CHAPTER 3

RESEARCH METHODOLOGY

3.1. INTRODUCTION

This chapter discusses in detail the research methodology that has been adopted in this study of Entrepreneurship Development in PURA Scheme Villages of Thanjavur District, Tamil Nadu, India. The method that has been adopted in this research was so carefully designed as to go well with the area of inquiry. As the area of study is a rural area where villagers’ cooperation and information were important to us to know the significant changes that have been taking place after the PURA Scheme Implementation. The villagers’ valuable participation will be very much helpful to us to arrive at the findings that will expose the effectiveness of the implemented project by the supporting institutions. Hence, basic statistical and advanced analytical tools have been employed to evaluate villagers’ sentiment towards entrepreneurship development and the prime institutions’ support of the program. The key area of the research was the factors that motivated villagers to take up entrepreneurship as their source of living and the role of the supporting institution in this entrepreneurial development in the PURA Scheme. The literature reviews have assisted the researcher to focus on the type of research method that will be most suitable for this area of study.
3.2 RESEARCH PROBLEM

Periyar Maniammai College of Technology for Woman was started in the year 1988 at Vallam, Thanjavur. The Chairman of the College, Dr K Veeramani launched a Rural Development Programme to uplift the downtrodden villagers that live near the college from penury. The programme involved educating the villagers on the modern technologies that are used in the urban area and to bring them to the rural areas for improving the living standard of the villagers. The visit made by Former President Dr A.P.J. Abdul Kalam to Thanjavur District in year 2003 has brought about a different dimension to the village. He inaugurated a scheme called as ‘PURA’ in the Villages in Thanjavur. PURA stands for “Providing Urbanised Amenities to Rural Area”. The PURA villages have been divided into six clusters. Each cluster was given an activity based on the resources obtainable in the village. The fundamental concept of this project was to educate the villagers on economic growth through available resources. Changing the mindset of the villagers to be self-sustainable through rural entrepreneurship by means of knowledge, economic, electronic and physical connectivity.

Since then, many villagers have started small and medium enterprises. Women in the village have formed self help groups which are very popular among married women. Youth who were school dropouts have taken up skill based training to acquire skills in basic jobs. Villagers have been attending entrepreneurship development programmes. However, no research has been carried out to know the Entrepreneurial activities going on in these clusters of village and their economic growth through this PURA Scheme.
As such research study entitled: “Entrepreneurship Development : A study on the PURA Scheme Villages of Thanjavur District, Tamil Nadu, India” was initiated.

Accordingly, some essential clusters have been identified to study the entrepreneurship development in PURA Villages, particularly in the Thanjavur District namely, Budhalur, Palayapati, Vallam, Veeramarasanpatti, Rayamundanpatti and Achampati.

3.3 THE RESEARCH QUESTIONS

The phenomenon of entrepreneurship development in rural areas has raised several questions:

1. What are the determinants of the entrepreneurship in the study area?
2. What was the supporting institutions’ role in the entrepreneurship development?

3.4 THE RESEARCH OBJECTIVES

This study proposes to address the issue of identifying factors that lead the villagers’ to become entrepreneurs and evaluating the supporting institutions’ role in promoting entrepreneurship in rural areas.

The objectives can thus be stated as follows:

1. To identify the deciding factors that influence entrepreneurship in PURA Villages

2. To substantiate the supporting institutions’ role in the development of PURA Clusters development and its effects
3.5 RESEARCH DESIGN

Research design is the backbone of the entire research process. Since the research problem was well defined and all the variables related to the study are well established, the research fits well as a descriptive research design. The study attempts to confine its framework to Entrepreneurship Development in PURA Villages of Thanjavur District and analyse the factors that influence entrepreneurship and role of the supporting institutions.

3.5.1 Secondary Data

Although the nucleus of the present work is dependent on primary data, the study like any other research work uses some secondary data for better understanding of the study area. As for the secondary information, we have included the historical background of the entrepreneurship development through PURA Scheme as well as rural industrial development of PURA Villages in Thanjavur District. The secondary data was obtained from the Panchayat Offices of the respective villages, Centre for Rural Development-PMU, Periyar Technology Business Incubator, Periyar Organisation for Women Entrepreneurs in Rural Area, Periyar Maniammai University, Thanjavur Collectorate Office, Village Administrative Offices, Village Presidents’ office etc.

3.5.2 Primary Data

We have mentioned the rationale for researching on entrepreneurship development in PURA Villages of Thanjavur District. As such, selection of the district requires no sampling.
3.6 RESEARCH METHOD

Field research method was adopted to collect the necessary data for the studies. Structured questionnaires were used in collecting the data from the villagers. However, to support the findings, secondary data was collected from the library archives, government offices, non-government agencies and supporting institutions.

3.6.1 Questionnaire design

In order to identify the important factors influencing entrepreneurship development, a structured questionnaire has been used to gather primary data (see Appendix A). It was designed to capture and identify factors (such as AGE, GENDER, MARITAL STATUS, EDUCATION, EXPERIENCE, INCOME, Skill Based Training and Entrepreneurship Development Programme) that could influence the entrepreneur’s sustainability in that area. The questionnaires of Subrata D. (2004); Amzad et al (2009); Abel D.A (2009); MacInnis (2004); Lavanya Latha K. (2009); Besnik A.K. (2009) and Nkhor (2004) have been used as guidelines in structuring the questionnaire. According to Casson M (cited in Acs Z J and Audretsch, 2003 p 244), demographic factors were important because few entrepreneurs acquire the breadth of experience needed for high level entrepreneurship until early middle age.

3.6.2 Sampling Procedure

Multi-Stage sampling method has been employed for collection of data. At Stage One, the six clusters of the PURA Village in Thanjavur District (Budhalur, Palayapati, Vallam, Veeramarasanpatti, Rayamundanpatti and Achampati) were chosen. At Stage Two, the number of respondents was established from each village within each cluster. Non-entrepreneurs and
entrepreneurs were identified at stage three. This sampling was conducted with the assistance of Village Co-ordinators (VCO), who were able to identify the suitable respondents in the various villages in each cluster.

Table 3-1
MULTI-STAGE SAMPLING METHOD

<table>
<thead>
<tr>
<th>STAGE ONE</th>
<th>STAGE TWO</th>
<th>STAGE THREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster Name</td>
<td>No. of Response</td>
<td>Village Name</td>
</tr>
<tr>
<td>Budhalur</td>
<td>185</td>
<td>Veerapudayanpatti</td>
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<tr>
<td></td>
<td></td>
<td>Vilvarayanpatti</td>
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<tr>
<td></td>
<td></td>
<td>Ayyasamipatti</td>
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<td></td>
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<td>Maduranpudukkottai</td>
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<tr>
<td></td>
<td></td>
<td>Maruthakudi</td>
</tr>
<tr>
<td>Palayapatti</td>
<td>125</td>
<td>Kadhapatti</td>
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<td></td>
<td></td>
<td>Thurusupatti</td>
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<td></td>
<td></td>
<td>Chidambarampatti</td>
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<td>Thakkantheru</td>
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<tr>
<td></td>
<td></td>
<td>Usilapatti</td>
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<tr>
<td>Vallam</td>
<td>94</td>
<td>Karuvapatti</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monaiyampatti</td>
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<tr>
<td></td>
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<td>Pillayarpatti</td>
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<td>Senampatti</td>
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<td></td>
<td></td>
<td>Thirukkanurpatti</td>
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<tr>
<td>Veeramarasanpatti</td>
<td>74</td>
<td>Avarampatti</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chinnakottarapatti</td>
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<tr>
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<td>Kottarpatti</td>
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<td>Maniayeripatti</td>
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<td></td>
<td></td>
<td>Muthuveerakandiyapatti</td>
</tr>
<tr>
<td>Rayamundanpatti</td>
<td>67</td>
<td>Kamatchipuram</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Keelathiruvilapatti</td>
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<tr>
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<td>Melthiruvilpatti</td>
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<td>Navalur</td>
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<tr>
<td></td>
<td></td>
<td>Velupatti</td>
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<tr>
<td>Achampatti</td>
<td>55</td>
<td>Sengipatti</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nattani</td>
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<tr>
<td></td>
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<td>Malayapatti</td>
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<tr>
<td></td>
<td></td>
<td>Kurumpoondi</td>
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<tr>
<td></td>
<td></td>
<td>Ayothipatti</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>316</strong></td>
<td><strong>284</strong></td>
</tr>
</tbody>
</table>

Source: Centre for Rural Development, PMU, Village Coordinator and Panchayat Office, 2010
3.7 INDEPENDENT VARIABLES OF RESPONDENTS

3.7.1 Preference of Entrepreneurs

The choice of the villagers to become an entrepreneur was the main area of interest in this research work. Villagers in this study area have the option to become an entrepreneur or remain at present status. The alternative of becoming an entrepreneur was determined by several independent variables that may have inspired them to take up entrepreneurship. However, the following variables were examined to know the tendency and commitment by the villagers towards entrepreneurship development:

3.7.2 AGE

Personal characteristics such as age (AGE) have a direct impact on entrepreneurial activities. Older people have been perceived to be less educated and thus tend to face more difficulties in entrepreneurial activities than younger educated villagers (Matungul et al., 2001; Nkhor, 2004). Most of the older villagers who were uneducated lack information on market pricing (Alene et al., 2007). Age is an important factor for entrepreneurship where the younger generation tends to take risk, when venturing into business activities. Pingali et al. (2005) argued that age can often be indicative of experience in farming or selling the farm products, indicating a positive influence on the decision to be entrepreneurially active. According to Storey (1994) an individual’s age has been an important factor influencing the decision to start-up the business and normally the business owners will fall between 25-45 years. Age of the rural women entrepreneur was an important factor in developing rural women entrepreneurship and majority of them started their business at the age of 20-29 years (Punitha, et al, 1999). Hence, the
researcher felt that this variable (AGE) would be revealing the active age group for the entrepreneurship activities that have contributed to the village development. Amzad et al 2009; Abel D.A. 2009; Christine T, 2006; Sharmina A.,2010; Hannu L.and Markku V.,2009; Kamal N., 2009; Giri J.,2006; Naresh Singh and Ashish Mitra, 2007 had used AGE as a factor to analyse the entrepreneur’s performance. So AGE is an important factor for entrepreneurial activities. As such, we have included the AGE as an independent variable.

3.7.3 GENDER

Gender refers to the socially constructed roles, behaviour, activities and attributes that a particular society considers appropriate for men and women (WHO,2011). Researchers, Sharmina A.,(2010) ; Madhavi S., (2010) and Shiralashetti A.S.,(2010) spelled out that women were better gender in engaging in entrepreneurship activities in the rural area. Maire et al., (2004) found that women were more risk averse and in addition, men put much more emphasis on monetary gains than their women counter parts. Brush (1992) argued that women were more family oriented and less keen on setting up business and expansion in related goals. Couples were in better position to start-up a business than singles as result of risk sharing due to economic gain from marriage (Lee, 1999; Maire et al., 2004). Investigators have chosen this variable to validate the native of gender involvement in the study area or to find out any significant issues between the genders and the influence of marital status. As reflected in the literature review, the researchers found that the women were better gender group in entrepreneurial activities. So, in order to confirm the findings, we have added GENDER as an independent variable to know the situation in PURA Scheme Villages.
3.7.4 MARITAL STATUS

Marital status was included in this research to know the influence of marital status of women and men on entrepreneurship development. Women who were married may not undertake the risk to be entrepreneurs as they give more importance to the family (Amzad Hossain et al 2009). According to Babaee E et al (2010) women tend to incline towards entrepreneurship after marriage. Helge Berglann pointed out that being married clearly boosts the entrepreneurship propensity for both men and women. Probable mechanisms behind this relationship are

i) that an employed spouse provides income insurance against the risky return from entrepreneurship,

ii) that a self-employed spouse offers crucial knowledge and networks, and

iii) that a non-employed spouse supplies cheap (non-taxed) and reliable labor (eliminating agency problems).

Helge Berglann et al (2009)

Married couples were able to make effective decisions and they work as a team for entrepreneurial activities. We were eager to know the impact of participation of the married couple on entrepreneurship in the PURA Villages. So we have included MARITAL STATUS as our independent variable.

3.7.5 EDUCATION

Education has been a positive booster in motivating villagers to venture into entrepreneurship. As a result of education villagers, experience an increase in self-confidence
and become more capable of recognizing their strengths. Those who have taken up the required education have ventured into entrepreneurial career and business. Entrepreneurship Development Programmes have been conducted by the government and institutions have provided an awareness among the villagers regarding entrepreneurship. Entrepreneurship education has been significant in many aspects. It can provide villagers with an understanding of business, its purposes, its structure and its interrelationship with other segments of the economy and society. Mohan-Neil (2001) mentioned that people exposed to entrepreneurship education have more favorable views of small business. The growth of the economy and growth of small enterprises was an evidence of the effectiveness of the entrepreneurship programmes (Hayward and Sundes, 2000). On the other hand, Sindu S.N. and Geethakutty (2003) mentioned that lack of technical education has suppressed the growth of entrepreneurs especially in food processing. Food Processing has been one of the businesses among the small scale industries in rural area and the villagers were expected to know the technical aspects of the operation. Current trend of farming is to use high technology based machines that need basic education in operating. Then, education can enhance the managerial ability of an individual and hence increase the propensity to undertake entrepreneurial activity (Bensik A.S.,2009). Educational achievement plays a role in skills and knowledge that are necessary to start and sustain a business (Bates, 1990). Education may enhance farm productivity directly by improving the quality of labour, by increasing the ability to adjust to disequilibria and through its effect upon the propensity to successfully adopt innovations. Education is thought to be very important to farm production in a rapidly changing technological or economic environment (Shultz 1964; 1975). Hence, EDUCATION was included as an independent variable in this study to know whether it has significant effects on entrepreneurship development of farmers in PURA Scheme Villages.
3.7.6 EXPERIENCE

Most of the villagers start-off their venture by experimenting with small business within their vicinity such as. Amla\(^1\) products, cashew nut processing, food and bakery products, tea stalls, masala\(^2\) powder, tailoring, two-wheeler repair workshop, hollow block manufacturing, titles manufacturing, brick manufacturing and any other job that can create income and livelihood for them. Examples of small scale industries which are prominent in rural areas are “blacksmithing, gold-smiting, watch repairing, bicycle repairing, basket weaving, barbing, palm wine tapping, cloth weaving, dyeing, food selling, carpentry, brick-laying, pot-making, leather works and drumming. Jibowo (1992) specified that labor intensive trades were found in urban areas, but they were more prominent in the rural areas. The small businesses have flourished into medium scale businesses where the experiences have helped the villagers in a way to survive in this competitive rural market. Elfenbein et al., (2009) said experience in small firm environment may induce entrepreneurship. Scientists and Engineers initially expressing an interest in entrepreneurship were more likely to choose small firms as initial work places, especially in rural sector where the overhead cost is reasonably low compared to urban sector. Sussie M.,(2009) added that family has strong influences not only on family members becoming entrepreneurs but also in terms of continuing their entrepreneurial activities. Hence, EXPERIENCE was included as an independent variable in this study to know whether it has significant effects on entrepreneurship development of the farmers in PURA Scheme Villages.

\(^1\) Indian gooseberry, called amla in Hindi. Amla is the size of a lemon, spherical, bitter and yellow-green. The fruit is rich in Vitamin C and has medical value for diabetics and other diseases

\(^2\) Masala powder (also known as curry powder), is an exotic spice mixture consisting of among others: funugreek, cumin, tumeric and coriander. Sometimes additional ingredients such as ginger, garlic, cinnamon clove, mustard seed, green cardamom, black cardamom, nutmeg, red pepper and black pepper are added. It is commonly used in the East-Indian cuisine but also in that of the West Indies and Surinam. Although basically the same, masala powder from Surinam is an aromatic blend that is more flavored, spicier and tastier! Use it in fish, chicken and vegetable dishes
3.7.7 SKILL BASED TRAINING (SBT)

Many examples of successful rural entrepreneurship have been mentioned in literature review. Diversification into non-agricultural uses of available resources such as catering for tourists, blacksmithing, carpentry, spinning, etc. as well as diversification into activities other than those solely related to agricultural usage, for example, the use of resources other than land such as water, woodlands, buildings, available skills and local features, all fit into rural entrepreneurship. The entrepreneurial combinations of these resources are, for example, tourism, sports and recreation facilities, professional and technical training, retailing and wholesaling, industrial applications (engineering, crafts), servicing (consultancy), value added products from meat, milk, wood, etc. and the possibility of off-farm work.

The villagers were given training on carpentry, plumbing, masonry and electrical repairs with a view to inculcating skill in the villagers to start-up a business of their own. The courses normally last for three to six months. Industrial training was given to youth who have not completed the 10th Standard education. This training would provide the unemployed youth an employment in the industries within the vicinity of the village e.g. Thanjavur, Thiruvembur, Thuvakodi Thiruchirapalli etc. In addition, training on maintenance of water pump sets, field-ploughing machines, electrical motors and diesel-powered machines were taught to the villagers to educate them in technical know-how. Hence, SKILL BASED TRAINING was included as an independent variable in this study to know whether it has significant effects on entrepreneurship development of the farmers in PURA Scheme Villages.
3.7.8 ENTREPRENEURSHIP DEVELOPMENT PROGRAMME (EDP)

The EDPs were offered by both the Government organisations and non-organisations (NGOs). Initially, the Small Industries Extension and Training Institute (SIET), Hyderabad selected 52 young persons in 1971 from business and industrial community and offered a three month training programme and motivated the participants to be entrepreneurs. This was the humble beginning of a massive programme in entrepreneurial development. At present, there are about 686 all India and State Level financial institutions and public sector banks such as Indian Bank, Canara Bank, State Bank of India etc. conducting EDPs. Joining them were the educational institutions, conducting short and the long term entrepreneurial development programmes.

Entrepreneurial training was provided through Entrepreneurship Development Programmes. The main aim and objectives of EDPs were:-

- To attract people to entrepreneurship development programmes through effective promotion
- To make people aware of the various available business opportunities
- To motivate and strengthen entrepreneurial quality
- To develop the course content and the curriculum of the programme, keeping in view the characteristics and the factors influencing entrepreneurs’ growth
- To develop management related skills like problem solving, decision making, communication, opportunity identification, interpersonal relationship, team building etc.
- To make participants aware of the various laws, procedures, etc, relating to entrepreneurship
To develop passion and interest in entrepreneurship

To conduct research and study on the effectiveness of the various programme and schemes and market potential of various business opportunities etc

The Entrepreneurship Development Programmes were conducted for the villagers to enlighten them on entrepreneurship and to train them to manage their production. Periyar Technological Business Incubator and Periyar Organisation for Women Enhancement Renaissance have been conducting Entrepreneurship Development Programmes periodically to the villagers who were interested in starting a business or to market their product in the open market. Laura Galloway (2007) pointed out that lack of enterprise skill and limitation of technology in rural areas prevent the entrepreneurs from excelling in business. Jarkko Prysiainen, et al. (2006) states that farmers need to be educated in entrepreneurship skill in order to become successful in entrepreneurship. Hence, EDUCATION was included as an independent variable in this study to know whether it has significant effects on the entrepreneurship development of the farmers in PURA Scheme Villages.

3.7.9 INCOME

India’s rural population of 74 per cent has 58 per cent of the country’s total disposable income. The rural markets also indicate increasing incomes, with agricultural output increasing from 176 million tonnes in 1991 to 215 million tonnes in 2004 (IBEF,2004) The agriculture development programmes of the government and institutions have contributed to greater purchasing power in rural markets. The income has gone up from ₹2000 to ₹5000 per month in average due to the burst of entrepreneurship activities among the villagers in Vallam, Thanjavur (Rajasekaran D. 2008). Pre-transition family income plays a crucial role in the start-up decision
of business ventures because the families that have been able to accumulate wealth have not been financially constrained (Earle and Sakova 1999). Although agriculture today still provides income to rural communities, rural development has been increasingly linked to enterprise development. National economies have been influenced by globalisation and competition has been intensifying at an unprecedented pace. This has affected not only the industry but also all economic activities including agriculture. Nevertheless, rural entrepreneurship has been gaining in its importance as a force of economic change. Looking at the requirement, PURA Scheme has implemented many programmes to ensure that the environment in the villages has the required substance to allow the villagers to involve in entrepreneurship activities. According to Panchayat Raj Report (2010-2011), the creation of such an environment started at the national level with the foundation policies for macro-economic stability, well-defined property rights and international orientation. National agricultural policies such as price subsidies to guarantee minimum farm incomes and the keeping of land in production when over-production already exists were definitely counter-productive to entrepreneurship. With sound policies in place, the income of the entrepreneurs has been gradually increasing and their businesses were able to sustain in the competitive market. Hence, the independent variable INCOME was included in our research work to estimate the earning power of the entrepreneurs in the PURA Schemed Village.
3.7.10 ROLE OF SUPPORTING INSTITUTION\textsuperscript{3} IN ENTREPRENEURSHIP DEVELOPMENT

Rural development is more than ever before linked to entrepreneurship. Institutions and individuals promoting rural development now see entrepreneurship as a strategic development intervention that could accelerate the rural development process. Furthermore, institutions and individuals seem to agree on the urgent need to promote rural enterprises. Development agencies see rural entrepreneurship as an enormous employment potential. Politicians see it as the key strategy to prevent rural unrest. Farmers see it as an instrument for improving farm earnings. Women see it as an employment possibility near their homes which provides autonomy, independence and a reduced need for social support.

A multi-dimensional view of Entrepreneurship, the linkage of university-industry that includes education and collaborative research, is now recognised as one of the most important issues for revitalising industries. (Jin-ichiro Y., 2004) Attention is being focused on the roles of local universities for encouraging start-ups and improving the innovativeness of localites themselves (Branscomb et al., 1999). Universities play a key role in accumulating high quality knowledge. They form a central part of regional industrial clusters where various entrepreneurial activities are performed. University-Industry relationships are three dimensional, linking education, research and business creation. Likewise, Periyar Maniammai University situated in Vallam, Thanjavur has been selected to correlate the programmes that have been conducted for the villages and their outcome. Kolawole O. D. and Torimiro D.O. (2005) measure the

\textsuperscript{3} Institution referred as :-

\textbf{Government Bodies} - (State Industries Promotion Council of Tamil Nadu (SIPCOT), National Institute of for Entrepreneurship and Small Business Development (NIESBUD), Small Industries Service Institutions (SISI), Small Industries Development Corporation (SIDCs), Technical consultancy Organisations (TCOs), Industrial and Technical Consultancy Organisation of Tamil Nadu (ITCOT), and Khadi and Village Industries Commission (KVIC).

\textbf{Banks} - Industrial Development Bank of India (IDBI), Industrial Finance Corporation of India Ltd (IFCI), Industrial credit and Investment Corporation of India Ltd (ICICI), Industrial Investment Bank of India Ltd (IIBI), Infrastructure Development Finance Company (IDFC), Small Industries Development Bank of India Ltd (SIDBI), National Bank for Agriculture and Rural Development (NABARD) and Export-Import Bank of India (Exim Bank).

\textbf{Universities/Centres} - Periyar Maniammai University, Centre for Rural Development-PMU, Periyar Technology Incubator,

\textbf{Industries} - Bharat Electrical Limited Small Scale Industries Association,
institutional factors by the availability of such facilities as postal services, financial institutions, health facilities and the roles of government in the promotion of rural entrepreneurship development. Goldmark and Rosengard (1981) specified that the entrepreneurship development programmes have various components such as financial assistance, training, technology, marketing, general research services, institutional brokering and raw materials and other inputs/services supply to improve the knowledge of the villagers. The term “entrepreneurial university” was coined by Etzkowitz (1998) to describe instances in which universities have proven themselves critical to regional economic development. Yanfeng Zhang and Chulin Si, (2008) mentioned that universities not only provide a source for technical expertise for society, but offer an educational facilities for the local communities and local enterprises to acquire wealth and tacit knowledge. Kharbanda, (2001) said that the Indian Government is promoting the use of linkages between the SME and technology support institutions to aid in development and usage of new technology. Periyar Maniammai University has been the prime supporting institution for the PURA Scheme programme. The university has been supported by Centre for Rural Development (CRD), Periyar Technological Business Incubator (PTBI) and Periyar Organisation for Women Empowerment and Renaissance (POWER). These supporting institutions have been organizing entrepreneurial activities for the PURA Scheme Villages to update the villagers on the Government Policies, financial schemes and marketing opportunities.
3.8 STATISTICAL TOOLS USED FOR ANALYSIS

Statistical tools have been used in this research to verify the outcome of the PURA Scheme in Villages in Thanjavur District. Statistical Tools are one of the methods to analyse the independent variables in scientific manner. The following tools were used in this research work:

3.8.1 Reliability

Reliability tells how accurately and precisely the measurement is made on a certain variable by a research instrument. The lower the errors, the higher is the reliability of the instrument. Cronbach’s Alpha is a reliability measure.

\[
\text{Cronbach’s alpha, } \alpha = k \left[ 1 - \frac{\sum s_i^2}{s_t^2} \right]
\]

\[
\frac{k}{k-1}
\]

\(k = \text{Number of items in the questionnaires}\)

\(s_i^2 = \text{Overall variance of the questionnaires}\)

\(s_t^2 = \text{Variance for } i^{th} \text{ item in the questionnaires}\)

3.8.2 HYPOTHESIS CHI-SQUARE TEST

Chi-square test enables the researcher to determine whether an observed pattern of frequencies corresponds to or fits in an expected pattern

The formula is

\[
X^2 = \frac{\sum (O_i - E_i)^2}{E_i}
\]

\(O = \text{observed frequencies}\)

\(E = \text{expected frequencies}\)

Calculation of expected value = (row x column total) / grand total

Degree of freedom = \((r - 1) \times (c - 1)\)
r = Number of rows

\( c = \text{Number of columns} \)

If the calculated value is less than the table value, the null hypothesis is accepted which means that there is no significant association between independent variable (AGE, GENDER, MARRIAGE, INCOME, EXPERIENCE, EDUCATION, SBT and EDP and entrepreneurship.

The frequency mean is equally distributed throughout the population. It means that the people in a village have chosen entrepreneurship based on certain determinants of being in a business in that village as entrepreneur. This also goes well with correlation coefficient analysis with respect to entrepreneurship to be opted as a career by the villagers. Shanthi Nachiappan and Shanti N. (2007) and Naresh Singh and Ashish Mitra (2007) have used the chi-square test to determine significance of the variables obtained from the research.

### 3.8.3 Pearson’s Coefficient of Contingency (COC)

Coefficient of Contingency is used in determining the strength of relationship between the variables. The Pearson's contingency coefficient is one method to provide an easier way to interpret its strength of association. Specifically, it is:

\[
\text{Pearson’s Coefficient} = \sqrt{\frac{T}{N + T}}
\]

where

- \( T = \text{the chi-square test statistic given above} \)
- \( N = \text{the total sample size} \)
This statistic basically scales the chi-square statistic to a value between 0 (no association) and 1 (maximum association). It has the desirable property of scale invariance.

3.8.4 F-TEST

The F-test in one-way analysis of variance is used to assess whether the expected values of a quantitative variable within several pre-defined groups differ from each other. Most F-tests arise by considering a decomposition of the variability in a collection of data in terms of sums of squares. The test statistic in an F-test is the ratio of two scaled sums of squares reflecting different sources of variability. These sums of squares are constructed so that the statistic tends to be greater when the null hypothesis is not true. In order for the statistic to follow the F-distribution under the null hypothesis, the sums of squares should be statistically independent, and each should follow a scaled chi-squared distribution. The purpose of the F-test is to ensure that the distribution of the collected data is significant. It acts as additional test after Chi-Square Test.

3.8.5 MULTIPLE REGRESSION ANALYSIS

Multiple regression analysis is a method for explanation of phenomena and prediction of future events. A coefficient of correlation between variables $X$ and $Y$ is a quantitative index of association between these two variables. Its squared form, the coefficient of determination, indicates the amount of variance (information) in the criterion variable $Y$ which is accounted for by the variation in the predictor variable $X$. A multivariate counterpart of the coefficient of determination is the coefficient of multiple determination, $R^2$. In multiple regression analysis, the set of predictor variables $X_1, X_2, \ldots, X_n$ is used to explain variability of the criterion variable
When there two or more than two independent variable, the analysis concerning relationship is known as multiple correlation and the equation describing such relationship is the multiple regression equation

Multiple Regression equation assumes the form:-

\[ Y = a + b_1X_1 + b_2X_2 \ldots b_nX_n \]

Where \( X_1 \) and \( X_2 \) are two independent variables and \( Y \) is the dependent variable, and \( a, b_1 \) and \( b_2 \) are the constant.

### 3.8.6 CROSS TABULATION ANALYSIS

Cross tabulation analysis, also known as contingency table analysis is most often used to analyze categorical (nominal measurement scale) data. A cross-tabulation is a two (or more) dimensional table that records the number (frequency) of respondents that have the specific characteristics described in the cells of the table. Cross-tabulation tables provide a wealth of information about the relationship between the variables. Alan T B et al (2010), Fredrick Z and Jan S A (2010), Katerina K S et al (2009), Helen W F et al (2009), Robert A O (2006); Laura G et al (2005) and Lloyd T et al (2003) have used cross tabulation to correlate their findings and the results were remarkable. Likewise, we have chosen this valuable advanced statistical tool. In addition, our research was based on clusters of villages and we found this tool would be suitable in our evaluation.
3.8.7 K-MEAN CLUSTER ANALYSIS

The \textit{k-means clustering} is a method of cluster analysis which aims to partition \( n \) observations into \( k \) clusters in which each observation belongs to the cluster with the nearest mean. Given a set of observations \((x_1, x_2, \ldots, x_n)\), where each observation is a \( d \)-dimensional real vector, \( k \)-means clustering aims to partition the \( n \) observations into \( k \) sets \((k \leq n)\) \( S = \{S_1, S_2, \ldots, S_k\} \) so as to minimize the within-cluster sum of squares (WCSS):

\[
\text{arg min}_S \sum_{i=1}^{k} \sum_{x_j \in S_i} ||x_j - \mu_i||^2
\]

where \( \mu_i \) is the mean of points in \( S_i \).

Looking at the sample population that has been taken for the study, we wanted to know the majority’s sentiments towards the PURA Scheme and its effectiveness. The K-Mean Cluster technique was appropriate in our study. Furthermore, the five point scale that was used in the questionnaire can easily define the response from the villagers through this technique.

3.9 HYPOTHESES STATEMENT

The following hypotheses are structured to know the significance of the variables that effect the entrepreneurship development in PURA Scheme Village.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Hypotheses Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>( H_0 ) Age and Entrepreneurship Development in PURA Scheme Village are independent  ( H_1 ) Age and Entrepreneurship Development in PURA Scheme Village are not independent</td>
</tr>
<tr>
<td>H2</td>
<td>( H_0 ) Gender and Entrepreneurship Development in PURA Scheme Village are independent  ( H_1 ) Gender and Entrepreneurship Development in PURA Scheme Village are not independent</td>
</tr>
<tr>
<td>H3</td>
<td>( H_0 ) Marital Status and Entrepreneurship Development in PURA Scheme Village are independent  ( H_1 ) Marital Status and Entrepreneurship Development in PURA Scheme Village are not independent</td>
</tr>
<tr>
<td>H4</td>
<td>( H_0 ) Experiences and Entrepreneurship Development in PURA Scheme Village are independent  ( H_1 ) Experiences and Entrepreneurship Development in PURA Scheme Village are not independent</td>
</tr>
</tbody>
</table>
3.8 RESEARCH CONCEPTUAL MODEL

The research conceptual model was designed to visualize the research process examining the relationship between the independent variables and dependent variables.

**Independent Variables**
- AGE
- GENDER
- MARITAL STATUS
- EDUCATION
- EXPERIENCE
- INCOME
- SKILL BASED TRAINING (SBT)
- ENTREPRENEURSHIP DEVELOPMENT PROGRAMME (EDP)
- KNOWLEDGE CONNECTIVITY
- ECONOMIC CONNECTIVITY
- ELECTRONIC CONNECTIVITY
- PHYSICAL CONNECTIVITY

**Dependent Variables**
- The determinant of Entrepreneurs
- Role of Supporting Institution

H5: Education and Entrepreneurship Development in PURA Scheme Village are independent
H1: Education and Entrepreneurship Development in PURA Scheme Village are not independent

H6: Income and Entrepreneurship Development in PURA Scheme Village are independent
H1: Income are not a cause for Entrepreneurship Development in PURA Scheme Village are not independent

H7: Skill Based Training and Entrepreneurship Development in PURA Scheme Village are independent
H1: Skill Based Training and Entrepreneurship Development in PURA Scheme Village are not independent

H8: Entrepreneurship Development Programme and Entrepreneurship Development in PURA Scheme Village are independent
H1: Entrepreneurship Development Programme and Entrepreneurship Development in PURA Scheme Village are not independent

H9: Supporting Institution and Entrepreneurship Development in PURA Scheme Village are independent
H1: Supporting Institution and Entrepreneurship Development in PURA Scheme Village are not independent
The research conceptual model was designed to visualize the research process examining the relationship between the independent and dependent variables

3.9 SUMMARY

The research methodology for this study was designed to carry out the research work systematically. Sampling of the population was carefully chosen to have equal participation among the villages in the PURA Scheme village. The factors that made the villagers to take up entrepreneurship as a career were identified as Independent variables. Knowledge Connectivity, Economic Connectivity, Electronic Connectivity and Physical Connectivity were chosen to examine the effects of the PURA Scheme in the village.

Statistical tools that have been proposed in this study were cautiously selected to ensure accuracy in the findings. Advanced statistical tools have been used in this study. Literature review has assisted us on the choice of the type of statistical tools that could be used in our study.