

PROMOTION OF ENTREPRENEURSHIP THROUGH SCIENCE AND TECHNOLOGY IN MIZORAM

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Abstract

Science and technology have always been important factors in shaping human society. Technological efforts have tended to manipulate and control the physical world while scientific pursuits have primarily attempted to comprehend it. These separate efforts have now joined into an inseparable whole and has helped improve the economy and quality of life of many nations and individuals. On the other hand, entrepreneurship contributes positively to nation building and is regarded as an integral player in the business culture, as an engine for job creation and economic growth. It plays an important role in increasing national productivity, distribution of economic power, balancing regional development, providing avenues for creativity and idea generation. The rapid paces of developments in the field of science and technology are leading towards a new class of knowledge savvy entrepreneurs and knowledge/technology driven enterprises, which are being recognized as an important factor for the economic development of nations and a source of value-added employment. Through the Directorate of Science and Technology, Government of Mizoram, projects such as the development of Portable Agarbati Round Sticks Producing Machine, Portable Low-Cost Induction Heater, Motor Cycle Trailer Suitable for Hilly Areas, Phytochemical Screening and Identification of Secondary Metabolites and Nutritional Profiling of Alocasia Fornicata (Baibing), etc., had been launched in Mizoram. These projects have contributed towards business start-up opportunities and generated employment in Mizoram. Hence, this paper seeks to bridge the gap between 'science and technology' and 'entrepreneurship'. It aims to highlight the role played by science and technology for the promotion of entrepreneurship in Mizoram.

Keywords: Entrepreneurship, Science and Technology, development

Introduction

Science and technology are key drivers to development, because technological and scientific revolutions underpin economic advances, improvements in health system, education and infrastructure¹. Developments in science and technology are fundamentally altering the way people live, connect, communicate and transact, with profound effects on economic development. To

¹ <https://ieet.org/index.php/IEET2/print/6596> (accessed on 13.09.2023)

promote technology advancements, developing countries should invest in quality education for the youth, and continuous training and development of skills for workers and managers.

In India, science and technology developed early in the history of our civilization along with the development of our society. Such science and technology being indigenous constituted an important part of our growth in social and cultural spheres. India is one of the top-ranking countries in the field of basic research. Indian science has come to be regarded as one of the most powerful instruments of growth and development, especially in the emerging scenario and competitive economy². In spite of the advances in science and technology and in many production sectors, the standard of living in many developing countries, including India, is very low and nearly one-half of the population in these countries lives in appalling conditions of poverty, malnutrition, hunger and disease. Indian experience in the development of science and technology and their application is more diverse than that in any other country, advanced or otherwise (B.V. Rangarao and N.P. Chaubey, 1982).

In many cases the reasons for supporting adult education in the area of science and technology is to make people accept new technology or even to break the resistance against it for economic reasons. Hence, in promoting science education, the structure of scientific knowledge should be carefully borne in mind, otherwise the investment of human and material resources might not bear the desired fruits (Digumarti Bhaskara Rao, 2001). Scientific knowledge alone provides a body of verified and tested truth and always tries to eliminate what is vague, ambiguous and indefinite. A man with scientific temper is always open-minded and as such he is never under the illusion that science and technology can provide a panacea to all human ills, thereby, creation of awareness of the interaction between science and society is very much essential (S.C. Datt and S.B. Srivastava, 1984).

High credibility of the promise of Information Technology (I.T.) inputs in public administration is based on the fact that I.T. is immensely capable of doing the impossible. Indian administrative culture reflects on I.T. interface and its impact on structure and nature of administrative functions (S.P. Verma, 2004). Technology as the ways in which humans do and make things with materials and energy directed toward practical ends. In the modern era, technology is to a large extent the product of engineering based on scientific principles, while science deals with the discovery, explanation and development of theories pertaining to interrelated natural phenomena of energy, matter, time and space. Based on the fundamental knowledge of science, engineering provides the plans and means to achieve specific practical objectives. Technology obviously has enormous importance in determining how human activities affect Earth and its life support systems (Stanley E. Manahan, 2006).

² <https://dst.gov.in/administrationfinance/administration-finance> accessed on (24.09..2023)

On the other hand, entrepreneurship is regarded as closely associated with the history of India. Accordingly, the evolution of entrepreneurship in India is traced way back to even as early as Rigveda, when metal handicraft existed in the country. Over the years, entrepreneurship has passed through several upheavals. The need for a broad-based entrepreneurial class in India arises from the need to speed up the process of activating the factors of production, leading to a higher rate of economic growth, dispersal of economic activities, development of backward regions, creation of employment opportunities, improvement in the standard of living and involvement of all sections of the society in the process of growth. Cultivating entrepreneurship often involves changing and sustaining a new set of social values. Such cultivation can be achieved by establishing an environment where business can flourish.

Entrepreneurship is the capacity and willingness to develop, organize and manage a business venture along with any of its risks in order to make a profit. In economics, entrepreneurship combined with land, labour, natural resources and capital can produce profit. Entrepreneurial spirit is characterized by innovation and risk-taking, and is an essential part of a nation's ability to succeed in an ever changing and increasingly competitive global marketplace (K.L. Dangi, S.S. Sisodia, Pravesh Singh Chauhan and Yogita Ranawat, 2014). Innovation is different from invention; an invention is discovery of new methods and new materials, whereas innovation is utilization of inventions to produce new and better quality of products that give greater satisfaction to the consumer and higher profits to the entrepreneur. An inventor gives the idea and an innovator implements the idea for economic gain. The importance of creativity and innovation has risen with the increasing competition amongst corporate. Successful entrepreneurs are realising that creativity, innovation and even incremental value additions are imperative ingredients to survive the ever-rising competition (S.K. Sinha, 2008).

Growth of entrepreneurship in a social organization is a highly complex process. It is the result of interaction of various factors, including natural endowments, historical tradition, education and cultural standards, social stratification, religious and moral values, family organization, social cohesion and economic development at any given period of time. Mark P. Rice and Timothy G. Habbershon (2007), in their book, *Entrepreneurship: The Engine of Growth* highlights about how entrepreneurship is a complex input-output process in which people, process, and place are constantly interacting to generate the entrepreneurial economy. They have examined 'place', which refers to a wide and diverse range of contextual factors that influence the entrepreneur and the entrepreneurial process. These contextual factors are represented as a series of concentric circles ranging from environmental and global forces, to national and regional policies, industries and infrastructures, to cultural communities, families and organizational forms.

Development of entrepreneurship in small scale sector is the only alternative to the problems that require immediate solutions viz., dispersal of industrial units, meet the massive unemployment problem, a more equitable distribution the national income, mobilisation of local resources and capital which might otherwise go unutilised and rejuvenate the depressed state of economy (G.S. Batra, 2004). Empowering women entrepreneurs is essential for achieving the goals of sustainable development and the bottlenecks hindering their growth must be eradicated to entire full participation in the business. Apart from training programs, newsletters, mentoring, trade fairs and exhibitions also can be a source for entrepreneurial development. As a result, the desired outcomes of the business are quickly achieved and more of remunerative business opportunities are found. Henceforth, promoting entrepreneurship among women is certainly a short-cut to rapid economic growth and development (Rajib Lochan Panigrahy and Sudhansu Sekhar Nayak, 2010).

Culture and education are two of the most valuable shapers of entrepreneurship. The former emanates from the numerous factors as historical roots, religious beliefs and tradition whereas the latter develops from the curricular formation of higher education. This study underscores the role of religion and higher education in the development of an entrepreneur. There is a strong influence of religion and education on the students' entrepreneurial development. As such, the religious source of entrepreneurship should be recognized. Meanwhile, the education needs to focus more on the actual practice of entrepreneurship. The teaching and learning should involve application rather than pure theoretical approach (Rodrigo M. Velasco, 2019).

Jiangru Wei, Yuting Chen, Jing Zhang and Yonghua Gong (2019), in their article, *Research on Factors Affecting the Entrepreneurial Learning from Failure: An Interpretive Structure Model* have pointed out that based on the interpretive structure model of system dynamics, this paper constructs a hierarchical structure model of factors affecting the entrepreneurial learning from failure, which has been also tested through a case of entrepreneurship. The study finds that: (1) there are 15 factors influencing entrepreneurial learning from failure that play different hierarchical roles; (2) the entrepreneurs' self-efficacy, as a key influencing factor of entrepreneurial learning from failure, can be cultivated and improved by enriched the entrepreneurs' successful career experience. In addition, emotion regulation after the entrepreneurial failure is also a key influencing factor of the entrepreneurial learning from failure and the emotion management is deemed as an important part of entrepreneurship education; (3) the entrepreneurial education may affect the entrepreneurship learning from failure indirectly by affecting the entrepreneurs' self-efficacy; (4) the economic conditions, the policy support, the industry characteristics and the cultural sense making of failure are the macro factors that may affect the entrepreneurship learning from failure.

Science and Technology in Mizoram

In recent years, there has been a lot of development in Science and Technology sector in Mizoram. The initiative for the development of science and technology in the state was taken by the Planning and Programme Implementation Department, Government of Mizoram which is the nodal Department for all development activities in Mizoram. The Directorate of Science and Technology, Government of Mizoram functions under this Department. The Directorate is the main administrative office of Science and Technology in Mizoram. It was first created as a Cell under the Planning and Programme Implementation Department, Government of Mizoram in the year 1986. The Cell functioned under the name Science, Technology and Environment Cell (STEC). It was created with a view to utilize Science and Technology inputs for various developmental activities and to take up scientific projects and schemes pertaining to frontier areas of Science. It was upgraded to a Directorate on 30th August, 2011 and was renamed as the Directorate of Science and Technology, Government of Mizoram. Hence, the new Directorate started functioning with the Chief Scientific Officer as its head.

The 'Mizoram Science, Technology and Innovation Council (MISTIC)' is an autonomous government body working under the Directorate of Science and Technology, Government of Mizoram. It is the oldest Science and Technology body in the state formed on 12th February 1985. MISTIC plays an advisory role as well as implementing body for science and technology promotion in the state. Some of the objectives and functions of the MISTIC are as follows:

- a) To identify areas in which Science, Technology and Innovation can be utilized for the achievement of the socio-economic objective of Mizoram and in particular, its objectives of tackling the problems of backwardness, unemployment and poverty, and of addressing itself to the problems of rural areas, and under-privileged section of the society.
- b) To initiate, support, promote and co-ordinate preferably by establishing networks, such research design and development projects and programmes, including demonstration projects, as are likely to be relevant to the specific objectives, problems, surveys and optimum utilization of natural resources of the state.
- c) To identify and encourage young talents in local universities, colleges, Micro, Small & Medium Enterprises (MSME), R&D Institutes and reward talents in innovation and disseminate success stories.

MISTIC receives yearly Grant-in-aid from the Department of Science and Technology, Government of India for salary of the limited scientific or technical employees as well as funds for implementing various projects undertaken by MISTIC in the state. The state government supports the Council for salary of administrative staff and for non-salary in the form of Grant-in-aid for its effective functioning.

Promotion of research development, innovation and entrepreneurship

Towards research and development endeavour, several activities have been taken up to promote innovation and entrepreneurship in Mizoram. Different projects and programmes are formulated with successive implementation, with the support of the Department of Science and Technology, Government of India, National Council for Science and Technology Communications (NCSTC), Vigyan Prasar, North Eastern Council (NEC), National Council of Science Museums (NCSM), etc., the State Government.

In order to achieve the mission and objectives of the Directorate of Science and Technology, Government of Mizoram, several activities have been carried out within the state. For the promotion of research development, innovation and entrepreneurship, the major programmes and projects undertaken by the MISTIC are:

1. Development of Indigenous Technology in Mizoram through establishment of Innovation Facility Centre and enhanced protection of Intellectual Property Rights

This project is funded by the State Government at a total cost of Rs. 6.67 crores. The Centre is being set up at the lower part of New Secretariat Complex, Khatla, Aizawl. The various components are – land development and building construction, procurement of plant and machinery, manpower recruitment, development of innovations or inventions and facilitation of intellectual property and patent filing. The objectives of the project are: to provide better scientific assistance and technological intervention by harnessing the fruits of indigenous technological innovations and inventions for sustainable development of the state; to foster and nurture the skills of indigenous innovators for inclusive growth; to provide institutional support mechanism to innovators and help in technology upgradation and promotion; to deliver low cost and affordable machinery with improved quality; to safeguard the tangible and intangible property of the innovators through internet protocol (IP) mechanisms.

2. Development of Sawdust Briquetting and Charcoal Making Plant at Baktawng

The project is funded by the State Government at a cost of Rs. 38 lakhs. It is taken up with objectives such as: to generate sustainable employment to increase the income of the households of the rural poor; to enhance the capabilities of the rural poor to manage new technologies and institutions at the village level; to harness the Self Help Groups as a productive means for economic empowerment through managing their own resources; to create awareness among the rural people about the importance and usefulness of charcoal briquette as an alternative to LPG/non-renewable source of energy; to create better agricultural waste management technique for people who are engaged in shifting cultivation.

The building or plant for sawdust briquetting and charcoal making was constructed at Chhuanthar, Baktawng where raw materials for the project are freely available and abundant. All the mechanics required for the project have been procured and installed.

3. Development of Water-Based Preservation Technology of Orange at Thingsai Village

The project is funded by the State Government. This water-based preservation technique of Orange Project is set up at Thingsai Village, Lunglei district. The project costs Rs. 8.97 lakhs. The objectives of the project are: to develop simple and working water-based preservation technology for orange; to better ascertain various parameters affecting the storage life of orange; to create orange market system such that the orange produce of Mizoram may be retained completely inside the state; to create awareness among the people about the importance and usefulness of simple and innovative means of preservation for various seasonal foods and fruits of Mizoram. Various equipments like water storage tank, temperature and humidity sensors, solar cell, etc., under this project have been procured.

4. Enhancement of Livelihood Options for Rural Women in Aizawl, Mizoram

The project is funded by the Department of Science and Technology, Government of India at a total cost of 17.29 lakhs and it falls under the Science for Equity, Empowerment and Development (SEED) Division. SEED Division has been set up under the Department of Science and Technology, established with the broad objectives of providing opportunities to motivated scientists and field level workers to take up action oriented and location specific projects aiming towards socio-economic upliftment of the poor and disadvantaged sections of the society through appropriate technological interventions especially in the rural areas. Under this Division, efforts have been made to associate concerned National Labs or other specialist Science and Technology institutions with each major programme so as to build-in expert input, utilize national Science and Technology infrastructure and link it up with grassroots Science and technology interventions/initiatives³.

The main objectives of the Enhancement of Livelihood Options for Rural Women in Aizawl project are: to provide technology input for production of healthier food products such as dried and pickled products; to provide better skills to women in production of food products at local or domestic levels; to provide technology input for improving poultry and pig farming, thereby producing better quality and quantity outputs; creating network of women or self-help groups in which skill development will be introduced and thereby creating chance for income generation. The project aims at upliftment of the condition of women in rural areas. The area selected is Zemabawk which is a peri-urban area, situated on the eastern outskirts of Aizawl, capital of Mizoram. The selected area

³ <https://dst.gov.in/about-us-0> (accessed on 9.09.2019)

Zemabawk constitutes of different localities, they are: Zemabawk, Zemabawk North, Thuampui, Berawlui and Bungbanga.

The main problem faced by women of the proposed site is unemployment. More than 70% women of the selected target are unemployed, either at government or private sector. They are involved either in their private farms or seek daily wages in different fields of work like daily labour, vendors, house maids, sweepers, cleaners, etc. The project is undertaken by MISTIC in collaboration with the MHIP Branch of Zemabawk.

5. Phytochemical Screening and Identification of Secondary Metabolites and Nutritional Profiling of *Alocasia fornicata* (Baibing)

The project is funded by the Department of Science and Technology, Government of India and was started on 1st December, 2017 at a total cost of Rs. 7.5 lakhs. *Alocasia fornicata* (Baibing) is a popular food in Mizoram, with potential medicinal value. It has been used as a traditional medicine in India and studies have also shown that this plant has antioxidant, antibacterial and cytotoxic activities. However, the constituents of *Alocasia fornicata* that contribute to its medicinal properties are yet unknown. The project aims to study the phytochemical and nutritional constituents of *Alocasia fornicata*. Using different solvents, *Alocasia fornicata* extracts were prepared and presence and analysis of the different secondary metabolites was performed. Furthermore, the nutritional content of the edible part Baibing plant, the spadix of *Alocasia fornicata* was also determined being a popular side dish in Mizo meals.

6. Development of Portable Agarbati Round Stick Producing Machine

The project is funded by Department of Science and Technology, Government of India at a cost of Rs. 5.99 lakhs. The main objective of this project is to construct an efficient machine, portable and requiring less manpower that could produce high quality bamboo round sticks suitable for agarbati stick, etc., at high production rate. This will indirectly add value to bamboo project in the state through better processing and faster product generation, promote forest-based livelihood activity options for the rural poor by using bamboo as a resource, and establish linkages with local and distant markets for regular supply of agarbati sticks. This project is expected to help reduce the problem of environmental degradation by providing employment through creation of numerous small scale bamboo incense stick industry. The project is taken up in collaboration with local innovator and is now completed. The product of this prototype is found to be satisfactory and could be improved further under field trial.

7. Development of Motor Cycle Trailer Suitable for Hilly Areas

The project is funded by the Department of Science and Technology, Government of India at a cost of Rs. 3 lakhs. The main objectives of the project are: to introduce or intervene scientific technology to uplift the socio-economic problem faced by the people of Mizoram by introducing affordable transportation equipment for transporting agriculture product to the market at lower cost; to assist two wheeler riders by providing modernize and simpler trailer for carrying their luggage and gear easily while journey. The project is taken up in collaboration with local innovator Mr. Jonah L. Pachuau from Ramhlun North, Aizawl. One prototype was proposed to be designed and constructed under this project which had been tested once and was found to be good and could be improved further under field trial.

8. Development of Portable Low-Cost Induction Heater

The project is funded by the Department of Science and Technology, Government of India. The main objectives are: to construct induction heating device that could run solely on rechargeable battery (recharged through solar energy) as well as commercial electric current; to impart more values to metallurgical products of the smiths in terms of price and give them economic advantage in their future; to devise a suitable working model through this proposed device that could solve the inherent problems of the smiths and of the people; to check pollution due to smoke and make environmental friendly devices; to help in minimization of environmental pollution. The project is taken up in collaboration with local innovator namely C. Vanlalawmpuia (Electrical Engineer) and is ongoing.

9. Solar Driven Hybrid Dryer

The project is funded by the Department of Science and Technology, Government of India. The objectives of the Solar Driven Hybrid Dryer are: to construct a hybrid vegetable dryer that could solely run on solar energy while utilizing solar infrared radiation heat itself and the electricity generated through solar cells for generation of microwave and creating partial vacuum pump inside the chamber; to impart more values to agricultural products of the farmers in terms of price, shelf life of products, etc., and give them economic advantage in their future; to devise a sustainable working model through this proposed device that could solve the inherent problems of the farmers. The machines for this project are procured, while the assembling and fabrication processes are still ongoing.

Conclusion

A fundamental need for the development of science and technology is to have partnerships for exchange of people, ideas and support facilities. The Directorate of Science and Technology enhances its relevance to society by developing partnerships with the local community and educational institutions. To meet the needs of the local industries, local research and development programmes are selected as far as possible in order to avoid mismanagement of limited funding. Over the years, the role of local innovators in evolving small or mini-innovative projects has become more and more intense. In-depth and more extensive researches need to be accomplished in several sectors especially technological innovations and biodiversity where the state has greater potential owing to its strategic location.

The programmes and projects implemented by the Directorate of Science and Technology in Mizoram have created platforms for the people to have access towards innovation and entrepreneurship development. These provide a key element for the local entrepreneurs to expand their business ventures within and beyond the state. This could possibly contribute a better source of revenue for the state and henceforth, improve the socio-economic conditions of the state. Therefore, science and technology play a pivotal role in the development of entrepreneurship.

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