness, reduced market share shallimplement TQM in the organization, as there are theories supported by various researchers, showing positive results in performance of companies when TQM was implemented there. The TQM has four guiding principles: Delight the Customer, Management by fact, People based management and Continuous Improvement.These four guiding principles can navigate the organizations towards continuous improvement of all functions. **Rastogi, M.K. & Yadav, Prakash (2013)** concluded that major strategies for revival of sick plants are **Employee engagement, Aggressive promotion, Cost management strategies, Lean Management**, Investment in new market, R&D and Image building etc. He further stresses that lean management strategies are more frequently being used for successful revival of the plants.

Table: 1: Perceived Causes of Sickness

Major Cause of Sickness	Moderate Cause	Minor Cause
Corrupt and centralized Management of Unit	Stagnation in Industry	Interference of Financial Institutions in unit Management
Lack of Commitment of Management / Professional Management	Excess Capacity in Industry	Credit Squeeze of Unit.
In-fighting within unit's Management	Competition in Industry	Tax Burden on Unit
Weak Board of Directors	Liberal Imports	Inadequate Transport facilities
Disturbed industrial relation	Inadequate Working Capital, Long term finance	Harshness of financial Institutions
Choice of Wrong Technology	Conservative and Bureaucratic Management.	Poor Law & Order
Rosy Assessment of Investment by Mgmt.	Poor Assessment of investment proposal by financial Institutions	Government going back on investment Promises
Poor Financial Mgmt. of Unit	Slackness in enforcing Accountability of Managers	Customer's resistance to product of unit
Poor Cost Control & Manufacturing Mgmt.	Too much nepotism and family domination.	Harsh Treatment of Staff by Mgmt.
Inadequate Marketing		Political Interference
Frequent changes in government policies		Unhelpful government machinery

Huarng & Chen (2002) made a survey in Taiwan and concluded that due to the outstanding performance of Japanese industries in 1980, all companies in the world imitated the Japanese success, the effectiveness of TQM seems to be recognized by this. **Chi S, Ou, et.al. (2006)** conducted a research on "The Effect of Total Quality Management on Business Performance: Evidence from Taiwan Information -Related Industries". The result of this study showed that an effective management leadership can positively influence human resource management, supplier management and design management. The findings revealed that **TQM practices** have direct effect on operating performance and this improving operating performance brings in better customer's satisfaction and improved financial performance. **Dr Fred Appiah, et.al. (2013)** conducted a study on "Linkage between Total Quality Management and Organizational Survival in manufacturing companies in Ghana". The study revealed that TQM when implemented and practiced, improves the performance of business and help the survival of manufacturing companies and shows that there is positive relationship between TQM practices and company performance.

Ma Gloria & V Talavera (2005) on TQM adoption and firm performance in Philippines on a sample of 64 companies and revealed that TQM adoption is highly associated with performance. **Therese A. Joiner (2006),** made a study on TQM and performance: Role of organization support and co-worker support. Researcher found that co-workers support and organizational support moderated the relationship between TQM implementation and organizational performance. **Daniel L. Projogo & Amrik S. Sohal (2006),** made a research on the relationship between organization strategy, TQM and organization performance. They concluded that TQM is positively and significantly related to differentiation strategy and this differentiation strategy partially mediates the three performance measures product quality, product innovation and process innovation. **Nagasu-Betek Ngole & Haroon Munior (2008),** conducted a research on TQM as Competitive advantage. The findings show that quality is not an extra cost for the company, rather it is a way to increase productivity, the better quality you have, the fewer products you discard and the better planning you have. Hence it was deduced from this research that competitive advantage is achievable by ensuring proper quality management in the pricing, product, promotion and distribution strategies implemented by a company. **Dr Ameen Al-basher et.al. (2015),** made a study on Jordan Islamic bank and empirically proved that there is significant effect of TQM on profitability ratio and liquidity ratio of Jordan Islamic bank. The study indicated that there is significant relationship between overall quality and financial performance element in the Jordan Islamic bank. **Enrique Clever & Juan Jose Tari (2008)** conducted a research to see the influence of TQM on customer, people, society and quality performance. The analysis shows that TQM has impact on Customer, People, Quality, Society and financial performance. This imp act can be clearer if company follows ISO 9000 standard and standard system of feedback of information. **Haim (1993)** refers the study of United States General Accounting Office (1991), in which any kind of numerical measurement of the impact of TQM on profitability was indicated. This study examines the effect of TQM practices on the basis of response of 22 firms that were finalist in the 1988 and 1989 Baldrige Award competition. This study used measures market share, sales per employee, return on sales and return on assets. For 15 firms, that responded the survey, it was noted that measures as above increased in case of 34 out of 40 observations. In 6 observations measures declined.

Fitzerald and Erdmann (1992) made a study of impact of Continuous improvement practices, a key element of TQM, based on responses received from 280 automotive supplier firms. Their survey proved that over a period of two to three years, responded reported an average 17% increase of profit, as a result of continuous improvement efforts **(Kelvin B. Hendriks and Vinod R. Singhal, (1997).**

It is a supported fact that TQM strategies improve organizations health and wealth in all the ways, if implemented properly. Even the industries, which have become sick or moving towards sickness can be improved by TQM strategies/tools. A revival case was analyzed.

Case Study: SPL is anEHV Power transmission line tower manufacturing company of Raipur, capital state of Chhattisgarh.Rejection of consignment lot in Malaysia, Indonesia and Bangladesh due to transshipment related problems, the company came under pressure and shutdown operation, in absence of working capital. Company management decided to give a thought on optional strategies of running it. **Business Alliance** and **Business Process Re-Engineering** (BPR) was adopted as first strategy.

Problem Definition

Turnaroundand revival of tower manufacturing company and securing jobs by Innovative Management /Technologies and to secure job of employees.

3. Methodology:

1. Strategic Turnaround
2. Operational Turnaround

a. Use of Business Process Re-Engineering & TQM: Operational Strategy
b. Use of Human Resource Strategies
c. Use of Marketing Strategies
d. Use of Financial Strategies

Turnaround or Revival of SPL

Schendel et al. (1975) studied 54 firms, which had suffered four years of consecutive decline of earnings and then four consecutive year of improvement of earnings and based on soft data concluded that there are two classified cause of decline and upturn "Strategic" or "Operating" in nature. **Schendel et.al. (1975) and Hofer (1980),** stressed the distinction between strategic and operating turnarounds. Roughly speaking the difference between Strategic and Operating is "doing different things" and" doing things differently". Schendel et.al., for example referred Operating Cures as plant expenditure, new emphasis on functional areas as operating cures and diversification, vertical integration and divestment as Strategic Cure. **Hambrick, D.C. et.al. (1983)** on the basis of study concluded that three turnaround philosophies were successful, Asset/Cost Surgery, Selective product /market pruning, piecemeal strategy. The same theories were supported by **Hofer (1980)** also. Asset/cost surgery was adopted by organizations with low capacity utilization, and selective product/market pruning was adopted by organizations with high capacity utilization. Piecemeal strategy was for business organizations with high market share.

A. Strategic Turnaround: Business Alliance: Toll Manufacturing

Jeje Kafigi (2015), in his research concluded that there is relationship between alliance typology and the likelihood **of both cost and risk reductions as well as resource accessibility**. Although not all type of alliances reduces the cost and risk, most of the alliance in the manufacturing industry can exert a great influence, should the alliance partners carefully blend the right mix of cost, risk and resources.SPL decided to make an alliance with JSL and AEL for toll manufacturing.

Toll Manufacturing, a business alliancein transmission tower were made with JSL, Raipur. Both the companies were in same field and registered in PGCIL and had similar reputation in Quality Standards, ISO 9000 certified.

Strategic Alliancefor this toll manufacturing was useful for both, as the raw material (steel and zinc) was to be supplied by JSL in addition to conversion cost per metric ton and SPL was to supply finish product as per schedule/quality specification. The scrap was saleable and an additional income to SPL. The JSL outsourced items which were **bottleneck** for them and limiting their project execution. This was a win-win situation for SPL and JSL both. SPL's facility utilization reached to **breakeven level**by this arrangement, and payment of electricity bills, consumables expenses, workmen salarypayment etc. regularized. This arrangement provided immediate use of company manpower, resources and normal working environment.

Alliance forContract Galvanizing,

Galvanizing Plant had excess production capacity and to utilize it, contractual galvanizing was tied up with two companies, AECL and a big industrial group of Raipur. Few other small manufacturers offered use of plant facilities. This made optimal use of galvanizing resources in SPL. Strategy of resource utilization was successful with above two alliances.

Own Domestic Order Execution

By the time, SPL grab local orders and started executing small lot, in addition to toll and contractual manufacturing through production facilities. This made full capacity utilization of plant. This took few months.

B. Production/Operation Strategies

Hofer (1980) in a study of twelve cases of badly performing businesses, concluded operating strategies, a solution, for operational problems and strategic solution for strategic problems. The similar solution was adopted in case of SPL. **TQM** was used as **Operational Strategy**. Improvement in product quality, cost cutting, revenue generation, asset reduction were areas were input of TQM was more important in first phase.

Operational Strategy: Business Process Re-Engineering with TQM

TQM initiatives, Operation strategies, Human Resource Strategies and Finance Strategies were chosen for revival of SPL. BPR was started from zero level for improving quality, cutting cost, reducing wastages at all level and implement JIT. Total Quality Purchasing was implemented for steel purchasing process and therefore it resulted in cost saving / quality improvement. In tower manufacturing almost 90% cost is involved in raw material and consumables. Consumption percentage of steel and zinc decides the profit margin and future of organization. Control of steel & zinc usage and wastages can bring company out of red. Re-engineering of manufacturing stages and production process is important for its revival.

Cost Cutting Strategy:

Almost 80% of the cost is the cost of raw material in transmission tower manufacturing. Cost control in such case is mostly concentrated on material purchase control, wastage control, return from sale of scrap and lastly from consumable consumption control. For finished cost of Rs.53000/MT, its steel of Rs. 36000 and zinc of Rs.6800, as raw materialwas needed other than consumables. Concentrating on steel, it was noted that 4% angleand 5% plate were being scrapped during processing.Giving attention on purchase process, it emerged that average purchase was higher than requirement. Further while checking finished tower trucks dispatched it was noted that weight of consignment was higher than designed weight. A **Quality Control Circle** (QCC) was formed to check the phenomenon. It emerged that section thickness tolerance of angles was higher than prescribed tolerance. This was one reason of weight variation. Instead of 5.0 mm, it was up to 5.1-5.2 mm range. The problem was addressed by ordering of angles in specific length and specification, and accepting it on the basis of tolerance as per IS: 1852:1985. The variation in thickness was controlled by comparing unit weight of actual piece by standard as per IS:1852-1985. Due to vigil and proper inspection around 300 kg/20 MT was saved. This excess weight was of no use for any one, as final product was designed on standard structural dimensions. SPL saved Rs.15000/20 MT, taking steel @ Rs.50/kg. For 20/MT production this was a saving of **Rs. 15000 per day.** This was possible due to workers participation and interest**.**Moving on consumables, cost saving was done

in rope sling size reduction, by utilizing rope of cranes, by adding used separator chains in galvanizing process and reducing inventory of stores. Cost of fuels were saved in reducing furnace oil consumption, zinc consumption, acid consumption, power factor improvement, thereby reducing power bills. Separate teams were formed on all fronts and results were positive because everybody had a will to survive.

Angle Straightening offloaded in Supplier account: The straightening of steel angles was usually done inside the plant. To save cost and time, it was added in re-roller responsibility, and thus saved a lot.

Failure of Plates in Tensile Test: Quality of steel plates size 5,6, 8 mm thickness were a challenge for in tower manufacturing. It usually failed in tensile test. Sources of plates were SAIL /JINDAL/TATA steel. This quality issue was resolved by acceptance testing at vendor's place for each plate before lifting from dealer stockyard.

Wastage Control in Cutting Operations: Dimensional control by in-process inspection at cutting stage, and return of balance steel as per material plan was strictly ensured by employees. Similarly, raw yard ensured return of scrap every day in bags, and small lengths, and made steel receipt & issue statement to ensure usage as per plan and stop any deviation.

Customer Satisfaction: Customer satisfaction was prime condition in toll manufacturing contract. JSL deputed their quality persons to monitor the quality. Due to satisfied customer in three years JSL offloaded work of 59.6 million in toll manufacturing. The same satisfaction and understanding were developed with work in AEPL also. In case of export consignment, CCI container stuffing for seaworthy packing was mastered, which was liked by customer.

Quality Improvement Strategy: It was **cross functional training** under TQM initiativethathelped in quality improvement in purchasing. Knowledge imparted to purchase staff during training, e.g. details like IS**:2062-2006,** Camber, Heal Radius, Flange Variation, Edge Cracks and wavy edge etc., promoted confidence level in price negotiation. **Just in Time (JIT) concept prompted t**he need-based MOU for steel supply at periodic interval and reduced the inventory & working capital requirement.

Bending, drilling and galvanizing were identified as critical operations. Customer complaints were analyzed with the help of **Cause and Effect diagram.** Corrective measures taken. Bending and drilling were made 100% inspection zone. One of major issues of quality was **white rust** on galvanized product. Its three-pronged solution was designed. First more space in finishing Area to allow it to completely dry was done before making a bundle. Second was to insert spacer between pieces and third was to improve its stacking and storage in inclined position, as per IS 262+9-1985 (clause 5.10, 7.1). Use of CNC machines gave an edge in quality and its operator was trained in CNC programming / maintenance of machine both under**TPM concept.**

TPM concept was initiated in Galvanizing department also, where furnace operator took additional responsibility of burner cleaning, acid tank cleaning, pre-flux filtration and dross separation to reduce downtime and promote efficiency. The optimization of furnace oil and zinc consumption was done through **QCC** team.

Proto Fabrication & Assembly Contract: The Proto (Model) tower manufacturing and its assembly before testing at test bed has been always a bottleneck for tower manufacturing companies. SPL decided to take toll manufacturing of Proto towers and assemble it at own yard and deliver it for final testing. The rates of proto manufacturing were attractive as it is very accurate and piece to piece fabrication. This gave additional revenue and engagement of employees.

Re-Engineering & Bench Marking of Galvanizing& Fabricationthrough TQM

The galvanizing is critical and costly finishing operation. Zinc consumption, Dross and Ash formation decides its cost effectiveness. Bench Marking /ISO 9000/5S/TPM all strategies of TQM are very much relevant in Galvanizing. Standards from best of industry of transmission tower manufacturing, KEC International were adopted for achieving in SPL.

Bench Marking Standards:

- Net Zinc consumption: 3.0%
- Dross generation not more than 0.5%
- Ash Generation not more than 1%.
- Furnace Oil Consumption 17 litre/MT with Size 5 Burner.
- Steel wastage up to 1% and Rejection 0.01%. Site rejection% Zero.

Achievements towards standards reviewed and motivation to achieve targets continued every day in morning meeting. Results cameafter one year due to team efforts, continuous improvement. Optimization of consumables /product quality improvement both achieved.

ISO 9000 Standard Impact:

Galvanizing, SOP of ISO 9000 and reference of IS in maintain process variables is optimal practice. Experience and continuous training of employees helps to achieve targets. 5S makes house keeping organized and sorting of accepted/rejected material, regular shifting to next stage and analysis of zinc consumption. Process variables directly affect the quality of product and cost effectiveness of operation. Workmen/Supervisors knowledge, promptness brings operation efficiency, and therefore their training and awareness matters. Keeping Zn coating thickness as per IS:2633 and IS:4759 is always a challenge (80 to 120 microns). Less coating leads to rejection and thick coating is loss of revenue and also bad quality. Minute control of dipping time decides coating accuracy. In aseven-tank process of Degreasing, Acid Cleaning, Rinsing, Pre-fluxing, Zn dipping, Quenching and Dichromate dipping, every stage has importance and has an impact over cost effectiveness of plant and accuracy.

Use of standard chemicals, setting of air oil ratio's in burners, operation of damper, blowers, burners are important in optimization of operation. In such a heavy engineering work, daily work management system, has its impact on overall production and profitability finally.

ISO 9000 QMS provides a sense of system working in organization and a confidence in employees that this is only way to do a work and no short cuts. Responsibility of individuals is fixed automatically by this ISO.SOP, QSP and Quality Manual, are guidelines to work. References of Indian standard, Charts, tolerances, figures make quality stable. Rejection, rectification procedure, recording of reasons of rejection, recordings of actions taken, filling of forms and formats, prevent deterioration of quality and lapses in future. It also paves way for continuous improvement. Impact of ISO implementation in SPL imparted knowledge, awareness and eagerness to achieve quality standard for customer satisfaction. **Customer satisfaction** was in the mind of every individual as they knew clearly that their **survival** was linked with customer satisfaction in respect of **quality and lot completion.**

Human Resource Strategy

Researchers suggest the use of Human resource strategy, for industries slipping into red or have gone sick. Economic crisis brings layoffs, hiring freezes, temporary or permanent closures of business/ divisions. Institutions such as United States Army, HP, Microsoft, JP Morgan, Proctor & Gamble and many other organizations announced massive layoffs in 2015 **(Fortune, 2015)**. In difficult situations, the most prevalent strategy for managing human resources is downsizing **(Cascio, 2002)**. But such decisions may prove counter-productive in terms of enhancement of company performance **(Luan et al., 2013)**. In-fact downsizing is not only option during such crisis. In 'the role of HR in Corporate Turnaround', **Prasad (2006)** concludes that HR plays a vital role in improving the performance of the organization. The HR plays a crucial role as a strategic business partner, change agent, administrative expert and champion of employees in shaping and directing strategic outcomes to ensure the viability of an organization. Santana, **(Monica et al., 2017)** concluded in their research that HR professionals may increase the strategic values of employees by tailoring the response of decline, instead of taking option of layoffs, pay cut, working time cut etc. Organization SPL, took strategic decision of increasing strategic values of employees and gave additional and specific role to fight the decline, instead of downsizing or layoff. Few steps.

- Strategic Alliance decision was decentralized to unit level.
- Marketing was decentralized from HO. Kolkata, and given to unit level as additional responsibility to key persons.
- Insourcing contractors were given charge of completing commitment of toll manufacturing for alliance partners.
- Insourcing contractors were motivated to play partners role.

These strategies brought a change inworking environment and employees gathered message that management has given them space to work for survival of company. They were convinced that bringing an order of any size, it's completion in time will help survival. The knew that every payment will help the employees only. **Employee co-operative Management** was established in the SPL and transparency in actions /dealing made it successful. It was just a parallel example, when employees took over ailing Kamani Tubes from management **(Shanti K. Bhowmik, 1989)**.

Smith, Vince. C. et.al. (2013) discussed on Successful Strategies for Managing Change, and SPL did it. Human resource department played a role of change agent successfully. Employees stopped making complaints about management and their needs and started working seriously to achieve target stipulated in time. Salary payment of workmen was given priority above all. Workmen started counselling to their co-workers to take responsibility. Loss of material in scrap, loss of consumables by mishandling reduced to minimum.

Financial Strategy

The management arranged the fuel cost/consumables payment regularly from own reserve and unit head was told to arrange salaries from toll manufacturing payment received from alliance company. Working capital bank payment /Excise duty liability was borne by head office. All capital expenses, emergency need related with plant and machinery was supported by SPL management from Kolkata. Raw Material delivery /Finish material lifting was responsibility of alliance partner. Contractual bills were raised as per system of JSL and payment was released after satisfactory scrutinization in schedule. A financial balance was reached for normal working. Unit became self-sufficient due to employee's co-ordination, promptness in lot completion and continuous improvement in quality. Customer imposed quality plans, safety plans and execution plans were adhered fully and this generated customer satisfaction.

4. Empirical Analysis-Impact of Strategies, TQM-Revival Measures

The sales figure of SPL was collected directly from accounts department on monthly basis, two years before implementing revival strategies and TQM and two years after implementing revival strategies. The figure was subjected to hypothesis testing, to see that whether there was overall improvement in sales, due to TQM and revival strategies or not. The null hypothesis to be tested in this study is as follows:

H_{01}: There is no significant difference in the sales of the company, SPL before the after implementation of strategies.

Before period is the financial year 2008-2009 and after the implementation of TQM and revival strategies period is financial year 2010-11,2011-12.

The best possible method for hypothesis testing was Wilcoxon-Sign Test, in this comparative case, to arrive on logical conclusion in such condition. Data of 2008-09, 2009-10, 2010-11 and 2011-12 were collected on month basis. The data was analyzed using software MS Excel and SPSS 21.0 version (Statistical Packages for Social Science). The mean and standard deviation of sales before and after implementation were analyzed.

Descriptive Statistics

	N	Mean	Standard Deviation
VAR00001	23	15407999.04	8585083.302
VAR00002	23	30344076.3333	24271496.98837

Ranks

		N	Mean Rank	Sum of Ranks
VAR00002 - VAR00001	Negative Ranks	3[a]	8.67	26.00
	Positive Ranks	20[b]	12.50	250.00
	Ties	0[c]		
	Total	23		

a. VAR00002 < VAR00001

b. VAR00002 > VAR00001

c. VAR00002 = VAR00001

Test Statistics[a]

	VAR00002 - VAR00001
Z	-3.406[b]
Asymp. Sig. (2-tailed)	.001

a. Wilcoxon Signed

b. Ranks Test

b. Based on negative ranks.

Since the P-Value of Wilcoxon-Sign Test is less than .05 (5% level of significance), it is inferred that the differences found with respect to turnover are significant and hence, these differences are actually traceable in the population. Therefore, the null hypothesis considered in this study cannot be accepted, given the test and study and hence alternate hypothesis, i.e., there is significant difference in the sales of the company SPL before the Strategical implementation of revival strategies and TQM and after the implementation of strategical revival strategies and TQM is accepted. Thus, it can be concluded that sales or turnover after 2010 has actually increased.

5. Conclusion

Industries get sick due to multiple reasons but mis-management is most important. TQM practices, if combined with operational and human strategiescan be very effective and can help in revivalof sick plants. In certain cases, instead of downsizing, proper use of employees in re-engineering/ cost cutting/ waste reduction/continuous improvement/bench markingis done. Financial strategies and strategic alliances /toll manufacturing/insourcing can be helpful in financial support, if quality is enhanced for customer satisfaction, as quoted in Deming's Chain reaction.

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