Focus

Technology Innovation in Indian MSMEs: A Case Study Using SWOT and SAP–LAP Analysis

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In India, 95 percent of the industrial units are in small-scale sector, with 40 percent addition in the manufacturing sector and 6.29 percent contribution to the Indian Gross Domestic Product. So it becomes necessary for organizations to adopt new technologies or upgrade existing setup to meet continuously changing global market and fulfil customer needs. The case study of ABC industry highlights the problems and possibilities of innovative behaviour in Micro, Small and Medium Enterprises (MSMEs). Strength, Opportunity, Weakness and Threats (SWOT) Analysis is one of the techniques to undertake a more structural analysis to formulate the best strategy. Also, a Situation Actor Process (SAP)–Learning Action Performance (LAP) Model has been applied to analyse the case study of ABC. The situation represents the present scenario of the organization. Actors are the participants, influencing the situation to evolve different business processes. Based on SAP, various learning issues have been analysed, which lead to suitable action followed by impact of SAP on the performance of the supply chain of the organization.

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1. Introduction

1.1 General

Indian economy has also brought a host of opportunities for the industrial sector, particularly the MSME segment. While MSMEs have responded to competition reasonably satisfactorily, there is scope for increasing their export potential, domestic market share and developing them as serious players in the global value chain. The socio-economic policies adopted by India since the Industries (Development and Regulation) Act, 1951, have laid stress on MSMEs as a means to improve the country's economic conditions (Garg and Walia, 2012; MSME Annual Report, 2012-13).

Economic development is a process of economic transition involving the structural transformation of an economy through industrialization and income per head. Economic growth, on the other hand, contributes to the prosperity of the economy and is desirable because it enables the economy to consume and contribute to more goods and services by increasing investment, increase in labour force, efficient use of inputs to expand output and technological progressiveness. Any nation that experiences economic development and growth will benefit from improvement in the living standards especially if the government can assist in growth by implementing complementary and growth-enhancing monetary and fiscal policies. The MSME sector is considered very important in many economies because they provide job, pay taxes, are innovative and very instrumental in country's participation in the global market. The MSME activity and economic growth are important because of the relatively large share of the MSME sector in most developing nations and the substantial international resources from sources like the World Bank group that have been channeled into the MSME sector of these nations (Beck and Kunt, 2004; Hussain et al., 2011; James et al., 2014).

Many researchers have observed that MSMEs enhance competition and entrepreneurship, therefore, they suggest that direct government support can boost economic growth and development. Also, MSMEs growth boost employment more than large firm because they are labour intensive and make better use of scarce resources with very small amount of capital. Developing countries should be interested in MSMEs because they account for a large share of firms and development in these countries (Hallberg, 2000; Baral, 2013). The MSMEs are not only important because they are a source of employment but also because they are a source of efficiency, growth and economic decentralization (Yong, 1994).

1.2 Importance of MSMEs

The 11 million MSME units, which make up the Indian MSME sector, produce over 8,000 products. The MSMEs constitute over 90 percent of total enterprises in most of the economies and are credited with generating high rates of employment and account for a major share of industrial production and exports. The MSME sector also plays a significant role in the development of entrepreneurial skills and forms a substantial portion of the country's export earnings. In this globalized environment, the government of India has felt that there is a need to enhance the global competitiveness of the MSMEs by simplifying systems and procedures, easy access to capital and taking the MSMEs in the global value chain by increasing their productivity (Rai, 2009; Kumar and Sardar, 2011).

The importance of MSMEs is well understood by national economies. World over, half to two-thirds of all businesses are MSMEs and in many regions this proportion is much higher. The MSMEs are capable of creating jobs with least amount of capital and in dispersed locations which makes MSMEs attractive to policymakers. The importance of MSMEs in India became crucial in rural areas because it promoted economic growth. In fact, MSMEs can be the factor through which productivity is increased and income generation for household local community is improved.

1.3 Technology Innovation

The MSMEs have been considered one of the *driving forces* of modern economies due to their multifaceted contributions in terms of technological development, employment generation, export promotion, etc., of these, the ability of MSMEs to develop assumes significance because innovation lends competitive edge to firms, industries and, ultimately, economies. Therefore, technological development has the potential to spur growth of individual enterprises at the micro level and aggregate industries and economies at the macro level (Subrahmanya et al., 2010; Srivastaw and Sadhukhan, 2013).

Technological development is a key factor in a firm's competitiveness. Technological development is unavoidable for firms which want to develop and maintain a competitive advantage and/or gain entry in to new markets (Becheikh et al., 2006). Among firms of different sizes, MSMEs are generally more flexible, adapt themselves better and are better placed to develop and implement new ideas. The flexibility of MSMEs, their simple organizational structure, their low risk and receptivity are the essential features facilitating them to be innovative (Harrison and Watson, 1998). Therefore, MSMEs across industries have the unrealized innovation potential (Chaminade and Vang, 2006).

1.4 Need of Technology Innovation

Modernization, technological and quality development have assumed great significance in the present day's context. With the inflow of latest technology reducing the cost of production and the increasing competition from within and outside, the small-scale sector will have to attach more importance and pay attention to the areas of technology innovation and modernization. However, due to lack of information on the areas of technology innovation, entrepreneurs who have plans for technical development are not to go ahead (Laranja, 2009).

In order to enable MSMEs tide-over the problems of technological backwardness and enhance their access to new technologies, it is imperative to offer them a conducive environment, which in the present context of globalization calls for an approach with knowledge playing a predominant role. There is a need to understand and assess the real needs of the MSMEs and accordingly devise approaches that ensure their sustainable growth. The need today is also to leverage on modern technologies to harness human capabilities through the process of increased communication, cooperation and linkages, both within the enterprise as well as across enterprises and knowledge-producing organizations.

2. Case Study of ABC Company

A case study on ABC Company is given to illustrate the essential implication of technological innovation in Indian MSMEs to improve manufacturing performance. The case study illustration is given in SWOT and SAP-LAP framework.

2.1 Quality Policy

They are pioneer in this line of manufacturing quality products and their products command country-wide market due to best quality. The quality of every part fitted in the machine is thoroughly checked by experienced and qualified technicians. The complete manufactured machine is individually checked and passed after a successful trial. The ABC Company shall achieve total customer satisfaction by providing quality products on continuous improvement basis, under reasonable cost and within agreed time frame.

2.2 Management

- All the resources required to meet the customer's requirements are made available.
- All the facilities and manpower have been provided accordingly.
- The production process is well established based upon many years of experience.
- The standards of acceptability have been well defined in the form of inspection and test plan for all stages.

2.3 Objective

Their objective is to be a lean organization that drives revenue through greater exports and higher value added products and profits through sustained cost reduction. They try to increase revenues and decrease costs through even greater emphasis on technologies and by leveraging their strengths in design and technology to considerably compress development time. The company emphasizes on three key themes that form the cornerstone of the company's growth strategy: they strictly adhere to the delivery schedule given by customers. They try to reduce the breakdown time. They would try to reduce in-process rejections, rework and wastages at all stages. These quality objectives are measurable, that is, they can measure the reduction in rejections, rework, wastage, breakdown time, unplanned down time, optimum utilization of the available resources and timely delivery to the customers.

The products manufactured by ABC and milestones achieved are summarized in the Tables 1 and 2, respectively.

Table 1: Products Manufactured and their Features

S. No.	Product	Features
1.	Self-Centring Chucks	• High tensile • Wear resistant cast iron alloyed with nickel, chrome and manganese
2.	Independent Chucks	• Manufactured specially for heavy duty and rigid gripping • Non-self-centring action of jaws allows highly controlled centering
3.	Special Purposes Chucks	• Manual self-centring power • Automatic indexing chuck with hydraulic clamping and indexing
4.	Rotary Table	• Dynamic performance • Higher acceleration/deceleration • Higher RPM • Zero backlash • Preloaded axial radial roller bearing • Direct measurement for precision positioning
5.	Ring Turning Chucks	• Ground working surfaces ensure sustained accuracy • Reasonable space for tool clearance is provided to do face turning
6.	Wood Working Chucks	• Safety jaw accessory mounting jaws • Comprehensive range of jaw set available • Available in a range of thread options
7.	Back Plates & Face Plates	• Comfortable without being bulky • Easily attaches to shoulder pads • Add protection for back from impacts from behind • Vented energy blocks disperse the impact of the force over a wide area

Table 2: Milestones of ABC

1995	• Incorporated as manufacturing unit in small machine tools. • First product manufactured in 1995.
1997	• Sales and production departments were established. • Raw material brought from different states.
1999	• Expanded their range of products by addition of manual lathe chucks. • Digital inspection equipments were installed.
2002	• Launches official website. • Started importing raw material from China. • Milling machine purchased.
2004	• Started their business in international market. • Tie up with Central Tool Room (CTR), Ludhiana, for inspecting raw materials.
2006	• Got ISO certification. • Established quality control department.
2008	• Installed CNC turning centres to improve machinability. • Dealer network is enlarged in order to provide quick delivery to customers. • Employee Provident Fund (EPF) started for all permanent employees and workers.
2010	• Adopted and formulated R&D policy for better utilization of research function. • Continuously installing CNC machines of different types for improving production and machinability.
2013	• Exhibited in EMO HANNOVER. • Started exporting products to Italy and Malaysia.

2.4 SWOT Analysis of ABC

- **Strengths**

- An ISO 9001:2008 certified company.
- Organization has loyal employees.
- Desire to succeed.
- Situated in industrial area.
- Organization has consistent track record.
- Owner's management.
- Flexibility in management.
- Strong relationship with customers.
- Adjacent to tourism city.
- Cost effective and competitive price of product.
- High level of top management commitment.
- Family environment.
- Credibility in quality.
- Strong leadership.
- Less overhead.
- Organization has vision in line to customer satisfaction in all aspects.
- Closeness to market.

- **Weaknesses**

- Conflicts of role and responsibilities.
- High absenteeism.
- Entrepreneur not multi-skilled for different functions of industry.
- Qualification background of employees not good enough.
- Lack of quality consciousness in workers.
- High dependency on individual.
- R&D is outsourced.
- Lack of quality control.
- Scale of production.
- Lack of service after sales.

- Dependency on local suppliers for part assemblies.
- Dependency on local manual labour.
- Lack of visibility in corporate world.
- Lack of professional input.
- Traditional outlook of industry.
- Hiring of employees is reference based and subjective.
- Low productivity whereas high input costs.
- Lack of advertisement opportunity.
- Cost induced on training of employees is very less.
- Career planning is of very small level.
- Lack of financial strategy.
- Bureaucratic hurdles for finance procuring.
- Inadequate information of market trends.
- Employee's reward scheme is not well structured and perfect.
- Financing problems.
- Small-scale production skills not helping enough to promote technical innovation.
- CAD facilities not available in factory premises.
- OEM drawings not available, design depends upon skills only.
- Extreme competition.
- Delivery delays are often.
- Hurdles of law and policies influence the growth of industry.
- Lack of government subsidies for technology upgradation.
- Poor technology base.
- High cost and unreliable power supply affecting industrial performance.
- Lack of infrastructure.
- Lack of skilled workers.
- Marketing and distribution problems.
- Gradual withdrawal of reservation policy.
- Entrepreneurial myth or e-myth.
- Mindset problem.
- Lack of extensive sales and service network.
- Customer complaint handling not effective.
- Limited interaction with third party R&D.
- Sharing of common issues among other industries is very limited.
- Specific innovation approaches not followed for technology upgradation.
- Absence of technology support from large-scale industries.
- More prone to global fluctuations.
- Social welfare areas neglected.

- **Opportunity**

- Increasing competition in small-scale industry.
- Government support is admissible.
- Product reservation by government.
- New technology and product can be introduced.
- Internal competition.
- Scope of on-job trainings for workmen and employees.
- Exposure to foreign markets.
- Flow of foreign investment and technology.
- Emerging areas of business.
- Less government intervention.
- Employment generation.
- Increased output of skilled manpower by technical institutes.
- Trade fare and international exhibitions.
- Increasing competition between banks.
- Improving upon market network to get into new market.
- Better performance by the MSMEs.
- Better customer satisfaction.
- Growing number of financial institutes to resolve finance issues.
- Short- and long-term capital.
- Export contribution.
- Grabbing of outsourcing created by MNCs.
- Inexhaustible source of innovation.
- Removal of regional disparity.
- Better industrial relations.

- **Threats**

- Bad economy.
- Payment delays.
- Order cancellation by party.
- Inadequate attention to R&D.
- Corporate linkage with steady in-flow.

- Lack of technology superiority.
- New cost, taxes and compliances.
- Logistic freight charges undetermined.
- Bank super conscious against Nonperforming Assets (NPA) for approving loans, etc.
- High alloy surcharge set by government for raw materials.
- Lack of honest working.
- Hidden costs which are untraceable.
- Present structure of Labor Law does not encourage MSME.
- Loan interest rates for plant and machinery is high.
- Wrong commitments.
- Complicated documentation procedure.
- Corruption.
- Stiff competition due to changing norms of WTO and arrival of MNCs.
- Hidden employment.
- Lack of supervision.
- Reduced profit margins.
- Outflow of wealth.
- Political interference.
- Wide technology gap with developed industries.
- Mismatch of education base and professional requirements.

2.5 SAP Analysis of ABC

✣ **Situation**

- The ABC Company has variety of product range. Nine products are manufactured and assembled at the location.
- A small group of dedicated team is focused on manufacturing the products for its different customers.
- Industry is having traditional outlook, layout and working as set by the first owner. No big change in these is made by follower entrepreneur.
- Production capacity is increased over the last few years.
- Very few workmen are permanent and remaining are on contract wage basis. Small increments are offered to them.
- Lack of skilled workers, lack of infrastructure, usage of poor technology and issues created by local agencies are making the industry weak.
- Policies are not effectively working to produce employment trust in small-scale industry.
- There is lack of support and cooperation between research organization to promote technology and remove barriers.
- Cleanliness and other environment-related activities are considered lightly. This affects the morale of working of all.
- Little support is gained from government agencies.
- Fuel and power tariff are high comparing to other states.
- Finance is the major problem for industry. Public sector enterprises tend to block major funds of the industry.
- It is difficult for management to provide job security and career development opportunity to employees as compared by large-scale industries.
- There is absence of modernization of innovation for technology development.
- Industry setup is in industrial area where it can avail its basic requirement any time.
- Production numbers are low and R&D is also outsourced which is affecting its turnover.

✣ **Actor**

Management of ABC, manager of the industry, supervisor of the industry, suppliers of the industry, work force of the industry are the *actors*.

✣ **Process**

- Plant has its special inbuilt mechanism to convert the raw material into useful product. Each product is accompanied with is process sheet-cum-drawings.
- Production is limited to conventional techniques. Non-conventional machining processes are not yet installed.
- All raw material testing is carried out at local testing laboratories at Mohali.
- Suppliers are connected to industry by means of telephone, fax and email. Main raw material used in industry is GI sheets, electric motors, electric control switches and gears, ducting grills, fan belts. The

manufactured units are transported through tempos to nearest road or rail transport carrier for delivery to the customers.

2.6 LAP Synthesis at ABC

- Small-scale industry has various challenges before it. To withstand with these challenges, industries have to put a lot in R&D, technology infrastructure and marketing.
- Industry needs to prove itself and made recognition as small-scale industries has specific advantages like flexibility, concentration and strong internal communication.
- Engineering standard, managerial policies and quality control have to be more successful with its current resources.
- Industry need to break old barriers of working, acquire and deploy new technology.
- A highly effective strategy for small-scale organizations is to develop a market niche. This involves developing a product which, by virtue of its own features, is able to defend itself against any competitor in the sector, whatever their size. Personalizing the product and addition of appropriate options is all part of this strategy.
- Technical trainings and work experience of workmen gives industry a prompting edge. Industry needs to promote these for their workmen and staff.
- Multi-skill enhancement in workmen always helps to reduce errors of working and initiate problem solving exposure among the team.
- Small-scale organizations prefer external recruitment of experienced staff rather than training the staff internally. Training in such organizations is usually ad hoc and underlines poor attitude towards learning.
- Small firms often rely on their own experiential know-how, and train up their own operative and intermediate level skills. Small units generally remain insular and autonomous and fail to recognize the underlying or latent skill deficiencies.
- It is critical to match employees to projects not only on the basis of their experience but also in terms of where their interests lie. Employees are most creative when they are about their work and are stretching their skills. So provide them opportunity to deeply engage themselves into their work and make real progress.
- Documented working of whole processes should be made effective to produce quality product. Separate inspection department be incorporated.
- Finance scheme should be easy and effectively approachable to entrepreneur to get maximum benefit out of these.
- Efficient usages of fund acquired from financing agencies is very much important than just to grab the liquidity only.
- Government should provide appropriate information and help to make the small-scale industry on its feet. It should also help to acquire new techniques which are non-hazardous, eco-friendly, economical and environment friendly.
- Government needs to regulate the equality among all states regarding policies, concessions and offers to enhance growth of industries.
- Provision of *study visits* for entrepreneurs to various technically advanced units both in India and developed countries, along with technical experts in the trade, to create awareness of prevailing technologies and manufacturing techniques.

3. Conclusion

The SMEs play an essential role in sustaining a developing nation's survival and growth. The aim of this article was to investigate the extent to which the SWOT factors have been attained in MSMEs with particular reference to the selected company. The SAP–LAP Analysis presents the situation of technology innovation in Indian MSMEs. It also helps in identifying technology gaps in adoption of innovation strategies. The synthesis of SAP leads to LAP, which bridges the gap of technology development by suggesting improvement actions on the gaps of innovation or the learning from the present situation, actors and processes. The main threats observed are competition from large and multinational businesses, financial stringency and technological obsolescence. In spite of the various lacunas, it is felt that with the existing technology and manpower, MSMEs can do miracle by adopting technological innovation.

The analysis and implications of technological innovations studied with reference to the small firm indicate that if small firms have to survive and grow, they need not

always resort to technological innovations. Even incremental innovations can contribute to their competitiveness. The most important advantage of these firms is their ability to provide what the market demands.

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Science and technology revolutionize our lives, but memory, tradition and myth frame our response.

—Arthur M. Schlesinger