

Fourth Industrial Revolution: Progression, Scope and Preparedness in India—Intervention of MSMEs



Arindam Chakrabarty, Tenzing Norbu and Manmohan Mall

Abstract MSME (Micro, Small and Medium Enterprise) sector constitutes more than 99% of private firms operating in India which generate crores of jobs across the country. In fact, the MSME firms aim to support the large companies either in the form of outsourcing partners for supplying raw materials, W-I-P or adding value to one or few processes as ancillary to the big establishments. However, in the growing competition and the market complexity, the MSMEs have to compete with the large firms. The world is emerging toward Fourth Industrial Revolution (4IR) which not only prescribes for automation, speed, and prompt delivery mechanism but also it attempts to duplicate Human Intelligence in the form of Machine Learning or Artificial Intelligence (AI). In the dynamics of rapid changes across the Industrial Ecosystem, it is emergent for the MSMEs to re-module its business directions. The threshold level technology needs to be transferred, absorbed, and adopted by the MSME firms so that they can play a meaningful role in today's knowledge economies. This paper has explored the Scope and Preparedness for the sector and has prescribed desired Policy Reforms to make the transition smooth, value-adding and resourceful.

Keywords 4IR · MSMEs · Artificial intelligence · Threshold level technology · India

A. Chakrabarty (✉)

Department of Management, Rajiv Gandhi University (Central University), Itanagar 791112, Arunachal Pradesh, India

T. Norbu · M. Mall

North Eastern Regional Institute of Science & Technology (NERIST), Centre for Management Studies (CMS), Nirjuli 791110, Arunachal Pradesh, India

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1 Introduction

1.1 MSMEs in the World

The contribution of MSMEs across the globe has been found highly significant particularly as a change agent for rapid socio-economic development [1, 2]. Research indicates that the MSME sector has a positive association with the economic growth and developmental indicators equitably both in developing and developed nations of the world [3, 4]. The sector has been instrumental to absorb a large pool of manpower directly or indirectly worldwide.

1.2 Indian MSMEs: Status, Scope, and Achievements

Indian MSMEs have the capacity of absorbing around 40% of the total workforce that contributes almost 45% of manufacturing outputs worth of around 6% of manufacturing GDP and reserves the share of 40% of total exports of the country. It is observed that around 94% of the firms belonging to the MSME sector are not registered even though the growth of this sector has been recorded at around 11% per annum which is more than the average GDP of the country in recent years [5, 6]. However, with the implementation of Goods and Service Tax (GST) in India, the unregistered MSMEs are compelled to enroll as a part of legal bindings. The MSME firms have been largely facing a series of problems and inadequacy which are mostly in terms of lack of availability of resources and opportunities leading to high-end inefficiencies. However, India witnesses a minuscule of MSME firms that are performing at par with the big corporates while the larger section of Indian MSMEs acutely suffer from Industrial Sickness or pro-sickness. The financial package extended to such sick firms would not be able to address the root causes rather offering some other set of benefits which might result in a favorable outcome [7, 8]. Most importantly, the industrial development is a function of the ease, access, and successful use of technological development. The MSME sector essentially needs the constant support for skilling of its manpower and technology led transformational business practice. Barring a few Medium and high performing firms, it is difficult for Micro or Small firms to afford continuous investment for technological upgradation. It is indeed a great challenge for the policymakers and the promoters these firms to have a full-proof solution for its survival, growth and sustainability.

2 Review of Literature

MSMEs are deemed to be an accelerator of economic growth across the world [1, 2, 9]. There is a positive relationship between the growth of MSMEs and the growth of the economy in many developed and developing countries [3, 4, 10].

MSMEs are the backbone of the Indian economy as they play a pivotal role by making a substantial contribution to the economy. They contribute around 40% of gross industrial value, 45% of the export and are considered to be the second largest employment generator in the country [9, 11]. Therefore, MSMEs are a necessity for the nation as they ensure innovation, revenue generation, and employment generation, etc. [12]. MSMEs, notwithstanding, face several challenges in India such as lack of tangible resources [13], HRM related issues [14], issues related to power, raw material procurement [15], lack of adequate financial assistance from Banks, absence of sophisticated technologies, scarcity of resources, and lack of skilled manpower leading to ineffective marketing [16].

3 Objectives of the Study

The present study endeavors to:

- i. Study and understand the progression of the Industrial Revolution with a special focus on the Fourth Industrial Revolution (4IR).
- ii. Explore the scope and emergence of 4IR in India with special reference to MSME sector.

4 Research Methodology

The paper has been conceptualized responding to the call of the hour about the emergence of the 4IR in the world and specifically in the Indian subcontinent. The paper has attempted to understand how the 4IR has progressed over a period of time which has been presented with the use of relevant and reliable secondary information. Since the country has been growing as one of the fastest economies of the world and also aspiring to optimize its demographic dividend, it has become imperative to understand the scope and emergence of 4IR and how the Indian MSMEs can play a responsible role as it caters to almost the entire Indian industries barring a few hundreds of larger firms.

5 Analysis and Interpretation

Analysis I

The Industrial Revolution (IR) began with a view to meet the demands of growing population in terms of supply of products. The primary sector has its limitation and highly concentrated on agricultural produces, handlooms, and handicrafts products. With the landmark invention of Steam based Power and Low Productive Machines and other tools, the First IR took place in the mid of the eighteenth century which continued up to the first half of nineteenth Century. With the pace of technological development in consonance with the growing demand for higher productivity, the Second IR started from the second half of the nineteenth century to the mid of the twentieth century where the sector emphasized on assembly line and mass production techniques to cater to the need of the population. In the later part of twentieth century, the industry was dominated by growing advent of electronics, instrumentation, and computational devices, IT and automation, it introduced a new age of Industrial Revolution popularly known as Third IR. This period of IR focused on higher volume of production with superior quality, precision, and Quality Function Deployment (QFD). In fact, Total Quality Management (TQM) appears to be the prime focus among most of the learning and large firms. The emphasis of Product Development has been shifted to achieving excellence in Process Development since the outcome of the lead processes essentially improvise creating higher quality of product. We are now in the era of 4IR where not only the Production Operation Systems are being modified through continuous improvement process as prescribed by Deming's P-D-C-A Cycle but the sector intends to replicate Human Intelligence par excellence into the devised mechanism in practice. The flowchart of the progression of IR consistent with the timeline has been enveloped in Fig. 1.

Analysis II

The new regime of IR has been propelled by outstanding advancement of satellite and wireless technology and its successful adaption among the population like Mobile Telephony, access to Mobile led Internet, use of high configuration platform like androids, etc. The wave of such advancement was highly appreciated and absorbed by the Indians particularly the Youth population of the country.

The tremendous growth of mobile and internet services have revolutionized the economic growth trajectory of the world and, of course, this is going to impact the Indian economy in the coming decades. The vivid penetration of Smartphone tremendously enhances the use of Mobile Internet as compared to Fixed Line Portals. This has made a growing propensity and user friendly internet access platform for the Indian users that resulted in greater participation in mobile led e-commerce activities across the country. This has motivated the Indian users to prefer new business model [17]. Internet economy of India is projected to double from the existing (April, 2017) 125 billion USD to 250 billion USD by 2020 at the behest of phenomenal growth in e-commerce/m-commerce of which the value of transactions would reach around 100 billion USD through digital platform. The ambitious project of Digital India

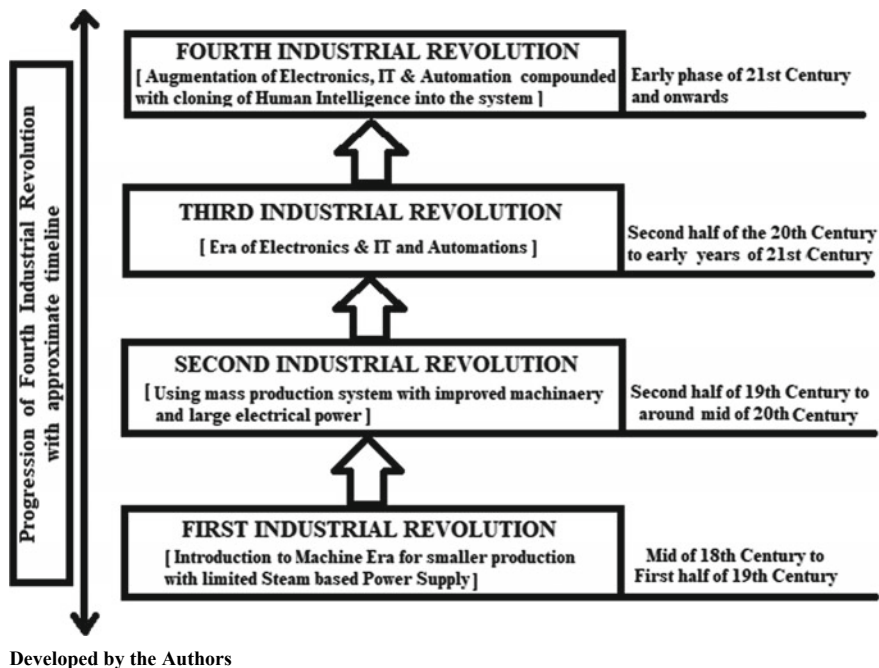


Fig. 1 Industrial revolution: journey ahead

Campaign intends to create online economy worth trillion USD by the year 2025 [18].

According to Worldometers—real-time world statistics, the present global population is around 7.6 billion of which it is estimated that almost half of the population are Internet users and surprisingly, around 50% of global internet users reside in Asia. Around 24% Internet users from Asia belong to India [19]. It is projected that the market potential for IoT devices in India would reach up to 9 billion USD by 2020 [20] as the country is poised to execute large scale IoT intervention projects to cater to its diversified reform policy [21]. All these above figures and observations signify that there is a growing market opportunity in creating, manufacturing and servicing IoT led devices in India which can be shouldered by the Indian MSMEs either as a support hub of large scale enterprises or the independent providers in the segment. This would depend based on the Competency Mapping of the MSMEs firms in terms of firm's core expertise, experiences, conformity of other value chain and the extent of absorbing and adopting new age technology within the least possible transition of time.

6 Recommendations

Based on the present study, it is imperative to understand the development of IoT led and other forms of digital ecosystem in the era of 4IR has been emerging as mammoth business opportunities where the MSMEs can play a leading role along with the larger firms. This transition needs certain policy reforms from the state as well as higher commitments by the enterprises operating in India since India is emerging as the fifth largest economy in the world and the second largest continent using part excellence technology. The sector can achieve enormous export opportunities in various countries of Asia, Africa and Latin America even a small segment of gulf nations since India enjoys a competitive edge over others in terms of its positioning as IT superpower, superior quality of human skill, competitive labor cost, and sustainable competitive advantage on the related domain trade. To achieve these agendas, the following recommendations may be incorporated:

1. The government should sponsor and organize massive skill development programs highlighting the necessary augmentations for creating devices related to IoT and other forms of digital and interactive ecosystem.
2. To reinforce the confidence among the smaller firms, the state may formulate time-bound financial incentives either in the form of tax exemption or extending case-specific subsidy so that financial aspect can be considerably supported.
3. The bank or Financial Institutions may be directed to promote firms for venturing into 4IR by allocating targeted budgetary provisions that should be disbursed in a time-bound manner.
4. The state must encourage Higher Educational Institutions like Universities, Colleges, and Research Institutes to take up innovative and need-based projects and applied research in the broader domain of IoT enabled devices so that the outcome of the research can move from lab to market. The present research has identified that people of India are keen to get IoT augmented high quality healthcare sector which can be prioritized along with other emerging areas.
5. Massive investment in the sector is essential in order to strengthen the infrastructure for delivering public utility services like health, education, Public Health Engineering (PHE), environmental protection etc., both in rural and urban areas of India in order to expedite rapid socio-economic transformation as prescribed by the United Nations' Sustainable Development Goals (SDGs).

7 Conclusion

The present paper is exploratory in nature which has been grounded by the latest dataset and information collated from most recent and reliable sources. The paper has attempted to showcase how 4IR has arrived and is knocking at the door. If we miss or delay to welcome, perhaps we would be compelled to invite ourselves to the

catastrophic consequence and would fail to get into the growth trajectory in the new millennium. India is about to encash its growing demographic dividends where it is inevitable to imbibe the youth with this new generation business model otherwise it would be detrimental to achieve the goals as doctrines by UN SDGs.

References

1. Chong MY, Chin JF, Loh WP (2013) Lean incipience spiral model for small and medium enterprises. *Int J Ind Eng* 20
2. Sun Y, Cheng J (2002) Hydrolysis of lignocellulosic materials for ethanol production: a review. *Biores Technol* 83(1):1–11
3. Demirbag M, Tatoglu E, Tekinkus M, Zaim S (2006) An analysis of the relationship between TQM implementation and organizational performance: evidence from Turkish SMEs. *J Manuf Technol Manag* 17(6):829–847
4. Ogunyomi P, Bruning NS (2016) Human resource management and organizational performance of small and medium enterprises (SMEs) in Nigeria. *Int J Human Resour Manag* 27(6):612–634
5. Accessed from <https://economictimes.indiatimes.com/small-biz/policy-trends/smes-employ-close-to-40-of-indias-workforce-but-contribute-only-17-to-gdp/articleshow/20496337.cms> on 28 April 2019
6. Accessed from <https://evoma.com/business-centre/sme-sector-in-india-statistics-trends-reports/> on 28 April 2019
7. Burpitt WJ, Rondinelli DA (2000) Small firms' motivations for exporting: to earn and learn? *J Small Bus Manag* 38(4):1
8. Jani HJ, Joshi YC, Pandya FH (2015) Impact of fiscal incentives on MSMEs' performance in Gujarat. *J Entrep Manag* 4(4):1–20
9. Singh B, Narain R, Yadav RC (2012) Identifying critical barriers in the growth of Indian micro, small and medium enterprises (MSMEs). *Int J Bus Compet Growth* 2(1):84–105
10. Bhuiyan N, Alam N (2004) ISO 9001: 2000 implementation—the North American experience. *Int J Prod Perform Manag* 53(1):10–17
11. Sharma RK, Kharub M (2015) Qualitative and quantitative evaluation of barriers hindering the growth of MSMEs. *Int J Bus Excell* 8(6):724–747
12. Boso N, Cadogan JW, Story VM (2013) Entrepreneurial orientation and market orientation as drivers of product innovation success: a study of exporters from a developing economy. *Int Small Bus J* 31(1):57–81
13. Singh RK, Garg SK, Deshmukh SG (2008) Challenges and strategies for competitiveness of SMEs: a case study in the Indian context. *Int J Serv Oper Manag* 4(2):181–200
14. Gakhar K, Kour H (2012) Issues and innovations of HRM in MSMEs—a study of the developing states of India. *Global J Arts Manag* 2(1):83–86
15. Srinivas KT (2013) Role of micro, small and medium enterprises in inclusive growth. *Int J Eng Manag Res (IJEMR)* 3(4):57–61
16. Aruna N (2015) Problems faced by micro, small and medium enterprises—a special reference to small entrepreneurs in Visakhapatnam. *IOSR J Bus Manag (IOSR-JBM)* 43–49
17. Chakrabarty A (2019) Is India poised for M-commerce in the cashless Milieu? In: Duhan P, Singh A (eds) *M-commerce: experiencing the phygital retail*. Apple Academic Press. Hard ISBN: 9781771887144, E-Book ISBN: 9780429487736. <https://doi.org/10.1201/9780429487736>
18. Accessed from <https://www.ibef.org/download/Role-of-Manufacturing-in-Employment-Generation-in-India.pdf> on 28 April 2019
19. Internet World Stats, Internet usage statistics, Dec 2017. <http://www.internetworldstats.com/stats.htm>

20. Deloitte (2017) Internet of Things (IoT) to be the next big thing for operators—TMT India Predictions, Feb 2017. <https://www2.deloitte.com/in/en/pages/technology-media-and-telecommunications/articles/tmt-india-predictions2017-press-release.html>
21. Tata Communications (2018) India IoT report—emergence of a new civic OS. Accessed from <https://www.tatacommunications.com/wp-content/uploads/2018/02/IoT-Report.pdf> on 28 April 2019