ABSTRACT

Technology had a great impact in all aspects of life such as economy, businesses and enterprises. The global economy is currently undergoing fundamental transformation in which technology plays a key role. Technology has a real impact in most of industries and in all aspects of economy, while businesses and enterprises continue to undergo considerable changes. Usage of these technologies is revolutionizing the rules of business, resulting in structural transformation of enterprises. Modern businesses are not possible without help of technology, which is having a significant impact on the operations of Micro Small and Medium scale Business. It is claimed to be essential for the survival and growth of economies in general. MSMEs are drawing attention in developed and developing countries as well as in transition countries. It is generally recognized that MSMEs play a vital role in the revitalization and development of national economy in many countries and particular in the context of India. It is encouraging the development of MSME and the role that MSME sector can play in promoting economic and social development by creating opportunities for employment. The various which effects the technological development in MSMEs such as role of entrepreneur, government policies, organizational culture, technology infrastructure capabilities needs to be explored more and various steps should be taken to develop the state of technology in MSMEs.

I. INTRODUCTION

A. GENERAL

MSME is the abbreviation for Micro Small and Medium Enterprises. These enterprises can be rightly called as the backbone of the GDP of India. The MSME sector in India is growing at an exceptionally fast rate due to which it is proving to be beneficial to the Indian Economy [1]. Following are some of the current figures related to the MSME sector in India:

- The contribution of the MSME sector to the entire output of the country is 40%.
- Currently, there are over 11 million MSME units in India that produces more than 8000 products.
- 90% of the Industrial Units in India belong to the MSME sector.
- These MSME units contribute 35% to the Indian Industrial Export.

Following are some of the factors that have contributed to the growth of MSME sector in India:

- MSME units in India are being funded by foreign and local fund provider.
- The advancement in technology has also contributed highly to the MSME sector [2].
- To start and maintain these units, minimal investment is required.
- These SME units are now being funded by many government and private banks.
- The SME sector is one of the greatest contributors of domestic production as well as the export earnings. Many major mergers have taken place recently [3].

B. DEFINITION OF MSME

MSME’s are the engines of growth of any country’s economy. They are an essential source of a country’s jobs, create entrepreneurial spirit and jobs in a country and are crucial for fostering competitiveness and employment. According to the Micro, Small & Medium Enterprises Development (MSMED) Act, 2006 the Micro, Small and Medium Enterprises (MSME) are classified as:

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II. TECHNOLOGICAL DEVELOPMENT IN MSMES

Technology development is a catalyst not only for growth among India’s micro, small and medium enterprises (MSMEs), but for the growth of the Indian economy as a whole. Many stakeholders, including the Government of India, technology companies and MSME leaders, recognize that roadblocks relating to infrastructure, technology and skilled labour must be eliminated to sustain the growth of MSMEs and ensure their continued contribution to India’s industrial production, economic growth and employment. In India, medium-sized and large businesses are adopting technology in major ways, even ahead of their counterparts in Western markets, particularly with respect to mobile technology. India’s widespread adoption of mobile solutions create a major opportunity for other countries to learn from the India experience and find new ways to “leapfrog” traditional communication means and use the mobile channel to reach huge populations on key issues of social and economic importance. Despite India’s global technology “case study” and best practices, today small business in India is simply not realizing the full potential technology can bring as a game-changer to the old ways of doing things in their businesses. Although technology adoption considerably increased during the implementation of the Government of India’s 11th Five Year Plan – with its focus on creating a technology infrastructure and rolling out technology-driven services – the use of technology in MSMEs remains limited. As a result, there is a clear and deeply-felt need to accelerate the pace of technology adoption in the small business community and disseminate technology across the bottom of the pyramid – and among India’s MSMEs specifically – dramatically during the implementation phase of the 12th Five Year Plan [4].

Majority of micro and small businesses has a low awareness of and engagement with technology. Three business types emerged during the qualitative sessions: “tech non-adopters”, “tech aspirers”, and “moderate tech adopters”. Tech non-adopters or “technology laggards” do not employ technology to any great extent and rely mostly on manual methods. They tend to be older manufacturing, established businesses who practice “old school” business development and management. Tech aspirers represent a mix of service and manufacturing units but tend to be on the smaller size. The business attitude among this group is “ambitious but cautious”, as this group is usually comprised of new entrepreneurs with younger, more inexperienced management. While tech aspirers have a much higher awareness of the benefits of technology than non-adopters, they also exhibit low engagement and only adopt technology solutions when they are tried and tested by others. The final group – moderate tech adopters – is the most technology-savvy of the sampling and uses technology to keep ahead of trends and interact with clients in various aspects of their business, although not always consistently and without struggle. These businesses are mostly found in the services sector. Moderate tech adopters have an evolved understanding and use of technology but this clearly remains at the nascent stage. Although all three types acknowledge the benefits of using technology, most businesses appear to be applying technology to a limited extent in business operations. Free and guided associations of technology remain in the “functional realm” where technology is viewed as a means to save time and effort. Software usage is basic and dependent on popular products and established brands. Internet and mobile telephone solutions, while used for personal purposes, are surprisingly not viewed as a means to save time and effort. 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Case studies and testimonials are incredibly important in communicating the benefit of technology adoption: Other small businesses have tremendous influence in helping reluctant business owners “get over the hump” and invest in technology. Specifically, 68% say they adopted technology solutions only after seeing other businesses using it to their benefit. Furthermore, 36% of all survey respondents said that hearing from other small businesses about their experiences with technology would be helpful. Government, small business organisations and even private sector communities need to roll out engaging case studies and tap into relevant “influencers” when communicating the value of technology adoption. One way to do this is to generate real small business “success stories” to communicate in local communities.

Share best practices and engage the community: Small business kiosks, incubators, hubs, clusters, business associations, and support centres, such as the country-wide network of Development Institutes, established by the Ministry of Micro, Small and Medium Enterprises, could be more active in bringing small business together to leverage skills, ensure resources are user-friendly and help answer IT questions throughout the growth cycle of micro and small businesses.

Timing is important: Moderate tech adopters tends to embrace technology either in beginning stages of forming a company (60%) or when starting to expand (20%). Supporting organisations must “meet the business at its comfort level” – that is, when and where they are mentally and financially open to adopting and investing in technology. Intuit has some additional ideas on specific solutions for both government and private sector that could leverage the open “entry points” for small businesses.

Technology adoption must be easier, more affordable, and implemented from a local perspective: Just less than 40% of moderate tech adopters went forward with IT plans because a credit or upgrade made the implementation affordable. Affordable solutions such as easy installments, credit options, and pay-as-you-go options can provide sustainable solutions toward addressing cost concerns. Additionally, software should be easy to use and offered in local languages to breakdown the perceived complexity of IT.

Provide long-term support: It is essential to offer sustained IT support that meets the needs of the end-user, from a variety of sources including in-person support. Coupling these with user-friendly solutions and baseline IT training will go a long way in helping small business overcome the hurdles to technology adoption.

Despite a government that has committed its support, and a community of training institutions, education organisations, and a private sector serving the market, India’s MSMEs have not – for the most part – adopted technology in their business operations. Changing this equation will require the Indian government, the private sector, training organisations and other key stakeholders to increase efforts to understand the barriers to technology adoption [6].

### IV. LITERATURE REVIEW

**Venesaa and Loomets (2006)** analyse development and contribution of entrepreneurship in the economic development during the last ten years through MSME development as well as new firms formation as an important indicator of entrepreneurial activity in Estonia. This is supplemented with the analysis of main constraints hindering new business start-ups. The empirical evidence is drawn from statistical databases and two large-scale telephone surveys undertaken in 2002 and 2005. The Likert scale method is used for measurement of the assessments of respondents based on their own opinions on the main constraints in enterprise development and support needs for policy measures. Statistical analysis indicated a remarkable contribution of entrepreneurship into economic development in the form of fast growth of the enterprise sector. A more detailed research of this, however, detects large fluctuations in the creation of new enterprises across counties and economic activities, indicating the need to direct entrepreneurship policy especially to support counties and activities with below the average firm formation rates. Also we can distinguish factors that hinder development of start-up enterprises compared with those faced by older enterprises. For eliminating these constraints it would be needful to find appropriate policy measures to support the development of entrepreneurship in the country [7].

**Raghavendra and Subrahmanya (2006)** outlines a methodology that uses quantitative measurement, validation and analytical tools for measuring technological capability and provides a useful means for testing the relationships between technological capability and the various technological learning mechanisms. Important conclusion that has emerged out of the data analysis is that it supports the central assertion made in the capability literature that ‘technological efforts’ made by firms to acquire and assimilate technology are important for the acquisition of technological capability. The variables such as, external technological and information channels, multilateral horizontal and vertical cooperation, and formal technical education are significant in the regressions. Firm size comes out as a significant variable in regressions and it also remarkably improves the explanatory power of the equations. Non-tiny firms exhibit much stronger inter-firm linkages with firms/agencies, both within the cluster and outside [4].

**Zaheer, Rehman and Ahmad (2006)** studies, defines and assessed the organizational culture exhibited by Micro Small and Medium Enterprises. They primarily focuses on four cultural categories: clan, adhocracy, hierarchy and market-driven. These conceptual domains have been examined by the Organizational Culture Assessment Instrument. Results from a sample of 162 SMEs indicates that MSME culture lacks creativity, innovation, freedom and risk taking. MSMEs are not looking to change in the future, preferring the status quo. The most important finding is that SMEs exhibit a market-oriented culture focusing on results, competition and achievements. Their results provided another source of information about the discrepancies between the current SME culture and what they prefer it to be. In the opinion of the
survey respondents, there does not exist a strong need for change. Their study revealed another important finding about the stronger or more dominant market culture of MSMEs. Strong cultures are associated with homogeneity of effort, clear focus, and higher performance in environments where unity and common vision are required [9].

Ravi (2009) focuses on entrepreneurship development within the Micro, Small and Medium Enterprise (MSME) sector in India. He studies the overview of this sector in India and look at some recent trends which highlight the development and significance of this sector w.r.t. the Indian economy. He also studies about specific government policy interventions on the growth of entrepreneurship in the MSME sector in India. His studies reveals that while specific policies that are aimed at the MSME sector have limited impact on the growth of this sector, more general development policies such as expenditure on infrastructure and access to finance have significantly positive impact on growth of the MSME sector across states in India over the last 15 years. His results suggest that perhaps the government should play a facilitator role and improve access to finance by encouraging more banks and other financial institutions to enter the local market, instead of becoming an active player itself. The results also suggest the core competence of the government in certain roles, example creating a facilitating environment such as improved connectivity by roads, railways and airways, improved availability of electricity and water supply [5].

Leitch, McMullan and Harrison (2009) evaluate an action learning-based, leadership development programme designed for founders and leaders of growth-oriented, entrepreneurial small to medium sized enterprises. Based on in-depth, qualitative interviews with participants on one cohort, undertaken two years after completion of the seven-month programme, authors demonstrate that by viewing action learning as an ethos that informs practice, it can contribute to the process of effective leadership development with identifiable personal and business outcomes. It has become clear from their evaluation that in the SME context, where the founder/owner/ leader still has a substantial ownership stake in and identification with the business, both learning and leadership development are focused more on personal development than on business development. In other words, there has been a shift in focus to examine problems relating to ‘own-job’ issues in small sets away from the wider organizational setting. One of the challenges for the future development of action learning-based, leadership development programmes will be to re-integrate the personal and the business and to capture the benefits of peer-learning with the discipline of being grounded in a specific organizational setting, which is the focus for the implementation of programme learning [10].

Wen hu (2010) reveals that there has been increasing recognition of the importance of the SME sector in recent years; indeed, the contribution made by SMEs to overall economic development has become widely recognized in many of the newly industrialized economies. In an effort to go beyond some of the present empirical works, his study uses a dataset on both developed and developing economies to examine the contribution to economic growth from the SME sector. Based on data covering thirty-seven countries, over the period from the 1960s to the 1990s, his empirical results support the hypothesis that small businesses are beneficial to economic prosperity; however, this study highlights considerable diversity in terms of the patterns of the contribution, by the SME sector, to overall economic growth. In the pursuit of economic growth, SMEs in the high-income economies will generally exploit entrepreneurship, whilst in the less-developed economies they will tend to drive the job-creation function [8].

Masurel, Montfort and Lentink (2010) presents new empirical results from a study on critical success factors in the SME innovation process. Based on an extensive literature survey, a taxonomy of 14 success factors is identified. Next, in a survey questionnaire among Dutch SME firms a total of 50 measurable and operational features of these critical success factors is investigated. The resulting multivariate dataset is analyzed by means of a separate factor analysis per critical success factor. The results appear to be illuminating in that – in contrast to the prevailing wisdom in much of the scientific literature ‘entrepreneurship’ is perceived as the most prominent crucial success factor in the SME innovation process. This result turns out to be rather robust after a sensitivity analysis by distinguishing various segmentations in our sample: manufacturing vs. service firms, entrepreneurs vs. managers, real vs. less innovative firms, and smaller vs. larger firms [12].

Romijn (2010) reviews approaches towards technology support for small-scale manufacturing enterprises in developing countries since the early 1970s. Early programmes tended to suffer from a number of weaknesses, emanating from a limited conceptualization of technology and an inadequate understanding of the role of the small-scale sector in industrial development more broadly. There was also a lack of practical experience with project implementation. However, in recent years important advancements have been made on all these fronts. Four features of recent technology assistance programmes that have tended to be associated with success are discussed and illustrated with evidence from three projects. Broadly, successful projects (a) embrace the notion that durable competitiveness of small producers in a competitive economic environment requires that they develop internal capabilities to effectively assimilate, use, and adapt product and process technologies; (b) are demand-driven; (c) target the assistance to groups of producers with common interests and problems, and help them to organise themselves in collective bodies that can evolve into self help institutions; and that (d) design [13].

Asghar, Nawaser, Paghaleh and Khaksar (2011) evaluates the government policies with respect to the MSMEs and the performance of these enterprises in relation to these policies and assistance and also concentrates on the growth of
entrepreneurship within the Micro, Small and Medium-sized enterprises in India. In addition, they also consider the contribution of MSMEs towards country's employment generation. They observed that in India a large number of micro, small and medium enterprises (1,035,102 out of 1,552,492) concentrate on manufacturing sector. The micro, small and medium enterprises (MSME) sector contributes significantly to the manufacturing output, employment and exports of the country. It is estimated that in terms of value, the sector accounts for about 45 per cent of the manufacturing output and 40 per cent of the total exports of the country. The sector is estimated to employ about 65.9 million persons in over 28.5 million units throughout the country. Further, this sector has consistently registered a higher growth rate than the rest of the industrial sector. Their analysis also shows that global market has changed considerably as also the activities of Micro, Small and medium enterprises. Today, for businesses to survive, dynamism and entrepreneurship must exist in its fullest degree. They found in the past record of MSME development that, those countries have succeeded in achieving higher growth of MSME, who have given much more emphases on Entrepreneurship Development Program [11].

Ghobakhloo, Saboury and Norzima Zulkiﬁ (2011) analyze and contrast the internal and external issues affecting the process of IT adoption in SMEs to provide clearer understanding of this process by reviewing IT adoption literature, which includes more than 20 years of empirical research and case studies from a variety of databases with high concentration on certain SME-related issues. Proposed integrated framework demonstrates the process of IT adoption in SMEs through reviewing existing perspectives in the literature. Their study will assist different parties involved with adoption process including managers, vendors, consultants, and governments to achieve a practical synopsis of the IT adoption process in SMEs, which is believed to assist them with successful adoption. They also reveals that IT has critically become indispensable tool for daily operations of organizations. MSMEs are now investing significant amount of financial resources in IT to strengthen their competitive positions. Due to large-scale application of IT among SMEs, they have been exposed to several associated risks within the adoption and development of IT solutions. Prior literature on IT adoption in SMEs show that approximately most of failures and dissatisfaction were the result of one or more of the subsequent reasons [13].

Das and Das (2012) attempts to establish the relationship between MSMEs competitiveness and Information Technology Comprehensiveness. This study examines the Information Technology Adoption of Micro, Small and Medium Enterprises (MSME) in North India. The data were collected through personal inquiry and semi structured questionnaire, thereafter responses of 36 successful MSMEs were analyzed. According to empirical surveys, information requirement, intensity of competition, and support and incentives, size and age influence the Information Technology Adoption. Their study proves that there is a relationship between environmental factors and the adoption of ICT. Information Technology Adoption increases with increasing information requirements. Highly competitive environments drive enterprises to adopt the IT to acquire first mover advantages, or to avoid being driven out of markets. MSMEs in highly competitive industries have no choice but to follow their competitors in adopting information technology. Government Support and incentives from the external environment also lead enterprises to pursue Information Technology Adoption. It should come as no surprise to learn that the government is the greatest champion of the business use of the Internet [16].

Chaston (2012) provides quantitative support for the accepted view that small firms can enhance their overall performance by adopting an entrepreneurial marketing style. It also conﬁrms the correctness of the Covin Slevin perspective that academics recommending the beneﬁts to small ﬁrms of adopting an entrepreneurial style should also communicate to owner/managers that such actions must not be implemented in isolation. Instead any deliberations on entrepreneurial marketing must be accompanied by a careful review of the appropriateness of the current organizational structure. His study concluded that marketing in the smaller ﬁrm can often be viewed as an integral part of managing entrepreneurial activities. One of the justiﬁcations for proposing the appropriateness of small ﬁrms adopting an entrepreneurial marketing style is that SMEs face speciﬁc constraints which set them apart from larger organization [17].

Majumdar (2013) focuses on two major considerations namely growth planning in small organization as entrepreneurial as well as strategic activity. Growth of small organizations is inﬂuenced by the background/resource of the entrepreneur, the nature of the firm, and the strategic decisions taken by the owner/manager. Entrepreneurs of the small businesses are the sole strategic decision makers and their close control supports easy translation of entrepreneurial vision into action. Their ability, need and opportunity are the major determinants of growth. Small business entrepreneurs show different motives and also have different attitude and behaviour towards growth. Also a given set of entrepreneurial characteristics beneﬁcial in one context may work adversely in the other. A fit between strategy, structure and processes is more favourable to the performance. In his studies a conceptual model on growth strategy in small entrepreneurial organizations is presented. Three propositions are based on the theoretical framework are - (1) Personal ambition and vision of the entrepreneurs drive the growth of small organizations, (2) The entrepreneurs of small organization search for strategic fit in the market and the environment, and (3) The entrepreneurs of small organisation continue to search better fit in the market. The propositions need to be validated with the help of empirical work. He takes an integrated view on all these aspects of small business management while explaining the growth strategy. The propositions made in his studies reﬂect strategic and entrepreneurial dimensions of growth and takes a view that entrepreneurial motivation is different from growth motivation [14].
Beley and Bhatarkar (2013) reveals that technology has a real impact in most of industries and in all aspects of economy, while businesses and enterprises continue to undergo considerable changes. Usage of these technologies is revolutionizing the rules of business, resulting in structural transformation of enterprises. Modern businesses are not possible without help of information technology, which is having a significant impact on the operations of Micro Small and Medium scale Enterprises. It is claimed to be essential for the survival and growth of economies in general. MSME is drawing attention in developed and developing countries as well as in transition countries. It is generally recognized that MSME play a vital role in the revitalization and development of national economy in many countries and particular in the context of India. It is encouraging the development of MSME and the role that MSME sector can play in promoting economic and social development by creating opportunities for employment. These components are described and discussed while more research and studies on the adoption of information technology in SMB in India are proposed as necessary [18].

Paramasivan (2013) studied the Effect of Technological Capability on the Performance of SMEs. This study contributes to the literature by yielding further insights into the impact of TC of SMEs on their export performance. The results show that entrepreneurial orientation (EO) and absorptive capability have significant impact on TC at the level of technological operating and technological upgrading. In addition, different levels of TC are significantly related to export intensity and export growth. These findings suggest that innovative processes and product innovation could entail the success of SMEs internationally. Thus, SMEs in developing countries need to accumulate technological knowledge acquired from internal and external sources and to develop distinctive level of technologies in order to improve their performance in the Indian economy [6].

V. CONCLUSION

The Small and Medium enterprises play a vital role in the Indian economic structure due to its significant contribution in terms of output, exports and employment. But still most of MSMEs in India lacks in their technological infrastructure and are technically backward. In order to enable MSMEs to 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 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.

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