

A STUDY ON WORKING OF GENERAL ENGINEERING CLUSTER IN KERALA

Thesis

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By

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DECLARATION

I hereby declare that this thesis entitled “**A STUDY ON WORKING OF GENERAL ENGINEERING CLUSTER IN KERALA**” is a bonafide record of research work done by me under the guidance of **Dr. P. M. Habeeburahiman**, Associate Professor (Retd.), Department of Commerce and Management Studies, PSMO College, Tirurangadi (Affiliated to the University of Calicut). I also declare that this thesis has not previously formed the basis for the award of any degree, diploma, fellowship or other similar title of this or recognition of any other university or institution.

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CERTIFICATE

This is to certify that the thesis entitled “**A STUDY ON WORKING OF GENERAL ENGINEERING CLUSTER IN KERALA**” is a bonafide record of research work carried out by **SREEKALA T** under my supervision and guidance for the award of Ph.D. Degree of the University of Calicut. No part of the thesis has been presented for the award of any degree, diploma, or other similar title or recognition of any other university or institution before.

She is permitted to submit the thesis to the University of Calicut.

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29/12/2022

Dr. P. M. Habeeburahiman
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CONTENTS

List of Tables

List of Figures

List of Abbreviations

Chapter	Title	Page No.
1.	Introduction	1 – 34
2.	Review of Literature	35 – 61
3.	Industrial Cluster -Theoretical Framework	61 – 101
4.	Status of Industrial Units in General Engineering Cluster	102 – 154
5.	Perception of Unit holders towards Industrial Clustering	155 – 182
6.	Linkage of Unit holders with Other parties	183 – 202
7.	Institutional Support to Industrial Cluster	203 – 222
8.	Summary, Findings, Suggestions and Conclusion	223 – 246
	Bibliography	i – xii
	Appendices	i – xxii

LIST OF TABLES

Table No.	Title	Page No.
1.1	Variables for Measuring Various Aspects of the Unit	16
1.2	Variables for Measuring Perception	18
1.3	Variables for measuring linkage	20
1.4	Reliability Statistics	21
3.1	Number of MSMEs (Activity Wise) (In lakh)	76
3.2	Percentage distribution of enterprises owned by Male or Female entrepreneurs (category-wise).	76
3.3	Percentage Distribution of Enterprises owned by male or female in rural and urban areas.	77
3.4	Estimated Employment in the MSME Sector (Activity Wise)	78
3.5	Distribution of employment by type of Enterprises in Rural and Urban Areas (Numbers in lakh)	78
3.6	Funding pattern under this scheme for setting up CFCs	84
3.7	The funding pattern of projects located in the Aspirational Districts, NER, Hill States and islands	84
3.8.	The funding pattern of projects	85
3.9	The funding pattern of projects located in the Aspirational Districts, NER, Hill States and islands	85
3.10	State Level Steering Committee (SLSC)	86
3.11	National Project Approval Committee (NPAC)	87
3.12	Year wise achievement in CFC and ID Project	88
3.13	Statement of funds sanctioned under MSE-CDP from 2014-15 to 22/04/2022	89
3.14	Status of Activities under MSE-CDP 2021-22	91
3.15	CFC Projects - On going	93
3.16	Industrial clusters under SFURTI	94
4.1.	Frequency Distribution – Age	103
4.2	Frequency Distribution - Educational Qualifications	104

Table No.	Title	Page No.
4.3.	Frequency Distribution - Technical Qualification	104
4.4.	Frequency Distribution – Community	105
4.5	Frequency Distribution – Religion	105
4.6.	Frequency Distribution - Place of Domicile	106
4.7	Frequency Distribution - Marital Status	106
4.8.	Frequency Distribution – Experience	107
4.9	Frequency Distribution – Generation	107
4.10.	Frequency Distribution- Training Programmes	108
4.11.	Frequency Distribution - Type of Units	109
4.12.	Frequency Distribution – Age	109
4.13.	Frequency Distribution - Type of activity	110
4.14.	Frequency Distribution- Industrial Classification	111
4.15.	Frequency Distribution- Invested Capital	111
4.16.	Frequency Distribution -Value of Fixed Assets	112
4.17	Frequency Distribution -Value of Current Assets	113
4.18.	Frequency Distribution -Sufficiency of Working Capital	113
4.19.	Frequency Distribution -Source of Fund	114
4.20.	Frequency Distribution-Repayment	114
4.21.	Frequency Distribution-Perception about Interest	115
4.22.	Frequency Distribution -Profitability	116
4.23	Frequency Distribution -Status of Building	116
4.24	Frequency distribution-Additional Production Facility	117
4.25	Frequency Distribution -Number of Machines Installed	118
4.26	Frequency distribution-Requirement of Installed Machines	118
4.27	Frequency distribution-Utilisation of Machinery	119
4.28	Frequency Distribution -Nature of Ownership of Storage	119
4.29	Frequency distribution- Nature of Vehicle	120
4.30.	Nature of Ownership of Vehicles	121

Table No.	Title	Page No.
4.31	Frequency Distribution- Quality Checking Facilities	121
4.32	Frequency Distribution-Availability of Power Supply	122
4.33	Frequency Distribution-Facilities Available	123
4.34	Frequency Distribution -Processing	123
4.35	Frequency Distribution -New product/technology	124
4.36	Research and Development	124
4.37	Frequency Distribution -Brand name	125
4.38	Frequency Distribution -Brand Promotion	126
4.39	Frequency Distribution -Marketing	126
4.40	Frequency Distribution -Coverage	127
4.41	Frequency Distribution -Competition	127
4.42	Frequency Distribution-First-aid Facility	128
4.43	Frequency Distribution- Fire Safety	129
4.44	Frequency Distribution -Volume of Production	130
4.45	Frequency Distribution - Cost of Production	131
4.46	Frequency Distribution - Quality Improvement	131
4.47	Frequency Distribution -Man Power	132
4.48	Frequency Distribution -Upgradation of Product	133
4.49	Frequency Distribution- Sales Value	133
4.50	Frequency Distribution -Profitability	134
4.51	Frequency Distribution- Cost of Inputs	135
4.52	Frequency Distribution-Economies of Scale	135
4.53	Frequency Distribution -Availability of Manpower	136
4.54	Frequency Distribution - Skill Improvement	137
4.55	Frequency Distribution -Training Facility	137
4.56	Frequency Distribution -Performance Improvement	138
4.57	Frequency Distribution-Absenteeism	138
4.58	Frequency Distribution-Wage Level	139

Table No.	Title	Page No.
4.59	Age with performance	140
4.60	Relationship between Performance and Educational Qualification	141
4.61	Experience and Performance of the units	142
4.62	Generation and Performance	144
4.63	Training Programmes attended and Performance	145
4.64	Type of Unit and Performance of the unit	146
4.65	Age of the Unit and Performance	147
4.66	Financial Aspects and Performance of the units	149
4.67	Infrastructural Aspects and Performance	151
4.68	Marketing Aspects and Performance	153
5.1	Perception of unit holders towards industrial clustering	156
5.2	Age with perception towards industrial clustering	158
5.3	Educational qualification with perception towards industrial clustering	159
5.4	Technical qualification with perception towards industrial clustering	159
5.5	Place of domicile with perception towards industrial clustering	160
5.6	Experience with perception towards industrial clustering	161
5.7	Generation with perception towards industrial clustering	161
5.8	Training programme with perception towards industrial clustering	162
5.9	Analysis of the perception of unit holders towards the support of CFC	163
5.10	Age with perception towards the support of CFC	164
5.11	Educational Qualification with perception towards the support of CFC	165
5.12	Technical Qualification with perception towards the support of CFC	166
5.13	Place of Domicile with perception towards the support of CFC	166
5.14	Experience with perception towards the support of CFC	167

Table No.	Title	Page No.
5.15	Generation with perception towards the support of CFC	168
5.16	Technical Qualification with perception towards the support of CFC	168
5.17	Analysis of the perception of unit holders towards the support of Government	169
5.18	Age with perception towards the support of Govt.	170
5.19	Educational Qualification with perception towards support of Govt.	171
5.20	Technical Qualification with perception towards the support of Govt.	172
5.21	Place of Domicile with perception towards the support of Govt.	172
5.22	Experience with perception towards the support of Govt.	173
5.23	Generation with perception towards the support of Govt.	174
5.24	Training programmes attended with perception towards the support of Govt.	175
5.25	Age with perception towards industrial clustering	176
5.26	Educational Qualification with perception towards industrial clustering	176
5.27	Technical Qualification with perception towards industrial clustering	177
5.28	Place of domicile with perception towards industrial clustering	178
5.29	Experience with perception towards industrial clustering	178
5.30	Generation with perception towards industrial clustering	179
5.31	Training programmes with perception towards industrial clustering	180
6.1	Linkage of unit holders with sub-contractors	185
6.2	Demographic variables of the units and Linkage with Sub-contractors	186
6.3	Relationship between the performance of the units and the linkage with sub-contractors	187
6.4	Linkage of unit holders with suppliers	188
6.5	Demographic variables of the units and linkage with suppliers	190

Table No.	Title	Page No.
6.6.	Relationship between the performance of the units and linkage with suppliers	191
6.7	Linkage of unit holders with buyers	192
6.8	Demographic variables of the units and linkage with buyers	193
6.9	Relationship between the performance of the units and linkage with buyers	195
6.10	Linkage of unit holders with other units	196
6.11	Demographic variables of units and linkage with other units	197
6.12	Relationship between the performance of the units and linkage with other units	198
6.13	Relationship between Performance and Linkage	199
7.1	Performance of MECON CFC (in numbers)	209
7.2.	Revenue of the MECON CFC	211
7.3.	Support of Kerala Iron Fabrication & Engineering Unit Association (KIFEUA)	216
7.4	Students contacted for Apprentice Training-2021-2022	217

LIST OF FIGURES

Table No.	Title	Page No.
4.1	Age with performance of units	140
4.2	Educational Qualification and Performance	142
4.3	Experience and Performance of the unit	143
4.4	Generation and Performance of the unit	144
4.5	Training Programmes attended and Performance	145
4.6	Type of Unit and Performance	147
4.7	Age of the Unit and Performance	148
6.1	Demographic variables of the units and Linkage with Sub-contractors	186
6.2	Relationship between Performance of the unit and Linkage with Sub-contractors	188
6.3	Demographic variables of the units and linkage with suppliers	190
6.4	Relationship between the performance of the units and Linkage with suppliers	192
6.5	Demographic variables of the units and linkage with buyers	194
6.6	Relationship between Performance of the unit and Linkage with buyers	195
6.7	Demographic variables of the units and linkage with other units	198
6.8	Relationship between performance of the unit and linkage with other units	199
7.1	Performance of MECON CFC	210
7.2	Revenue of CFC (in Lakh)	211

LIST OF ABBREVIATIONS

MSME	:	Micro, Small and Medium Enterprise
DIC	:	District Industrial Centre
IC	:	Industrial cluster
CDP	:	Cluster Development Programme
SME	:	Small and Medium Enterprises
IHCDP	:	Integrated Handloom Cluster Development Programme
SICDP	:	Small Industry Cluster Development Programme
CFC	:	Common Facility Centre
K-BIP	:	Kerala Bureau of Industrial Promotion
MSE-CDP	:	Micro and Small Enterprise -Cluster Development Programme
BDS	:	Business Development Service
UNIDO	:	United Nations Industrial Development Organisation
CDE	:	Cluster Development Executive
CDA	:	Cluster Development Agent
CFC	:	Common Facility Centre
IID	:	Integrated Infrastructural Development Scheme
DPR	:	Detailed Project Report
EDI	:	Entrepreneurship Development Institute
FYP	:	Five Year Plan GOI Government of India
IIE	:	Indian Institute of Entrepreneurship
NIC	:	National Industrial Classification
MELE	:	Ministry of Economy, Labour and Entrepreneurship
CFCA	:	Central Finance and Contracting Agency
NSIC	:	National Small Industries Corporation
KVIC	:	Khadi and Village Industries Commission
MGIRI	:	Mahatma Gandhi Institute for Rural Industrialisation

NIESBUD	:	National Institute for Entrepreneurship and Small Business Development
NI-MSME	:	National Institute for Micro, Small and Medium Enterprises
NRC	:	National Resources Centre
TCs	:	Technology Centres
ID	:	Infrastructural Development
SLSC	:	State Level Steering Committee
NAPC	:	National Project Approval Committee

1.1. Background of the study

Cluster-based economic development has become a sort of a mantra in policy discourses dealing with various areas related to anything that touches upon regional development, competitiveness, innovation, entrepreneurship, and Small and Medium Enterprises (SMEs) development for policymakers and economic development professionals (Kozovska, 2010). There is an increasing acceptance that economic growth emerges from fruitful cooperation among economic actors that form innovative complexes of firms and organizations generally referred to as clusters (Hodgkinson, 2007).

The Cluster-based approach is initially developed as a tool for entrepreneurial growth, now it is considered the basis of many industrial and local system policies. (Boufaden, Lourimi, & Torre, 2009). Industrial clusters were visualized as models of flexible specialization, where efficiency and adaptability of production could be enhanced by taking advantage of the economies of scale and scope in local/regional /sectoral settings (Kurian, 2005).

Industrial clusters can be defined as geographically proximate groups of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. It is a group of spatially concentrated entrepreneurs who simultaneously compete and cooperate in specific areas, interconnected with supporting organizations such as educational and research institutions, government and public agencies, trade associations, and others. (Bialic & Pavelkova, 2010)

Clusters offer many specific benefits to participating companies, such as economies of scale, reduced costs, faster transfer of information & technologies, and

enhanced innovation. In addition, it may increase the power and voice of smaller companies and encourage government investment in the specialized infrastructure, moreover providing effective interconnection and partnership. Trust and willingness to co-operate are important aspects of cluster success (Jircikova, 2010). A cluster approach is based on the rationale that joint actions allow stakeholders to overcome limitations and reap benefits beyond their individual capacities.

In the cluster, companies operate in a common field, and their production is often mutually complementary. Together, they can respond to market changes more quickly and meet customers' more exacting requirements. In addition to sharing marketing activities, better and faster access to information and new technologies are providing better opportunities for the companies to develop rapidly. Furthermore, cooperative efforts within a cluster can help to reduce costs and take advantage of economies of scale. Moreover, the cluster as a group of companies possesses stronger negotiating power in sales and purchases and has great potential to receive government support (Bialic & Pavelkova, 2010).

The origin of the cluster approach can be traced back to the work of economist Alfred Marshall in 'Principles of Economics' (1890), who described it as 'the concentration of specialized industries in particular localities' and noted that these small-business agglomerations experienced economies of scale comparable to large firms. In the late 1970s, the concept again emerged as a new model of the industrial organization and in 1990, Michael Porter made the concept more popular with his book 'The Competitive Advantage of Nations'. After that, clusters have become hubs of innovation and drivers of economic growth (Ceglie, 2010).

UNIDO adopted the Cluster development project in 1995 to stimulate economic growth in developing countries. As a result, several developing countries have adopted UNIDO's Cluster development programmes. The aim of this program is to strengthen the competitive advantage of under-achieving SSE clusters. Identifying the collective competitive advantage of particular clusters and building local capabilities to realize it, were the goals of the strategy. It was done by partnering with the broadest range of cluster actors, such as producers' associations, SSE owners, BDS

providers, local policymakers, etc. The government of India adopted the Cluster Development Programme in 1996 (Ittyerah, 2009)

In 2003, the Kerala Government adopted cluster development as a postulate in their Industrial Policy. According to the Industrial Policy 2003, clusters of industrial units would be promoted with the help of financial institutions, and skill development would be facilitated through common facility centres. The sector was to be centralized in terms of production, marketing, design, and quality control. The Kerala government proposed clusters in different sectors to bring entrepreneurs who produced similar products and belonged to the same locality together with common facilities. Through this arrangement, the MSMEs were expected to reduce their relative isolation and strengthen their links with other cluster members, allowing them to coordinate their actions and pool their resources for a common purpose. It includes setting up Common Facility Service Centres (CFCs), creating a common brand for export markets, creating common purchasing practices, and establishing mutual guarantees (Cherukara & Manalel, 2007).

1.1.1. MSME Sector and Industrial clusters

MSME sector is a significant and vibrant sector in Indian economy. It contributes much to the economic and social development of the country. This sector provides large employment opportunities with lower capital. It leads to the industrialization of the rural and urban area and thereby reduce regional imbalances. This sector is an important contributor to the Gross Domestic Product of the country and its export. MSMEs are complementary to large industries as ancillary units and contribute to inclusive industrial growth. (Annual report of MSME 21-22 and Economic Review 2021)

Ministry of MSME provides various measures for the growth and development of the MSME sector including khadi, village, and coir industries in cooperation with concerned Ministries, State governments, and other departments (Economic Review 2021). The Micro Small and Medium Enterprises Development (MSMED) Act 2006 was enacted by the Government of India with the aim of facilitating the promotion, development and enhancing the competitiveness of

MSMEs. It describes the concept of enterprise which include both manufacturing and service industries. It describes the coverage and investment ceiling of MSMEs and on this basis, enterprises are classified as micro, small and medium (<https://msme.gov.in/about-us/about-us-ministry>).

The MSME sector in India includes micro, small, and medium industries of different sizes and products, which employs different levels of technology. The contribution of the MSME sector to the economy is very significant. The 73rd round of National Sample Survey data for 2015-16, reported that there were 633.88 lakh unincorporated non-agricultural MSMEs in the country which are engaged in different types of economic activities. Out of this 31% were found to be engaged in manufacturing activities, 36 % in trading activities, and 33 % in other services excluding those MSMEs registered under (a) Sections 2m(i) and 2m(ii) of the Factories Act, 1948, (b) Companies Act, 1956 and (c) construction activities falling under Section F of National Industrial Classification (NIC) 2008 (Annual report, 2021-2022).

In Kerala, the MSME sector is one of the major sectors which provides employment and helps to generate income. As per the fourth census, the Ministry of MSME, Government of India 5.62 % of enterprises in India is in Kerala. Kerala is suited for the development of the MSME sector because of the availability of skilled human resources, good industrial infrastructure, good communication networks, etc. This sector ensures inclusive growth through the industrialization of rural and backward areas and thereby provides employment to youth and other socially backward groups (Economic Review, 2021).

MSE clusters play an important role in the sector and are estimated to contribute 60% of the country's manufacturing exports. In India, clusters of MSEs are estimated to generate a significant share of employment. Some Indian MSME clusters are so big that they account for 90 percent of India's total production output in selected products. For example, the knitwear cluster of Ludhiana. Similarly, the clusters of Chennai, Agra, and Kolkata are well-known for leather and leather products. Almost the entire Gems and Jewellery exports are from the clusters of Surat and Mumbai.

However, many Indian clusters, especially those in the handicrafts sector, have not more than hundred workers and are so specialized that no other place in the world can match their quality and skills. This is the case, for example, of the Paithani sarees cluster in Maharashtra. However, only a tiny minority of such artisan clusters are globally competitive.

Liberalization of the Indian economy and closer integration into the global economy require a great deal of innovation from the MSME sector, and this has sparked great interest in developing new approaches within India. Therefore, both the private and public sectors are increasingly focusing on cluster development at the Central and State levels.

1.2 Statement of the problem

In today's world of globalization, it is difficult to survive as an independent MSME due to their small size, possession of narrow equipment, low income, and limited investment in resources and skills (Bialic & Pavelkova, 2010). As a result of this difficulty, individual MSMEs are often unable to achieve economies of scale when buying inputs, such as equipment, raw materials, finance, and consulting services (Ceglie & Dini, 1999). They are often unable to take advantage of market opportunities requiring large production quantities, homogeneous standards, and regular supply. Many firms are troubled by their isolation rather than their dimensions. The cluster-based approach emerged as a tool to overcome this unfavourable condition because a firm inserted in a cluster is not alone. Industrial clusters could help micro and small enterprises to overcome these constraints and to improve their productivity and market access. (Weisert & Kaubitsch, 2013)

In 1995, UNIDO launched an industrial cluster programme, based on Italian experience, designed to grow SMEs worldwide, especially in developing countries. Cluster Development Programme was adopted by the Government of India in 1996. A cluster development strategy was included in Kerala's Industrial Policy in 2003. Through District Industries Centres (DICs), the Kerala Industries Department identifies and develops clusters.

An industrial cluster is a geographical concentration of industries producing similar and closely related goods. The concept of an industrial cluster encompasses not only the concentration of output-producing enterprises but also input suppliers, output buyers, financial providers, educational institutions, and other various service providers as well as government and non-government agencies.

These entities are located close to each other and connected by externalities and complementarities of different types. This close connection is beneficial to industrial units in the forms such as access to specialized human resources and suppliers, knowledge spillovers, pressure for higher performance in head-to-head competition, etc. Furthermore, these linkages bind each cluster to the other and the economy as a whole.

In Kerala, there are 12 commissioned clusters such as Rubber cluster Kottayam, Plastic cluster Aluva, Plywood cluster Perumbavoor, Furniture cluster Ernakulam, Rice millers cluster Kalady, Wood cluster Malappuram, General engineering cluster Malappuram, Terra tile cluster Trissur, Wood cluster Kollam, Offset printers cluster Kannur and furniture cluster Thrissur.

There have been many studies on industrial clusters conducted around the world which explain the benefits of industrial clustering to Micro, small and Medium enterprises. In the preliminary study, the researcher found that some unit holders get benefited from being part of this cluster and some did not get benefited. So, it is necessary to study the performance of units in clusters and the development of units in the cluster due to the interaction with all other parties in the cluster. It is necessary to understand how the industrial cluster mitigates the constraints of MSMEs

Hence this study analyses the working of the general engineering cluster in Malappuram district, Kerala. This study analyses the present status of the unit holders and their perception towards industrial clustering. It also analyses the backward, forward, and horizontal linkage and support of various institutions to the development of the cluster.

In this study, the following research questions were developed by the researcher.

- What is the present status of the units in the industrial cluster?
- What is the perception of unit holders towards industrial clustering?
- Is there any linkage occurring in this cluster?
- Is there any positive linkage with suppliers?
- Is there any positive linkage with sub-contractors?
- Is there any positive linkage with customers?
- Is there any positive linkage with other units?
- What are the institutional supports received?
- Is the cluster system useful to industrial units?

1.3 Significance of the Study

Industrial clusters are the geographical concentration of inter-related firms and associated institutions in a particular field. Clusters aim to facilitate the growth of the MSME sector. It helps in overcoming several challenges of the MSMEs like small size, technological aspects, skill levels, etc. through co-operative efforts. The industrial units in clusters that are concentrated in a particular geographical area can speed up the dissemination of best practices and also reduces fixed cost by distributing among a large number of beneficiaries

It is beneficial to participating enterprises at different stages of their development. By developing trust and peer pressure within clusters, joint action can be taken to invest in common facilities and infrastructure, facilitating smoother commercial transactions and reducing transaction costs and risks. There is a significant externality associated with knowledge spillovers among enterprises, and therefore fixed costs associated with investments in research and development can be reduced. In clusters, enterprises can consolidate their market access and offer

consumers a greater choice and greater convenience by reducing search costs (Yoshino, 2011).

The General Engineering Cluster in Malappuram district, Kerala is functioning based on the objective of the industrial clusters. In this context, it is useful to study the working of the General Engineering Cluster in the Malappuram district.

1.4 Scope of the study

- This study gives information about the working of the general engineering cluster in the Malappuram district, Kerala.
- It is found that the general engineering cluster in the Malappuram district functions based on the objectives of the industrial cluster. The unit holders in the cluster interact with other parties like buyers, sub-contractors, suppliers, and other units. There is a Common Facility Centre that supports unit holders in their performance. So, it is found that there exists a system of industrial clusters in this general engineering cluster.
- Hence this study covers the General engineering cluster and it includes demographic variables of unit holders and units, the financial aspects of the units, infrastructural aspects, technological aspects, and marketing aspects, safety aspects of the units and also analyzes how these aspects affect the performance of the units.
- This study covers the perception of unit holders towards industrial clustering. This includes the unit holders' perception towards industrial clustering, the CFC, and the government.
- Scope of the study includes analysis of the linkage of the unit holders in the cluster with the various other parties. It includes backward linkage, forward linkage, and horizontal linkage. The backward linkage is analyzed by considering the interaction with sub-contractors and suppliers and the forward linkage is measured through the interactions of unit holders with the

customers. The horizontal linkage is analyzed with the interaction of other units in the cluster.

- Scope of the study also includes the evaluation of the institutional support to unit holders in this cluster.

The scope of the study covers the working of General Engineering Cluster in the Malappuram district

1.5 Objectives of the study

1. To study the present status of units in the industrial cluster.
2. To analyse the perception of unit holders towards industrial clustering
3. To study the linkage (backward, forward & horizontal) of unit holders with various parties in the industrial cluster.
4. To understand the institutional support to the industrial cluster.

1.6. Hypotheses of the study

1. There is no significant difference between the demographic variables of the unit holders and the performance of the units.
2. There is no significant difference between the demographic variables of the units and the performance of the units
3. There is no significant difference between various dimensions of the financial aspects of the units and the performance of the units.
4. There is no significant difference between various dimensions of the infrastructural aspects of the units and the performance of the units.
5. There is no significant difference between the various dimensions of marketing aspects of the units and the performance of the units.
6. There is no significant difference between the demographic variables of the unit holders and their perception towards industrial clustering.

7. There is no significant difference between the demographic variables of the unit holders and their perception towards the support of CFC.
8. There is no significant difference between the demographic variables of the unit holders and their perception towards the support of Govt.
9. There is no significant difference between the demographic variables of the units and linkage with subcontractors.
10. There is no correlation between the performance of the units and linkage with sub-contractors
11. There is no significant difference between the demographic variables of the units and linkage with suppliers.
12. There is no correlation between the performance of the units and linkage with suppliers.
13. There is no significant difference between the demographic variables of the units and linkage with buyers.
14. There is no correlation between the performance of the units and linkage with buyers.
15. There is no significant difference between the demographic variables of the units and linkage with other units
16. There is no correlation between the performance of the units and linkage with other units.

1.7. Operational definition of the terms

➤ Industrial clusters

Industrial clusters are the group of inter-related companies concentrated in a particular geographical area. It includes suppliers, service providers, and associated institutions in a particular field that share resources.

➤ **Cluster initiatives**

Cluster initiatives are organized efforts to increase the growth and competitiveness of clusters within a region. It is the activities undertaken by cluster actors to make the cluster more competitive and grow.

➤ **Cluster programmes**

An organized effort by the government to foster the growth and competitiveness of clusters in its area

➤ **Agglomeration of industries**

It is a group of company engaged in same type of business activities. It refers to the process of concentrating economic activity in one place to improve productivity for businesses.

➤ **External Economies**

External economies of scale refer to the factors that enhance business performance in a similar industry but outside of a company. Additionally, external economies of scale can lower a company's variable costs per unit as a result of operational efficiencies and synergies.

➤ **Value-chain industry cluster**

In an industry cluster, value chains refer to input-output lines or buyer-supplier chains. They include suppliers who directly or indirectly trade with final market producers.

➤ **Horizontal linkage**

It is the inter relationship between enterprises engaged in similar line of production or activities.

➤ **Vertical linkage**

It is the relationship between firms engaged in different levels of a production chain. It includes interaction between parties involved in the whole process both before and after the production process.

➤ **Backward linkage**

It is the relationship between the parties engaged in production and the parties that support the production process prior to the actual production stage. This includes subcontractors and suppliers.

➤ **Forward linkage**

It is the relationship between producers and buyers in a production value chain.

➤ **Network**

Networks are groups of companies that cooperate on a common development project, complementing each other and gaining collective efficiency in order to conquer new markets.

➤ **Unit holders**

Unit holders are the owners of the industrial units.

1.8. Research methodology

This section explains the methodology used in this study to answer all the research questions

1.8. 1. Research design

The research is descriptive in nature.

- a) **Sources of data:** In order to gather information for the study, both primary and secondary sources have been used.

➤ **Primary data:**

Primary data has been collected from the units in General Engineering Cluster in the Malappuram district. It was collected from the units by using structured questionnaire. The data was collected for the study from unit holders in the cluster.

➤ **Secondary data.**

The secondary data for the study was collected from the records of District Industrial Centre, Malappuram and Common Facility Centre -MECON situated at Manjery and the website of the Ministry of MSME, Directorate of Industries Thiruvananthapuram, MSME Development and Facilitation Office, Thrissur and K-BIP.

b) Sampling design

i. Population

The General Engineering Cluster in Malappuram district consists of two hundred industrial units. These units are located in almost nearby places in the Malappuram district. Hence this study considered the two hundred units as population.

ii. Selection of samples

The list showing details of all members in the General Engineering Cluster in the Malappuram district is available. Hence it is considered as sampling frame for the study and the respondents are selected from this sampling frame.

iii. Sample size

The total number of units working under the General Engineering Cluster is 200. The sample of the units was calculated by using the Taro Yamane formula with a 95% confidence level (Yamane, 1973) The following formula describes the calculation of the sample size.

$$n = \frac{N}{1 + N(e)^2}$$

Where

n = Sample size required

N= Number of people in the population

e= Allowable error (%) (Acceptable error assumed as 9%)

$$\begin{aligned} N &= 200 \\ n &= \frac{200}{1+200} \times (.09)^2 \\ &= 60 \text{ (rounded)} \end{aligned}$$

iv. Sampling method

The simple random sampling method is used for collecting primary data from the industrial units in General Engineering Cluster. Under the simple random sampling method, each element has an equal and independent chance of being selected.

1.8.2. Design and structure of the questionnaire

The questionnaire consists of three parts. The first part is related with the status of the general engineering units, second part deals with the perception of unit holders towards industrial clustering and the third part deals with the linkage of unit holders towards industrial clustering.

1.8.2.1. Status of industrial units

The first part of the questionnaire is related to the status of the general engineering units working under the industrial cluster which includes the demographic variable of the unit holders, demographic variables of the unit, financial aspects, infrastructural aspects, technological aspects, marketing aspects, safety aspects and performance of the units.

a) Demographic profile of unit holders

The demographic profile of the unit holders is necessary to understand the status of the unit holders and also for analyzing the perception of unit holders towards industrial clustering. The demographic profile considered for this purpose based on the studies of (Arangannal, 2014) and (Santhakumar, 2014). Following are the variables included in the study.

- Gender
- Age
- Educational qualification
- Technical qualification
- Community
- Religion
- Place of domicile
- Marital status
- Housing
- Experience
- Generation
- Training programmes attended

b) Demographic profile of the unit

- Type of the unit
- Age of the unit
- Type of activity
- Industrial classification

c) Variables for measuring various aspects of the units

Table 1.1

Variables for Measuring Various Aspects of the Units

Components	Variables
1) Financial aspects	<ul style="list-style-type: none"> ➤ Invested capital ➤ Value of fixed asset ➤ Value of current asset ➤ Sufficiency of working capital ➤ Source of fund ➤ Repayment ➤ Perception about interest rate ➤ Profitability
2) Infrastructural aspects	<ul style="list-style-type: none"> ➤ Status of building ➤ Additional production facility ➤ Number of machines installed ➤ Requirement of installed machinery ➤ Utilization of machinery ➤ Nature of ownership of storage ➤ Nature of vehicle used ➤ Nature of ownership of vehicle used ➤ Quality checking facilities ➤ Availability of power supply
3) Technological aspects	<ul style="list-style-type: none"> ➤ Facilities available ➤ Processing ➤ New product or technology development ➤ Research and development
4) Marketing Aspects	<ul style="list-style-type: none"> ➤ Brand name used ➤ Marketing activities undertaken ➤ Coverage of marketing ➤ Brand Promotion ➤ Competition
5) Safety aspects	<ul style="list-style-type: none"> ➤ First aid facilities ➤ fire safety measure

Components	Variables
6) Performance of the unit	
a) Production	<ul style="list-style-type: none"> ➤ Volume of production ➤ Cost of production ➤ Quality improvement ➤ Manpower for production ➤ Upgradation of product
b) Financial aspects	<ul style="list-style-type: none"> ➤ Sales Volume ➤ Profitability ➤ Cost of inputs ➤ Economies Scale
c) Human resources	<ul style="list-style-type: none"> ➤ Availability of manpower ➤ Skill improvement ➤ Training facility ➤ Performance improvement ➤ Absenteeism of labour ➤ Wage level

1.8.2.2. Perception of unit holders towards industrial clustering

The second part of the questionnaire deals with the perception of unit holders towards industrial clustering. It consists of three parts such as perception towards industrial clustering, perception towards the support of Common Facility Centre (CFC) and perception towards the support of govt. The variables for the study are developed based on the studies of (Arangannal, 2014) and (Santhakumar, 2014). A five-point Likert scale from strongly agree to strongly disagree was used to measure the variable. Following are the variable included for the study.

Table 1.2*Variables for Measuring Perception*

Component	Variable
a) Perception towards industrial clustering (General point of view)	<ul style="list-style-type: none"> ➤ Suitability of geographical area ➤ Sharing of common resources ➤ Utilize materials of other units ➤ Timely availability of raw materials ➤ Reduce inventory cost ➤ Provide a pool of workers ➤ Hiring of new workers ➤ Utilize the services of employees of other units ➤ Do not face the problem of a shortage of workers ➤ Ensure the services of skilled workers ➤ Opportunity to get expert advice ➤ Good infrastructural facilities ➤ Availability of transportation ➤ Reduces transportation cost ➤ Ensure availability of electricity facility ➤ Helps to compete in the market ➤ Helps to connect marketers very easily ➤ Common brand name ➤ Common marketing system ➤ Increase productivity ➤ Increase profitability ➤ Co-operative mentality ➤ Mutual trust ➤ Cluster satisfies its objectives
b) Perception towards the support of CFC	<ul style="list-style-type: none"> ➤ Utilization of services of CFC ➤ Functions of CFC ➤ Fulfil its objectives ➤ Technological support ➤ Reception arrangement at CFC is satisfactory ➤ Behavior of the staffs in CFC ➤ Use of machineries in CFC ➤ Charges levied at CFC are normal ➤ Financial support through CFC

Component	Variable
	<ul style="list-style-type: none"> ➤ Financial position of CFC ➤ Arrangements in CFC ➤ Avail credit facilities with the support of CFC ➤ Interested to get more services from CFC ➤ Training programmes for unit holders ➤ Arrangement of exhibitions and other programmes ➤ Support for the growth
c) Perception towards the support of Govt.	<ul style="list-style-type: none"> ➤ Provide support for the development of the cluster ➤ Provide infrastructural facilities ➤ Conduct meeting of all unit holders ➤ Provide training to unit holders ➤ Arrangement of exhibitions ➤ Trade show support ➤ Financial support ➤ Marketing support ➤ Arrange classes of expert ➤ Helps to interact with other agencies ➤ Support to avail finance from banks ➤ Frequent visit in unit ➤ Make continuous interaction with cluster

1.8.2.3. Linkage of unit holders with various parties

The third part of the questionnaire deals with the linkage of unit holders with various parties in the cluster. It includes backward linkage, forward linkage and horizontal linkage. Backward linkage includes linkage with sub-contractors and suppliers. Forward linkage includes linkage with buyers and horizontal linkage means the linkage with other units in the cluster. The variables for the study were developed based on the studies of (Bindu V.V., 2012) and (Pillai, 2000). A five-point Likert scale from strongly agree to strongly disagree was used to measure the variable. Following are the variables included for the study.

Table 1.3*Variables for measuring linkage*

Component	Variable
a) Backward linkage	
➤ Sub contract	<ul style="list-style-type: none"> ➤ Sharing of information and experience ➤ Negotiation of payment and delivery conditions ➤ Product development ➤ Sharing of innovative ideas ➤ Easy access to customers ➤ Easy access to suppliers ➤ Quality in work and delivery time
➤ Suppliers	<ul style="list-style-type: none"> ➤ Sharing of information and experience ➤ Negotiation of payment and delivery conditions ➤ Support to product development ➤ Sharing of innovative ideas ➤ Maintaining improved quality ➤ Easy access to customers ➤ Availability of material on time
b) Forward linkage	
➤ Linkage with buyers	<ul style="list-style-type: none"> ➤ Sharing of information ➤ Negotiation of payment and delivery condition ➤ Technical upgrading ➤ Quality control ➤ Setting of product specification ➤ Organization of production ➤ Support to connect new customers
c) Horizontal linkages	
➤ Linkage with other units	<ul style="list-style-type: none"> ➤ Lending Machinery ➤ Product development ➤ Marketing support ➤ Sharing of information and experience ➤ Joint labour training to workers. ➤ Joint purchase of inputs ➤ Sharing of orders. ➤ Sharing labours ➤ Sharing innovative ideas.

1.8.3. Pilot study

Preliminary investigation is necessary to ensure the validity and reliability of research instruments. Because they will provide information to the researcher to improve and finalize an instrument before collecting final data. The pilot study was conducted by considering 30 units from General Engineering Cluster in the Malappuram district. The reliability and validity statistics are explained below

1.8.4. Reliability

Reliability means the ability of a measuring instrument to give accurate and consistent result. A measuring instrument is reliable if it gives consistent results with repeated measurements of same object (Krishnaswami & Ranganatham, 2016). The reliability of the data was measured by using Cronbach's Alpha, which is used to measure the reliability and internal consistency of the scaled data. The general rule of thumb is that Cronbach's Alpha .70 and above is good, .80 and above is better, and .90 and above is best. The reliability statistics shown in table 1.4.

Table.1.4

Reliability Statistics

Factors	Cronbach's Alpha
Perception towards industrial clusters	0.927
Linkage with sub-contractors	0.68
Linkage with suppliers	0.67
Linkage with buyers	0.827
Linkage with other unit holders	0.679

1.8.5. Validity.

Validity indicates the degree to which an instrument measures what it is supposed to measure. It is the extent to which differences found with a measuring

instrument reflect true differences among those being tested. Content validity and construct validity were measured (Kothari & GARG, 2014)

- **Content validity.**

It is the extent to which a measuring instrument provides adequate coverage of the topic under study. If the instrument contains a representative sample of the universe the content validity is good. It can also be determined by using a panel of persons who shall judge how well the measuring instrument meets the standards (Kothari & GARG, 2014).

The researcher checked the content validity in the following ways:

- Reviewing various literature relating to industrial clusters
- Obtaining information from experts in the field of research
- Acquiring ideas from researchers who have already done research in this area.
- Discussion with Govt. officials

This could also help to identify the items in the scale and modify the scale as per the need of the situation. Hence, with these entire mediums, the researcher ensured the content validity of the research instrument.

- **Construct validity**

It measures the degree of relationship between a property under study and other constructs. In order to determine the construct validity of measuring instrument, the investigator has to find that these relationship in fact exists. (Krishnaswami & Ranganatham, 2016)

1.8.6. Normality

A major assumption of parametric test is that the data must be normally distributed. Therefore all variables were subjected to test normality. For checking normality, Kolmogorov-Smirnov and Shapiro-Wilk tests, Q-Q plot and P-P plot, and skewness and kurtosis are widely used. Here Kolmogorov-Smirnov and Shapiro-Wilk

tests, were used to check normality and also used QQ plot to support the normality of data and found that all the variables are normally distributed as the p value is more than 0.05. It also considered skewness and Kurtosis for measuring normality and found that p values of most of the variables were lies within the acceptable limit (+ 2.58 and + 1.96). Hence the researcher conclude that the data for the study were normally distributed and used parametric tests to prove the hypothesis.

1.8.7. Tools used for the study

Following are the statistical tools and tests used for primary and secondary data analysis.

➤ **Mean, St. Deviation, percentage**

Mean is a measure of central tendency. It is the average of all values in a distribution. Std deviation is the square root of the means of the squared deviations from the arithmetic mean. Percentage simply means per hundred and is used for comparing the information of two different groups (Kothari & GARG, 2014)

➤ **Independent sample t-test**

It is a test for comparing the means of two independent groups to check the significant difference between them. The independent t-test is used in situations in which there are two experimental conditions and different participants have been used in each condition.

➤ **One-way ANOVA**

One way Analysis of Variance test is a parametric test used to compare more than two of the group means. One of the assumptions of ANOVA is variance in the group must be homogeneous. If the p-value is less than 0.05, the variance is assumed to be heterogeneous. Wherever the variance is found to be heterogeneous, the researcher used F test.

➤ **Correlation analysis**

It measures the degree of association between variables. When both independent and dependent variables are interval or ratio level measures correlation analysis is used for measuring the relationships and testing the hypothesis.

➤ **Regression analysis**

It describes the nature of the association. A regression equation is useful for predicting or estimating an unknown value of one variable for a given value of the other variable.

1.9. Period of the study

The primary data was collected for the study during the period 2018-19 and secondary data was used for the study during the period 2017-2022.

1.10. Limitations of the study

This study has faced many problems in each stage of research work. Some are listed out below:

- This study considers only a single cluster
- The area covered for the study was only the Malappuram district.
- The sample unit under the study is 60 industrial units only.
- There are no accounting records are available in the units in cluster.
- All the analysis regarding the unit is based on primary data.
- Cluster deals with general engineering units are only included under this study

1.11. The organization of the thesis.

The research report is organized into eight chapters

Chapter 1: Introduction

This chapter gives an introduction to the study. It contains the statement of the problem, the significance of the study, scope, objectives, methodology, hypotheses, tools and tests, period of the study and limitations of the study.

Chapter 2: Literature Review

This chapter describes the literature reviewed for the study. The literature reviewed is classified as studies in international arena, studies in the Indian context, and studies in Kerala. This describes the gap in the study.

Chapter 3: Industrial cluster- Theoretical framework

This chapter gives an overview of the cluster. It includes the concept of industrial clusters, definition, characteristics, objectives, benefits, and types of clusters. It also includes MSME sector in India and Kerala, cluster development in India and Kerala.

Chapter 4: Status of industrial units in General Engineering Cluster

This chapter depicts the analysis of the present status of industrial units in General Engineering Cluster. It includes demographical variables, financial aspects, infrastructural aspects, technological aspects, marketing aspects, safety aspects and performance of the units.

Chapter 5: Perception of unit holders towards industrial clustering.

This chapter covers the perception of unit holders in general engineering clusters towards industrial clustering. It includes perception towards the cluster , perception towards the support of CFC, and perception towards the support of govt.

Chapter 6: Linkage of unit holders with other parties

This chapter covers the analysis of the linkage of unit holders with other parties. It includes backward linkage, forward linkage, and horizontal linkage. The backward linkage includes linkage with sub-contractors and suppliers. Forward linkage is the linkage with buyers and horizontal linkage is the linkage with other industrial units.

Chapter 7: Institutional support to industrial clusters

This chapter explains the support of various institutions for the development of industrial units in industrial cluster. This includes the support of govt. institutions, Common Facility Centre, and educational institutions.

Chapter 8: Summary, Findings, Suggestions, and conclusion

This chapter includes the summary of the study, findings of the study, suggestions based on the findings, and conclusion. It also provides the scope for further research.

1.12. Conclusion

This chapter provided an introduction to the study on working of general engineering cluster in Kerala. It includes the background of the study, significance, scope, statement of the problem, objectives, hypothesis, operational definitions, research methodology, period, limitations, and chapter scheme of the study. It is a detailed plan for conducting the study within the time frame.

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2.1 Introduction

In the present study, the researcher conducted a thorough literature review. Research theses, conference proceedings, journal articles, working papers, articles in periodicals, agency reports, and documents from various websites were critically examined for this purpose. Numerous studies have been conducted in the areas of industrial clusters throughout the world. Most of the literature is related to the benefits of industrial clustering and its role in industrial development. This study covers the working of the general engineering cluster in Malappuram district, Kerala. It includes the status of units in it and the perception of unit holders towards industrial clustering. Moreover, its linkage with other parties in the cluster. However, it considers literature regarding industrial clusters in the whole world. Hence the literature reviewed was organized into three sections such as studies related to industrial clusters in the international arena, studies related to Industrial clusters in the Indian context and studies related to industrial clusters in Kerala.

2.2 Studies related to Industrial clusters in the international arena

Russo, Eyvazo, & Kaibitsch (2020) studied UNIDO's cluster-based approach and described it as a tool for promotion of the private sector development based on inclusive growth. As the clusters are the geographical concentration of enterprises, they can share similar socio-cultural backgrounds. It revealed that it helps entrepreneurs to develop new products or new processes and to find a new market through collective efforts. This study also explains the phases of cluster development and different actors in cluster development such as cluster development agents, cluster commission, steering committee, etc. It also explains the cluster-based approach in different countries.

Thomsen, Lindgreen, & Vanhamme (2016) analyzed the relationship between industrial clusters and corporate social responsibility in developing countries. It also analysed the barriers to the adoption of CSR in industrial clusters and evaluates the empirical studies of CSR initiatives. It reveals that CSR initiative improves environmental management and working conditions and reduces poverty in local industrial districts.

Rivera, Gligor, & Sheffi (2016) described the benefits of logistics clustering and explain its growth and popularity among private agents and policymakers. This study revealed that the agglomeration of logistics firms provides several key benefits to companies such as collaboration-related benefits, offering of value-added services, career mobility for the logistics workforce within the cluster, and promotion of job growth at multiple levels within the cluster.

Pataconi & Russo (2015) studied small-scale industries and identified that the networking of industries can solve the problems of small-scale industries. The study shows that industries can increase economies of scale through networking or clustering and this also helps to attract the market and compete in the market.

Woodward & Guimaraes (2015) analysed the industrial clusters as central to regional economic policy. In this study, the researcher clarified the nature of Porter's cluster theory and the industry targeting approaches. It revealed that cluster initiatives are often combined with targeted industry approaches. This study also emphasizes the importance of export-oriented clusters.

Slaper & Ortuzar (2015) explained the theoretical aspects of the cluster and its impact on the economy. This study considers 67 industrial clusters and analyses their impact on the economy. The impact on the economy is analysed by considering employment opportunities. For this study, the researcher grouped the clusters into traded and local and found that all clusters do not create equal employment opportunities. It depends on the requirement and availability of the supply chain and workforce.

Pisa, Rossouw, & Viviers (2015) analysed the impact of the formation of

industrial clusters to enhance the competitiveness of the economy of South Africa's North West Province. It also considered forward and backward linkages of industries. The researcher analyzed 10 industries in this area and reveals that industrial clusters improve the strength of the economy.

Hawkins (2014) studied the complex interactions between organizations and economic connections. According to this analysis, the cluster system facilitates access to available resources and inspires collaborative leadership. By collaborating effectively, organizations can easily access the resources available in their clusters. It reveals that organizations can gain a competitive advantage by gaining access to these innovative relationships and resources.

Vlasceano (2014) conducted a study on the impact of the cluster on innovation, knowledge, and competitiveness in the Romanian economy. The study discusses the concept of clusters, as well as the effects of clusters on innovation, knowledge creation, and competitiveness. It was shown in this study that cluster systems facilitate the industries to transfer knowledge and the utilization of skilled employees, which promotes innovation and economic growth. This reveals that industrial clusters greatly influence the growth of the Romanian economy.

Chatterji, Glaeser, & Kerr (2014) discussed the importance of the agglomeration of activities and the economic consequences of clusters. The researcher explains the policies that are pursued in the United States to encourage local entrepreneurship and innovation and also explained the arguments that exist for and against policy support of entrepreneurial clusters.

Luiz C. R. & Rafael H. P. (2013) studied the topic of Institutions for collaboration in industrial clusters. In this study, the performance and change model is applied to support institutions in planning, implementing, and assessing joint actions. The different dimensions of this model help to formulate a self-assessment tool to evaluate the acceptance of this model. This study covers three clusters in Brazil and uses this tool to evaluate management. It reveals that the institutions for collaboration in industrial clusters help in improving the capabilities of companies in clusters through joint action.

Ali, Coniglio, & Seric, (2013) studied UNIDO's experience in Ethiopia regarding industrial clusters promotion as a tool for private sector development. It described the structure and benefits of clusters and also explained different clusters in Ethiopia. This study explained the development programme. It describes that cluster development through policy intervention might be at high risk of failure. But it states that cluster policies have an important role in the growth and development of natural clusters. It provides an environment for the effective conducting of business through hard infrastructures like roads and electricity and soft infrastructures such as supporting institutions, resources for trust, and cooperative efforts.

Liu, Weng, Mao, & Huang (2013) conducted a detailed study on industrial clusters in Wenzhou city, China, and also examine the support of various govt. and other agencies. It includes education and training institutions, the accounting firm, legal consultation institutions, government's preferential policy or project funding, recruitment agencies, intermediary service agencies, industry associations, property service intermediaries, incubators, mass media promotion agencies, central or local economic development agencies, investment institutions, and management consulting organizations. It reveals that all these parties provide support to entrepreneurs in industrial clusters, among these universities and research institutes play an important role. Furthermore, government policies, industrial associations, investment institutions, and social networks are also considered very important to entrepreneurs' development.

Weisert & Kaibitsch (2013) explains the UNIDO approach to cluster development. It states that a cluster-based approach helps the stakeholders to enhance opportunities through collective action. The cluster system helps the growth and development of SMEs through co-operative efforts. It describes the steps in cluster development and various cluster actors in the process of cluster development.

Hsieh & Lee (2012) studied value creation in consumption-oriented regional service clusters. This study applied a value price cost framework to analyse the value creation and growth of the service clusters. It reveals that the existence of a firm in a service cluster depends on benefits perceived by customers, strategic effects to

generate competitive advantage, etc. It also reveals the importance of collaboration with other clusters and firms to provide unique services to the customer.

Jircikova (2010) studied clusters as a tool for increasing the performance of companies. It describes the good practices which are useful for the effective management of industrial clusters. This helps in the successful development of clusters. It also analyzed the characteristics of industrial clusters with characteristics of clusters in Czech Republic and other countries. It gives information about good practices suitable for the functioning of industrial clusters in Czech and foreign countries.

Knapkova, Pavelkova, & Friedel (2010) described different models and approaches for measuring and managing the performance of clusters. This study gives a picture of different models for measuring the performance of industrial clusters such as Porter's Diamond model, Cluster Initiative Performance Model, Cluster Benchmarking model, the British approach to the evaluation of clusters, and Benchmarking of cluster initiatives. It also gives a description of the multidimensional Model for the Complex Evaluation of Clusters and Cluster Initiatives. It helps to evaluate the performance of individual units involved in cluster activities, their effectiveness, and the cluster as a whole, in addition to regional development.

Hobbs, Moloney, & Walsh (2010) conducted a comparative study about cluster and satellite platforms. This study made a comparative study of Porter's clustering and Markusen satellite platform system and describe certain similarities and differences between these two systems. This study also considers linkages among industries in these sectors based on nine linkage categories such as industry associated linkages, input linkages, Training and development linkages, govt. agency linkages industry peer linkages, output linkages, distribution linkages, and specialist service linkages. It reveals that in terms of the concentration of employees, either a satellite or cluster system can be applied, while international linkages resemble satellite-type platforms. It appears that the cluster system is better suited to local inter-connections

Kozovska (2010) made a study on the efficiency of knowledge and technology-intensive sectors located within regional clusters. This study analyses the

cluster effect on the performance of firms in two Eastern European Countries – Poland and Romania. It analyses the performance of firms within the cluster and outside the cluster and revealed that the firms within the cluster show higher productivity than those outside the cluster. The researcher also examined the cluster effect on firms' productivity by using stochastic frontier production to measure how efficiently they use inputs to get outputs. It reveals that the cluster effect plays an important role in the reduction of technical inefficiency of firms. The overall result of the study is that the 'clusters effects' increase the efficiency of firms' performance.

Bialic & Pavelkova (2010) conducted a study on the topic of differences and similarities in the establishment and development of clusters in Poland and the Czech Republic. In this study, they analyzed the growth and development of clusters in each country and also made a comparative study between clusters in Poland and the Czech Republic. It analyses the co-operation of Small and Medium Enterprises in both countries and also analyses the support of the Government in each country. It revealed that the system of the cluster is unofficial in Poland but in the Czech Republic, it officially exists. In the case of Poland, the entrepreneurs are unaware of the system of clustering. But in the case of the Czech Republic, the entrepreneurs are aware of the clustering system. This study concludes that both countries require support by way of different policies and programs to strengthen their performance.

Ceglie (2010) studied the UNIDO's cluster development approach for pro-poor growth. It explains the origin of cluster development and the importance of the cluster-based approach in the development of industries. It is analyzed through three elements such as collective efficiency gains, spatial proximity effects, and pro-poor potential. It also explains the assistance provided by UNIDO through the CDE for the development of clusters such as building trust and governance, strengthening the capacities of local institutions that support entrepreneurship, and take efforts for pro-poor growth.

Shakya (2009) studied the topic cluster for competitiveness. It describes the concept of cluster and it states that clusters can increase productivity as well as operational efficiency through linkages, spillovers, and synergies among firms and

institutions, as well as better coordination and diffusion of best practices. It explains cluster initiatives and various tools for implementation of cluster initiatives such as cluster mapping, SWOT analysis, GAP analysis, Porter's five forces, etc. It also describes the process to develop cluster initiatives.

Pachura (2008) studied the cluster initiative in EU policy. This study reveals that one of the important elements in EU policy is innovation and cluster theory. It states that the networking system developed in the clusters. This promotes innovation and a competitive advantage in the regional economy. This study explains that cluster policy is an integral element of various policies and is developed as a strategy for the development of the region.

Stejskal & Hajek (2008) studied the influence of business climate on industrial clusters. In this study, the researcher analyses various business climate factors on the existence of industrial clusters such as human resources, capital resources, infrastructure, natural resources, growth of employment, growth of turnover, etc. Then the researcher identified that human resources, capital resources, infrastructure, and natural resources have a great influence on cluster formation and its existence.

Weng (2008) examines the effects of the HR environment on talent growth by considering five aspects such as industrial clusters economy (ICE), industrial clusters HR policy (ICHRP), industrial clusters living setting (ICLS), industrial clusters culture (ICC) and industrial clusters HR management. This study identifies that the economy of ICE, ICHRP, ICLS, and the HRM of companies in the industry have a positive direct impact on the talent growth in the clusters and ICC does not have a direct impact on talent growth in the clusters.

Ketels & Memedovic (2008) explain the role of different stakeholders in cluster development. It describes the concept of the cluster, the competitive advantage, the relationship between the cluster, and economic policy. It states that the linkage with different cluster participants enhances innovation, productivity, and competitive advantages.

Porter M. E., (2007) studied cluster and economic policy and described the role of public policy in clusters. It states that, in order to gather data about cluster composition, membership, employment, and performance, the government plays an important role. Moreover, it analyzes the impact of clustering on the competitive environment. It also describes the concept of clusters by considering factors such as the minimum concentration of firms, the participation of cluster members, the involvement of governments, etc. It states that a cluster-based approach would also be encouraged at the state and local levels with federal leadership.

Falcone (2007) analyses the benefits of industrial clustering to small and medium industrial units in improving marketing and communication strategies. It states that the firms in clusters can share local brands, area images, management consultancy, etc. The firms under the cluster can promote products through the cluster image and can perform in a better way through a collective effort of other units, suppliers, research centres, universities, etc. This explains that the cluster system is beneficial to customers and the local community. This study also analyses various factors that influence marketing and communication strategies in clusters. It describes different tools for improving collective marketing and communication strategies.

Hodgkinson (2007) discussed Small Business Across Disciplines and outlined the different concepts used in cluster analysis. It narrates different concepts like agglomeration, external benefits, geographical proximity, etc. It analyzed the external benefits that arise from clustering through the models such as pure agglomeration, industrial complex, and social network. All these three models explain that cluster helps the firms in the reduction of transaction costs and maximizing the benefit of agglomeration. It also describes that the foreign investment and networking system improves the strength of the cluster by way of transferring knowledge, skills, capital, etc. This study reveals that the clusters are considered a means of acquiring entrepreneurial talents for the development of the region.

Merrilees, Miller, & Herington (2007) studied the topic, Leveraging the Benefits of Business Clusters: A Branding and Stakeholder Management Framework. This study analyses the clusters in the Australian context and explains the key benefits

of clustering such as fostering regional development, fostering innovation, helping in marketing, etc. This study mainly focusing the analysis of four areas such as stakeholder management, branding, internet, and e-mail facility. It reveals that effective stakeholder management helps to make the cluster more cohesive. Branding is very beneficial to clusters for achieving distinctiveness. However, it needs a high level of investment. Virtual channels like the internet and e-mail help in knowledge creation and dissemination. This helps direct interaction with the parties within and outside the clusters. This helps to create trust among them and thereby speeding up the delivery of products and services.

Rosson & McLarney (2007) conducted a case study in a biotechnology cluster in Halifax Canada. This study explains the characteristics of this cluster and also the challenges faced by the cluster. It is conducted on 38 biotechnology companies and supporting organizations and found that various supporting organization provides a number of services such as advocacy financing, business development, research infrastructure, etc. for the development of the cluster. Although various supporting organizations support this cluster, they are facing many challenges like lack of financing, and insufficient govt. support, reluctance to innovation, tax system, etc. Hence this study reveals that this cluster is in an early developing stage. The cluster policy white book provides guidance to overcome these challenges such as attracting venture capital firms, developing specialized investment funds, improving foreign direct investment, providing training to workers, developing of the industry research center, etc.

Efendioglu (2007) studied issues, progress, and key success factors of the cluster. This study covered two biotech clusters such as San Francisco cluster and the Hsinchu cluster in Taiwan. It describes the characteristics of these two clusters and key factors that influence the success of the clusters which include appropriate infrastructures, the environment that links university/research institutions and the private sector, linkages among companies within the cluster, etc. It reveals that these factors contributed significantly to the success of these clusters. However many of these factors are in the formative stage.

Rowe & Burn (2007) give an explanation about the concepts such as clustering, collaborative networks, and collaborative commerce in relation to SMEs. It states that collaborative networks develop new relationships, new assumptions, trust, and sharing. A cluster is a group of firms located in a particular geographical area. Collaborative commerce is a soft network that is useful to firms to develop a relationship with others without any geographical proximity. It also explained the elements needed for implementing collaborative commerce.

Nasir, Bulu, & Eraslan (2007) studied the tourism cluster development of the Sultanahmet district. This study identified that the cluster strategy includes various stakeholders such as academic experts, community groups, universities, regional tourism associations, etc. These stakeholders formed NGOs and it helps the cluster to face challenges in the future. This study was longitudinal and empirical and consider the period 2001 and 2005. This study reveals that in 2001 the members did not come to make common projects like marketing, purchasing, research, and development, etc and there was no trust among owners. In 2005 the number of members increased and also increased the linkage among members.

Williams (2007) studied the application of cluster theory in a small group of wine and tourism industry. It explained the characteristics of these two clusters. There are three case studies are conducted in both clusters and considered geographical, economic, and social variables. It found that some variables are more important in certain studies. Second case study shows that geographic, economic, and social preconditions are very important. It also studied the cluster overlap between wine and tourism clusters and found that there is no cluster overlap. That means the interactivity between clusters is less. Another study reveal that wine clusters performed more actively than tourism clusters.

Nadvi & Barrientos (2004) studied the relationship between industrial clusters and poverty. It describes that small firms get benefited through the linkage and cooperation of cluster participants. Collective action improves the performance of industries in the cluster. This increases employment, and income and also makes changes in the local economy.

Andersson, Serger, Sörvik, & Hansson (2004) explain the concept of the cluster, cluster policies, cluster initiatives, and various elements of the cluster such as geographical concentration, specialization, cluster actors, linkage, competition, co-operation innovation, etc. It describes the cluster life cycle which includes agglomeration, emerging cluster, developing cluster, mature cluster, and transformation. It explains the various kinds of clusters and the driving forces of innovative clusters. It shows the benefits and risks of clusters.

Solvell, Lindqvist, & Ketels, (2003) analyzed cluster initiatives and explains the meaning, characteristics, and objectives of cluster initiatives. It states that cluster initiatives are organized efforts to increase growth and competitiveness. It explains the cluster initiative life cycle and cluster initiative process. It describes the cluster initiative performance model which includes social, political, and economic settings, objectives of cluster initiatives, cluster initiative development process, and the performance of cluster initiatives. It describes that the firms in the cluster have access to specialized and advanced factors of production and are also capable to compete in the global market

Pandit & Cook (2003) studied the benefits of industrial clusters. This study made a comparative analysis of British financial service industries in three locations and compares the general benefits of clustering with specific benefits of financial service industries in 3 locations. It also studied different types of clusters and identifies that the financial service industries in three locations follow 3 types of clusters. According to the researcher, the growth factors for clusters are customer proximity, reduced customer search cost, informational externalities, knowledge spillover, specialized inputs, infrastructural benefits, etc. This study also identifies certain factors that decline the growth of the clusters.

UNIDO (2001) describes the problems of SMEs and the need for UNIDO's cluster development program. It explains the technical assistance provided by UNIDO for the development of cluster and network approaches. UNIDO provides technical assistance in various aspects such as vision building, capability building based on shared targets, and the sustainability of the cluster development process. This study

explains that the main problem in the development of clusters and network systems is a lack of coordination and consistency. This study also describes the network approach; vertical and horizontal and also explains the role of brokers in cluster development.

Ceglie & Dini (1999) studied UNIDO's experience in promoting business development services to develop small-scale enterprises through networking strategy. This study explained the methodological concepts and principles which include four activities which are needed at different interaction level-the promotion of the network, restructuring at the firm level, the improvement of the institutional environment, and the improvement of dialogue between the public and private sector. It reveals that the networking system helps enterprises to overcome the problems of working as an individual unit and helps them to reach a collective competitive advantage.

Rabellotti (1998) studied the Collective Effects on Italian and Mexican Footwear Industrial Clusters. This study analyzes the economic effects obtained through external economies and cooperative behaviour in four clusters in Italy and Mexico and also made a comparative study of Italian and Mexican footwear industrial clusters. It covers the backward, forward, horizontal and institutional linkages of industrial units in these clusters. It is found some differences in the forward linkage between these two industrial clusters. However, it reveals that the linkages create a collective efficiency in industries in both clusters.

2.3 Reviews of Literature in India

Singh (2015) conducted a study on the topic of the impact of export facilitation programmes usage on firms' export performance. This study considers the export facilitation programs offered by govt. and analyze how these programs affect firms export performance. The researcher analysed the effect of the firm's characteristics, management characteristics and clustering on firm's export performance. It reveals that export assistance as well as clustering is beneficial to MSMEs and it helps to increase export performance.

Das (2015) studied cluster development initiative for poverty alleviation. According to the study, the cluster development initiative brought a change in the status of cluster artisans in the study area. After the introduction of the cluster programme, there is an improvement in employment opportunities and also improve the assets of artisans. This system helps the members to perform in a collective way and improve their performance. Hence this helps to reduce poverty and improve the standard of living of people.

Santhakumar (2014) made a study on Match Industrial Clusters at Virudhunagar in Tamil Nadu. This study analyses the impact of the industrial cluster approach on reducing the cost of production and facilitating the interaction of different parties associated with the business. It also analyzed the usefulness of the common facility centre in this cluster. It reveals that the cluster system is helpful for safety match industrial units for increasing their performance and it supports the unit holders to interact with other units, associations, government agencies etc. However, this study states that the cluster approach needs improvement to attain the objectives of this approach.

Arangannal (2014) studied the performance of food cluster in the promotion of food processing industry. This study analyzed the performance of CPS cluster in Madurai district. For this study the researcher divided the industries into micro and small and analysed their performance by considering different aspects such as demographic, financial, technical, infrastructural, import, export, etc. Then it identified that the performance of small industries is better than micro industries for promotion.

Chawla (2013) conducted a case study on cluster entrepreneurship in Panipat handloom cluster, Hariyana. This study gives information about the export performance of this handloom cluster. It describes the importance of entrepreneurship and innovative cluster in the development of the state Hariyana and it reveals that the Panipat cluster helps to increase the export of Hariyana.

Sharma & Varma (2012) made a case study on the competitiveness of leather and leather product export at the Kanpur cluster. The researcher identified that the

Kanpur leather cluster is the oldest cluster in India and faced certain problems in ensuring export competitiveness. This study explained the certain strength and weaknesses of this cluster in exporting products and also state the support of the government for exporting. It is suggested that, if the State Government provided better support for the industrial clusters and improved export performance, the clusters could become India's largest leather cluster.

Akoija (2012) studied the cluster development programme at the Handloom cluster Nambol area, Bishnupur district, Manipur. The study identified that there is an improvement in the income of people after training through the HCDP. It also found that 95% of participants in the training started their own household enterprises and this helps to increase the income of people.

Singh P. (2012) evaluated the management practices in clusters of small-scale industries in the Varanasi district. It analyses the framework and workings of the industries in the clusters. The study also analysed the SSI unit's problems and found that they were mostly related to input availability, marketing, and operational effectiveness. According to the study, cluster management plays a significant role in the development of the industries and also the district.

A.M. & Mehrotra (2011) conducted a study on Emerging SME clusters in India. This study describes the origin and the introduction of the concept of industrial cluster in the Indian context. They made a detailed study on the performance of the two distinct clusters and identifies that the clustering improves the performance of industries by increasing purchasing power, demand, low cost of skilled labour, proximity to markets, and so on.

Sachdeva & R.Kulshrestha, (2011) studied on SMEs in the economic growth of Agra: Opportunities and Challenges. The researcher analyses the performance of the Agra Shoe cluster through SWOT analysis and identified the opportunities, threats, strengths, and weaknesses of the cluster. It shows that the Agra Shoe Cluster has a growth potential by giving importance to some key areas.

Kaur (2009) conducted a study on the topic of the industry cluster approach for export promotion. This study analyzed the development of export through the support of industrial clusters, govt. and other agencies. It also analyzed the factors that influence the development of industrial clusters and export and found that certain factors such as external economies, collective efficiencies, trust, competition, and cooperation are important for development.

Ittyerah (2009) made an evaluation study of the cluster development programme under the Indian Institute of Public Administration (IIPA). This study assesses the performance of clusters and identifies the area that needs corrective action to strengthen the performance of clusters. This study also analyses the impact of the MSE-CDP programme and various schemes under this programme. It covered twenty-six clusters including the rubber cluster Kottayam and it reveals that this programme is essential and more effective for the MSME sector. This provides necessary support to MSMEs to catch the new economy and to meet global competition.

Jati (2007) analyzed the effect of industry clusters and isolated units on marketing activities in micro-enterprises. This study analyses the performance of industrial clusters and the advantages of this system and also compared the performance of units in industrial clusters with the performance of isolated units. Through the analysis the researcher found that the performance of the units in clusters is better than the isolated units.

Kurian (2005) examined the topic of industrial clusters and labor in rural areas through the brick kilns industry in three states. This study describes that the industrial clusters provide an opportunity for better performance in terms of pay and work. The trustworthy relationship between employer and employee is found in successful industrial clusters. This helps to solve various problems and improve the confidence of employees. This study reveals that large number of migrant and family labour creates a large pool of labours in rural industrial clusters. This study analyse the role of trade unions in making changes in the attitude toward migrant and uneducated workers by creating committees and undertaking campaigning.

Das K. (2005) analysed the topic of competition and response in small firm clusters. The study was conducted in two clusters in Gujarat such as flooring tile clusters and garment clusters. This study considers 21 units from each cluster, and also includes a discussion with the associations, traders, workers, and dealers. This study focuses on three dimensions such as internal differentiation, competitive strategies, and joint action.

Gomes (2001) studied the topic of SME and Industrial Clusters and it describes the different kinds of clusters such as natural clusters, induced clusters, infrastructural clusters, etc. This study analyses Indian and Italian clusters. It reveals that the Indian clusters adopted many aspects of Italian clusters and the Indian clusters get benefited from the innovative aspects of the Italian clusters. India co-operates with Italy in different ways for undertaking their industrial activities. Many industrial clusters in India act as sub-contractors overseas. This increases the demand for the products of small firms and helps to improve local and international competitiveness.

Dwivedi & Varman (2005) evaluated industrial clustering and co-operation in Kanpur Saddlery Cluster. It explains the characteristics of Industrial districts such as geographical concentration, firm size, and the situations of the Kanpur Saddlery cluster. This study collected information regarding firm size, inter-firm linkage, labour practices, use of job workers etc. from 33 respondents.

Sarkar (2005) studied the cluster development approach in Handicrafts industrial cluster in Jaipur. This study analyses the challenges faced by this industry and how the cluster-based approach helps to overcome these challenges. This study also made a case study in the Hand Block Printed Textile Cluster in Jaipur. It identified that the challenges faced by the industries are related to lack of market intelligence, product quality, migration of labour etc. The cluster-based approach is helped industries to overcome these challenges through the development of geographical proximity of industries. This helps to develop backward, forward, and horizontal linkage among the cluster stakeholders.

2.4 Reviews of Literature in Kerala

Franklin (2019) studied the Economics of Industrial Clustering in Bricks industries in Kerala. It analyses the performance of Brick industry as well as the economics of clustering in this industry. This study considered the bricks industries in three districts, Thrissur, Ernakulam, and Kottayam and analyzed their performance. It also compared the isolated units with clustered units and found that the clustered unit is performing better way than the isolated units.

Premavalli P.V. (2015) analysed the role of cluster development in enhancing the competitiveness of Handloom Co-operatives in Kannur District. This study describes the status of Handloom clusters in Kannur District and also explained the strength, weaknesses, threats and opportunities through SWOT analysis. It studied pre and post cluster intervention and found that after cluster intervention there is good improvement in the performance of the units under handloom cluster. It shows that the cluster intervention helps to move a demand-based production and this leads to increase in domestic production. It also helps in diversification in production, skill upgradation, adoption of new marketing techniques etc.

Jisana T K & Ahammed (2013) conducted a study on the role of cluster development programmes on MSMEs in Kerala. They conducted study in two clusters in Kozhikode District and identified that the units in clusters perform in a better way than others. These clusters are also facing some problems. Then the researcher suggested that the successful implementation of a cluster development programme will help MSMEs to improve their performance.

Thomas (2013) analysed the efficiency of a cluster-based approach for the revival of handloom co. operative societies in Kerala. This study concentrates on handloom industrial clusters in Thiruvananthapuram and Kannur. It analyses the operational weaknesses of handloom co. operative societies in Kerala based on pre and post-period of industrial cluster development approach and evaluates the efficiency of cluster-based approach in overcoming the operational weaknesses of handloom co. operative societies. It identifies that the cluster-based approach provides support for the growth of handloom co. operatives in Kerala.

Bindu V.V.(2012) studied cluster approaches in the handloom industry in Kerala. It analyzed the impact of cluster development programmes on Handloom industries in Kerala and also analysed the linkage, co. operation and performance of co-operative societies after the introduction of the cluster development programme. This study reveals that the cluster development programme promotes the co. operative efforts among co. operative societies. This helps them to improve their performance and also helps them to compete in the market.

Sukumaran (2009) conducted a study on the topic of small firm clustering and local economic development in Kerala. This study analysed the local economic development through the performance of industrial clusters. It considered two clusters, Plywood cluster Perumbavoor and Agriculture implement cluster in Shornur and analysed their performance by considering their output, sales, profitability, backward, forward, and horizontal linkages. It also analysed its support for local economic development. It revealed that both clusters lack inter-firm co-operation. The profitability of the Shornur cluster is better than the Perumbavoor cluster. However, both clusters require development in order to compete in the market.

Cherukara & Manalel (2007) evaluated cluster development in Kerala and give a brief description of the cluster development programme in Kerala. This study explains the UNIDO's contribution to cluster development as well as the evolution and growth of cluster development programmes in Indian and Kerala contexts. It explains various cluster initiatives of the government and various NGOs. This study revealed that the majority of clusters are under-achievers and suggests the need to increase government initiation for the development of the programme.

Pillai (2001) made a comparative study between the pump manufacturing cluster in Coimbatore and the rubber cluster in Kottayam. This study analysed the performance of these two clusters based on the factors such as the evolution of these two clusters, growth, inter-firm linkages, backward and forward linkages, as well as the aspects of cooperation and competition. It revealed that these two clusters perform in a better way through linkage and co-operation. However, the performance of the pump manufacturing cluster is better than the rubber cluster.

2.5 Conclusion

This chapter logically arranges previous literature reviewed by the researcher. The literature shows that there are number of studies regarding industrial clusters in the whole world. Most of the studies reveal that the industrial cluster is beneficial to industrial development. It plays an important role in the development of the industrial sector in Kerala. But it is found that none of the studies were made regarding the working of the general engineering cluster. Hence arise an urge to study the working of the general engineering cluster in Kerala.

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3.1 Introduction

Clusters have gained increasing prominence in debates on economic development in recent years. Governments worldwide regard clusters as potential drivers of enterprise development and innovation. Cluster initiatives are also considered an effective policy instrument since it focuses resources and funding in targeted areas with high growth potential that can spread beyond the target locations. (Russo, Eyvazo, & Kaubitsch, 2020).

Clusters are today recognised as an important instrument for promoting industrial development, innovation, competitiveness and growth. Although primarily driven by the efforts made by private companies and individuals, clusters are influenced by various actors, including governments and other public institutions at national and regional levels (Andersson, Serger, Sörvik, & Hansson, 2004).

The potential of cluster development resides not just in its capacity to stimulate high rates of growth, but also in the conducive environment it provides for the promotion of broad-based and inclusive forms of development. This is partly because clusters constitute socio-economic systems where the population of enterprises often overlaps with the communities living and working within a specific area or territory. The internationally renowned clusters like the Sassuolo ceramic cluster in Italy, the information technology cluster of Bangalore in India, the automotive cluster of Tangier in Morocco, the Chilean wine cluster etc. can develop competitive and global edge and also can generate wealth and local economic development (Russo, Eyvazo, & Kaubitsch, 2020).

Cluster-based entrepreneurs and workers often share a similar social, cultural and political background and practice reciprocity and self-help. This tends to lend

itself to growth patterns that are likely to be more inclusive than in most other economic contexts.

3.2. Industrial cluster - Concept

Simply put, industry clusters are regional concentrations of related industries. Clusters consist of companies, suppliers and service providers, as well as government agencies and other institutions which provide education, information, research and technical support to a regional economy. One might say that clusters are a network of economic relationships that create a competitive advantage for the related firms in a particular region. This advantage then becomes an enticement for similar industries and suppliers to those industries to develop or relocate to a region. (Slaper & Ortuzar, 2015) As clusters show, the immediate environment of businesses outside the companies is also crucial.

Clusters are the geographic concentrations of inter -connected companies and institutions in a particular field. It encloses a group of linked industries and other institutions important to competition. It includes suppliers of specialised inputs such as components, machinery and services, together with providers of specialized infrastructure. It is also typical for clusters to extend downstream to the channels and customers, as well as lateral to manufacturers of complementary products and companies associated with companies in related industries by skills, technologies, or common inputs. It also includes governmental and other institutions such as universities, standard-setting agencies, vocational training providers and trade associations that provide specialised training, education, information research and technical support (Porter M. E., 1998)

An industrial cluster is an agglomeration of companies, suppliers, service providers, and associated institutions in a particular area. It includes financial providers, educational institutions, and various levels of government. Cluster members can enjoy economic benefits like access to specialized human resources and suppliers, knowledge spillovers, opportunities for better performance etc. (Shakya, 2009).”

Developing industry clusters has become a key goal for regional economic development as clusters have been shown to strengthen competitiveness by increasing

productivity, stimulating innovative new partnerships, even among competitors, and presenting opportunities for entrepreneurial activity. (Slaper & Ortuzar, 2015)

Clusters vary based on geographic locations, products, functions, and patterns of inter-firm linkages. It gives exposure to suppliers of raw materials, machinery & spares, human skill, product-related services, etc. Furthermore, it offers small firms an opportunity to combine the advantages of operating a small company with the benefits of scale and specialisation provided by larger companies

Industrial clusters include support institutions like:

- Business associations
- Business development service (BDS) providers
- Financial service providers, including banks
- Public authorities such as local regional and national governments and regulatory agencies
- Training agencies such as vocational schools, universities, etc.

(Weisert & Kaibitsch, 2013)

3.3. Definition

In the UNIDO context, clusters are defined as “geographical concentrations of inter-connected enterprises and associated institutions that face common challenges and opportunities” (Weisert & Kaibitsch, 2013)

Michael E. porter (1998) defines clusters as “Geographically proximate groups of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities”. (Isbasoiu , 2007)

Europe Innova (2007) defines clusters as the co-location of partners, service providers, educational and research institutions related through linkages of different types”.

Michael Porter (1998) “Clusters promote both competition and cooperation. Rivals compete intensely to win and retain customers. Without vigorous competition, a cluster will fail. Yet there is also cooperation, much of it vertical, involving companies in related industries and local institutions. Competition can coexist with cooperation because they occur on different dimensions and among different players. (MELE, 2013)

Krugman (1981) defines clusters as “a geographically bounded concentration of similar, related or complementary businesses, with active channels for business transactions, communication and dialogue, that share specialized infrastructure, labour markets and services, and that are faced with common opportunities and threats.” (Isbasoiu , 2007)

3.4. Characteristics of Industrial cluster

Clusters have different characteristics as to their own history, participants, relationships, personalities, goals, activities, strong and weak points ambient conditions etc (Jircikova, 2010). However functional clusters exhibit the certain characteristics.

A cluster is a group of enterprises located within an identifiable and contiguous area or a value chain that may go beyond a geographical area and producing same or similar products or complementary products or services, which can be linked together by common physical infrastructure facilities. The essential characteristics of enterprises in a cluster are:

- (a) Similarity or complementarity in production methods, quality control, energy consumption, pollution control, etc.
- (b) Similarity in technology and marketing strategies or practices
- (c) Communication channels among cluster members are similar,
- (d) Common market & skill needs
- (e) Common challenges & opportunities.

(<https://msme.gov.in/sites/default/files/ModifiedGuidelinesofMSE>)

3.5. Objectives

- Support the growth and sustainability of MSEs by improving technology, skills, quality, market access, and capital access.
- Developing the capacity of MSEs for mutual support through the creation of self-help groups, consortia, and upgrade of associations.
- Create infrastructural facilities in the new or existing industrial areas or clusters of MSEs.
- Set up common facility centres (for testing, training Centre, raw material depot, effluent treatment, complementing production process)

<https://msme.gov.in/sites/default/files/ModifiedGuidelinesofMSE>)

3.6. Types

3.6.1. By composition

On the basis of inter-organizational networks, the clusters can be classified as- Geographical clusters, Sectoral clusters, Horizontal clusters, and Vertical clusters.

- Geographical clusters: These are the clusters in which similar kinds of industrial units are concentrated in a particular geographical area.
- Sectoral clusters: These are the clusters in which industrial units are operating together within the same commercial sector
- Horizontal cluster: These are the clusters in which the industrial units are interconnected by sharing of resources
- Vertical cluster: These clusters connect industrial units with suppliers and customers. It is also called supply chain clusters.

3.6.2. Based on the type of comparative advantage

These clusters are identified based on knowledge:

- **High-tech clusters:** The clusters are high-technology and well-adapted to the knowledge economy, with universities and research centres as their core areas.
- **Historic know-how-based clusters:** These are based on more traditional activities that maintain their advantage in know-how over the years, and for some of them, over the centuries. They are often industry-specific.
- **Factor endowment clusters:** The development of these clusters is based upon the comparative advantage that they might have due to their geographical location. For example, wine production clusters because of sunny regions surrounded by mountains, where good grapes can grow.
- ❖ **Low-cost manufacturing clusters:** Usually, these clusters emerge in developing countries within particular industries, such as automotive, electronics, or textiles. The firms in these kinds of clusters serve clients in developed countries. Low Labour costs and proximity of the clients etc. are the driving force behind cluster emergence
- ❖ **Knowledge services clusters:** These clusters are providing lower-cost skills and expertise in response to the growing demand for increasingly commoditized knowledge. These clusters have typically emerged in developing countries within particular industries, such as automotive production, electronics, or textiles services.

https://en.wikipedia.org/wiki/Business_cluster

3.6.3. Another way of classification of clusters as national, regional, and commercial clusters.

➤ **National Clusters**

A national cluster is a group of companies and organizations that collaborate to resolve development issues related to a cluster. Typically, they deal with issues of policy, infrastructure, etc.

➤ **Regional Clusters**

The cluster is based on the premise that an industry will prosper in a networked, specialised environment. The goal is to build a supportive environment for cluster participants as well as to strengthen links between firms, suppliers, and related and supporting organizations.

➤ **Commercial Clusters**

A Commercial Cluster is a group of companies that collaborate in a number of areas. They are membership-based, funded by a membership fee. (MELE, 2013)

3.6.4. Markusen notes that there are four types of clusters:

➤ **Marshallian cluster**

These clusters characterised by small and medium sized locally firms with substantial inter-firm trade and collaboration and strong institutional support

➤ **Hub and spoke**

In this cluster there are one or several large firms with numerous smaller suppliers and service firms that cooperate between large firms and smaller suppliers on terms of the large firms.

➤ **Satellite platforms**

These types of clusters include medium and large sized with minimum inter-firm trade and networking

➤ **State-anchored**

This kind of clusters includes large public or non-profit entity and related supplying and service firms and there is a restrictions to purchase-sale relationship between public entity and suppliers (Isbasoiu , 2007)

3.7. Benefits of industrial clusters

The following are the important benefits of cluster.

- The availability of inputs, specialized labour, and various services within a cluster helps to reduce business costs.
- Close proximity between various actors facilitates the flow of knowledge and information.
- The trust that naturally develops within clusters provide the basis for joint actions (cooperation) to invest in common facilities and facilitate smoother commercial transaction, reducing risk and uncertainty.
- Industrial clusters typically lead to large markets that enable enterprises to operate at a larger scale arising from the division of labour within a cluster.
- The available large markets within clusters also provide consumers with greater choice and convenience by reducing search costs.
- The overall effects of clustering might result in a significant increase in the competitiveness and profitability of enterprises, in particular MSEs which, at least partly, overcome in this way the short comings of their small size.

3.8. Phases of Cluster Development

Cluster development involves the following phases:

- Selection of a cluster
- Cluster Governance, Trust, and the Role of the Cluster Development Executive/Agent

- Cluster Diagnostic study
- Vision Building and Action Planning
- Implementation of the action plan
- Monitoring and evaluation

3.8.1. Phase I- Selection of a cluster

It is essential to design a well-structured, participatory selection process with clearly defined criteria. to ensure a successful selection. The criteria may change to some extent depending on the type of cluster and the goals they aim to achieve. However, the following points should be taken into consideration:

- The importance of the cluster in terms of the number of units, employment opportunities, production, exports, etc.
- The presence of critical gaps in technologies, product quality, common facilities, skill upgrading, raw material availability, and marketing support.
- Institutions that promote and develop small businesses at the national and international levels
- Viability of the cluster.
- Associations of local industries and/or other institutions which are supporting the cluster's development and promoting SSIs.
- Taking into account social and environmental factors such as gender inequalities, poverty conditions, the need for employment generation, pollution scenarios, etc.

3.8.2. Phase II - Cluster Governance, Trust, and the Role of the Cluster Development Executive/Agent

After selecting a cluster, a Cluster Development Agent/executive (CDA/CDE) is appointed to facilitate the cluster development process. A cluster

diagnostic study will be undertaken by the CDA to assist the cluster stakeholders in working together to transform the cluster from an underdeveloped one to a performing one, as well as establishing and operating a cluster governance structure.

3.8.3. Phase III – Cluster Diagnostic

After selecting the cluster, a diagnostic study will be conducted by CDE/CDA. The aim of the study is to map all the business processes of the cluster units such as manufacturing processes, technology, marketing etc to understand their strengths, weaknesses, opportunities, and threats (SWOT).

This helps to develop an understanding of the socio-economic and institutional environment of the cluster, detect potential leverage points for the intervention, provide a baseline for monitoring and evaluation, and build initial trust between the CDA and the cluster stakeholders. Cluster diagnostics are participatory exercises, with cluster stakeholders as the principal informants, conducted under the supervision and participation of the CDA (Russo, Eyvazo, & Kaibitsch, 2020).

3.8.4. Phase IV-Vision Building and Action Planning

After discussing the diagnostic study's results, cluster stakeholders develop a shared vision for their cluster's future performance or the overall cluster development path that will be periodically reviewed and updated over time based on changes in cluster conditions or related framework conditions. An action plan entails translating a vision statement into a realistic and achievable development strategy over time. As part of a monitoring and evaluation framework, cluster stakeholders also review action plans periodically.

3.8.5. Phase V- Implementation

The implementation process refers to the execution and management of the activities described in the action plan. Cluster Development Agents facilitate this process.

3.8.6. Phase VI – Monitoring and Evaluation

The Monitoring and Evaluation (M&E) of cluster is a continuous process and starts with clearly defined results. It describes the relationships between specific inputs, project activities, the expected outputs & outcomes and how they contribute to the overall development of a cluster project or programme. To attain the information needs of various stakeholders, key performance indicators, data collection methods, and reporting responsibilities and frequencies are defined and integrated into an overall monitoring framework. (Russo, Eyvazo, & Kaibitsch, 2020)

3.9. Economic geography of industrial clusters

Industrial agglomerations are attractive to companies due to their profitability. Externalities due to agglomeration helps to improve productivity. Following are the three types of positive Marshallian externalities.

➤ **Technological spill over**

It is through the proximity of enterprises that industry and location specific knowledge and skills can be shared either explicitly or implicitly among enterprises. It is possible to diffuse industrial knowledge horizontally between producers or vertically between producers and input suppliers, traders, and other service providers.

➤ **Labour market pooling**

By concentrating enterprises in the same or similar industries, a pool of labour with specific skills is created. This pooling attracts external labour with corresponding skills.

➤ **Specialised immediate inputs and services.**

Through agglomeration the industries can attract specialised suppliers of inputs and services emerged both internally and externally (Yoshino, 2011).

3.10. MSME Sector in India

The level of industrial development generally determines the economic development of a region. India is well on its way to rapid industrialisation through co-ordinated development of Micro, Small, Medium and Large-scale industries. The MSME segment is a significant stake holder in the country's industrial base. The sector contributes most significantly to employment, GDP and exports. MSMEs not only play crucial role in providing large employment opportunities at comparatively lower capital cost than large industries but also help in industrialization of rural & backward areas, thereby, reducing regional imbalances, assuring more equitable distribution of national income and wealth.

Micro, Small and Medium Enterprises (MSMEs) account for about 90 per cent of businesses and more than 50 per cent of employment worldwide. They are key engines of job creation and economic growth in developing countries. The sector contributes about 45 per cent to India's manufacturing output, more than 40 per cent of the country's exports and over 28 per cent of the GDP (including services), while creating employment for about 111 million people (Economic review 2021)

3.10.1. MSME governed by Ministry

The Ministry consists of various divisions:

- Small & Medium Enterprises (SME) Division
- Agro & Rural Industry (ARI) Division
- Administration & Financial Institutions (AFI) Division
- Integrated Finance Wing (IFW) and
- Data Analytics and Technical Co-ordination (DATC) Wing

Besides these ,there are some attached offices for providing infrastructure support services to MSMEs for implementing various policies and programmes, namely the Office of the Development Commissioner (DC -MSME), National Small Industries Corporation (NSIC), Khadi and Village Industries Commission (KVIC);

the Coir Board, and three training institutes- National Institute for Entrepreneurship and Small Business Development (NIESBUD), National Institute for Micro, Small and Medium Enterprises (NI-MSME), Indian Institute of Entrepreneurship (IIE) and Mahatma Gandhi Institute for Rural Industrialization (MGIRI).

3.10.2 Micro, Small and Medium Enterprises Development (MSMED) Act 2006

The Micro, Small and Medium Enterprises Development (MSMED) Act enacted June 2006. It came in to force 2nd October 2006. The aim of this act is to facilitate the promotion and development and enhance the competitiveness of Micro, Small and Medium Enterprises. It describes the coverage and investment ceiling of the sector.

Definition of Micro, Small and Medium enterprises:

According to the provision of Micro, Small & Medium Enterprises Development (MSMED) Act, 2006 the Micro, Small and Medium Enterprises (MSME) are classified as:

- **Micro enterprise** -The investment in plant and machinery or equipment does not exceed one crore rupees and turnover does not exceed five crore rupees.
- **Small enterprise** - The investment in plant and machinery or equipment does not exceed ten crore rupees and turnover does not exceed fifty crore rupees
- **Medium enterprise**- The investment in plant and machinery or equipment does not exceed fifty crore rupees and turnover does not exceed two hundred and fifty crore rupees.

This classification was declared under Aatma Nirbhar Bharat package on 13th May, 2020. It came into effect from 1st July 2020. The earlier classification of MSMEs under MSME Act, 2006 was based only on investment in plant and machinery / equipment and it was very low in investment. It was different for manufacturing and service unit.

❖ **Features of this Act**

- This act furnishes a legal framework for the acceptance of the concept ‘enterprise’. This includes manufacturing enterprises and servicing enterprises and co-ordinating the three tiers of these enterprises i.e., micro, small and medium.
- Establishing specific funds to enhance the competitiveness of these enterprises.
- Notify relevant schemes or programs for this purpose and adopt progressive credit policies and practices.
- The Government gives preference to micro and small enterprises in its procurement.
- Mitigation of delayed payments to micro and small enterprises through more effective mechanisms.
- A simplified process for all three categories of enterprises to close their businesses. <https://www.indiacode.nic.in/handle/>

3.10.3. Performance of MSME Sector

MSME sector is a major contributor to the growth of Indian economy. This sector plays significant role in the development of economy by rendering large employment opportunities at lower capital in urban, rural and backward areas and ensure equitable distribution of national income.

➤ **Estimated number of MSMEs in country**

The National Sample Survey (NSS) 73rd round, conducted by the National Sample Survey Office, Ministry of Statistics & Programme Implementation in 2015-16 found that the country had 633.88 lakh unincorporated small and medium enterprises involved in wide range of economic activities. This excludes MSMEs registered under (a)Sections 2m (i) and 2m(ii) of the Factories Act, 1948,

(b) Companies Act, 1956 and (c) construction activities falling under Section F of National Industrial Classification (NIC) 2008.

Table 3.1

Number of MSMEs (Activity Wise) (In lakh)

Activity Category	Rural	Urban	Total
Manufacturing	114.14	82.5	196.64
Electricity	0.03	0.01	0.04
Trade	108.71	121.64	230.35
Other Services	102	104.85	206.85
All	324.88	309	633.88

Source: Annual report of MSME 2021 -2022

The table shows that there were 633.88 lakh unincorporated non-agriculture MSMEs in the country engaged in various kinds of activities which includes manufacturing (196.64 lakh), non-captive electricity generation and transmission (0.04 lakh), trade (230.35 lakh) and Other Services (206.85 lakh).

➤ **Type of Ownership of Enterprises**

It explains the percentage distribution of enterprises based on ownership of enterprise as male and female and also gives a classification based on micro, small and medium enterprises.

Table 3.2

Percentage distribution of enterprises owned by Male or Female entrepreneurs (category-wise).

Category	Male	Female	All
Micro	79.56	20.44	100
Small	94.75	5.25	100
Medium	97.33	2.67	100
All	79.63	20.37	100

Source: Annual report of MSME 2021-2022

The table shows that male-owned enterprise (79.63 %) is high as compared to female owned and it also shows that, the medium size enterprise is high as compared to small and micro enterprises.

➤ **Type of Ownership of enterprises**

It explains the percentage distribution of enterprises based on ownership of enterprise as male and female and also give a classification based on rural and urban.

Table 3.3

Percentage Distribution of Enterprises owned by male or female in rural and urban areas.

Sector	Male	Female	All
Rural	77.76	22.24	100
Urban	81.58	18.42	100
All	79.63	20.37	100

Source: Annual report of MSME 2021-2022

The table shows that male owned enterprises are high in urban area (81.58%) as compared to rural areas (77.76%).

➤ **Employment**

Here explains the distribution of employment generated in the MSME sector through various kinds of activities such as manufacturing, electricity, trade and other services based on the National Sample Survey (NSS) 73rd round. It is shown in the table 3.4.

Table 3.4*Estimated Employment in the MSME Sector (Activity Wise)***Employment (in lakh)**

Activity Category	Rural	Urban	Total
Manufacturing	186.56	173.86	360.41
Electricity	0.06	0.02	0.07
Trade	160.64	226.54	387.18
Other Services	150.53	211.69	362.22
All	497.79	612.11	1109.89

Source: Annual report of MSME- 2021-2022

The above table shows that 1109.89 lakh employment is created by the MSME sector through manufacturing (360.41 lakh), non-captive electricity generation and transmission (0.07 lakh), trade (387.18 lakh) and through other services (362.82 Lakh) in rural and urban area in the country.

➤ **Employment -Sector wise**

Here explains the employment generated in (MSME sector category wise) and also in rural and urban area based on National Sample Survey (NSS) 73rd round. It is shown in table

Table 3.5*Distribution of employment by type of Enterprises in Rural and Urban Areas (Numbers in lakh)*

Sector	Micro	Small	Medium	Total
Rural	489.3	7.88	0.61	497.79
Urban	586.88	24.06	1.16	612.1
All	1076.18	31.94	1.77	1109.89

Source: Annual report of Ministry of MSME 2021-2022

The table shows that the micro sector provides employment to 1076.19 lakh, persons, small sector to 31.94 lakh persons and medium sector is 1.77 lakh persons in

total employment provided by the MSME sector. It also shows the employment provided by the micro sector is high in an urban areas as compared to rural area.

3.10. MSME sector in Kerala

MSME sector is emerging as Kerala's largest income-generating and employment-generating sector. The growth of MSMEs in Kerala would be supported by its good communication network, highly skilled workforce, and relatively good industrial infrastructure. As a result of the MSME sector, it has assisted in industrializing rural and backward areas and has provided employment to youth and socially disadvantaged groups including SCs, STs, women, and persons with disabilities. MSMEs play a key role in the economic growth of Kerala.

The Economic Review 2021 of the Government of Kerala reports that 11,540 new MSME units were established in the State in 2020-21 with an investment of 1,221.86 crore and created 44,975 jobs. It is estimated that 15,285 new units and 56,233 new employees began operation in FY 2021-22. The largest number of MSME units was located in Thrissur (1789) with an investment of 121.15 crore, generating 5,200 jobs, followed by Kozhikode (1455 units) with a 134.38 crore investment, generating 4738 jobs, and Thiruvananthapuram with 1,420 units, providing employment to 5142 people. With 220 units, Kasargod had the lowest number, providing employment to 959 people.

3.11. Industrial clusters in India

3.11.1. Introduction

The Ministry of Micro, Small, and Medium Enterprises (MSME), Government of India has adopted the cluster development approach as a key strategy for improving productivity and competitiveness as well as building capacity in Micro and Small Enterprises (MSEs) in India. MSME's Cluster Development Programme is one of the longest-running schemes under the Office of Development Commissioner. (<https://msme.gov.in/sites/default/files/ModifiedGuidelinesofMSE>)

The Ministry of Micro, Small & Medium Enterprises emphasized the development of clusters and launched the UPTECH program in 1998 for technology upgradation and management. It used a cluster-based approach to develop MSEs, but mainly focused on technology, with diagnostic studies, demonstration plants, workshops, and seminars. It aimed to accelerate the diffusion of technology across the cluster of small businesses.

This scheme was renamed in August 2003 as the Small Industry Cluster Development Program (SICDP) and was enacted by adopting a holistic approach to cluster development which includes marketing, exports, skill development, setting up common facility centres and upgrading the technologies of the enterprises. As a result of comprehensive revisions to SICDP guidelines in March 2006, the cluster programme is able to deploy resources with considerable economies of scale in the medium-to-long term. Moreover, the Government of India provided additional assistance to selected clusters up to Rs.8 crore to support soft and hard interventions, including the establishment of common facilities (Ittyerah, 2009).

In October 2007, SICDP was renamed as Micro & Small Enterprises - Cluster Development Programme (MSE-CDP) as part of the Government's Promotional Package, though its basic features have not changed. For the purpose of providing developed sites for new enterprises and upgrading existing industrial infrastructure, the Integrated Infrastructural Development Scheme (IID) was subsumed into the MSE-CDP. A comprehensive MSE-CDP is being administered by the office of Development Commissioner (MSME), the Ministry of MSME.

The last revision of the MSE-CDP was in 2019. With regard to cluster development, the Ministry of MSME intends to bring harmony and alignment between its two cluster schemes, Scheme of Fund for Regeneration of Traditional Industries (SFURTI) and Micro & Small Enterprise Cluster Development Programme (MSE-CDP). All enterprises within or near the clusters should be able to become competitive vertically and horizontally, as well as improve cluster competitiveness across sectors and regions. (<https://msme.gov.in/sites/default/files/ModifiedGuidelinesofMSE>)

Though the schemes target different segments from artisans, traditional enterprises, village enterprises, micro & small enterprises to medium manufacturing enterprises, the sole intention is to bring competitiveness and technology among enterprises, right skill and linking various efforts of Government of India. Currently, these are operating independently. MSME-Technology Centres (TCs) may act as apex institutions for providing world class common facility services and skill development support to MSMEs. TCs can contribute effectively in technology needs of the cluster development in the country. (<http://www.dcmsme.gov.in/schemes/New-Guidelines>.)

There is a National Resources Centre (NRC) for Small Industry Cluster Development at the National Institute of Small Industry Extension and Training (NIISIET), Hyderabad and the International Centre for Cluster Competitiveness and Growth at the Entrepreneurship Development Institute of India, Gandhinagar, Gujarat for providing training and other services for cluster development. As part of the training, they offer courses over three to four weeks to CDEs to learn how to conduct diagnostic studies and implement cluster development initiatives. Once the Ministry of MSME approves their project proposals, implementation agencies can approach these institutions to arrange training for the CDEs (Ittyerah, 2009) .

3.11.2. Elements in Cluster Development Programme

Cluster Development Programme (MSE-CDP) is issued in supersession of the previous guidelines relating to SICDP and IID schemes and it includes the following elements.

➤ **Diagnostic Study:**

The first step in the process of cluster development is to conduct a diagnostic study. This study aims to depict all the business processes of the cluster units to understand their strengths, weaknesses, threats and opportunities. This helps to suggest remedial measures with a well-drawn action plan as a diagnostic study report.

➤ **Soft Interventions:**

It includes various activities such as the creation of general awareness, counselling, motivation and trust building, exposure visits, market development etc. for cluster units. This intervention provides general attitudinal changes to initiate improvements in the existing working style of units in the clusters.

➤ **Detailed Project Report (DPR)**

Technical and financial feasibility report should be prepared for setting up a common facility centre for clusters of MSE units as well as for an infrastructural development project in a new industrial area or to upgrade existing infrastructure.

➤ **Hard Intervention/Common Facility Centres (CFCs):**

It consist of the creation of tangible assets such as common facility centre like common production or processing centre, design centres, testing facilities, training centre, research and development centres, effluent treatment plant, marketing display or selling centre, common logistics centre, common raw material bank or sales depot, etc.

➤ **Infrastructure Development:**

It consists development of infrastructural facilities like power distribution networks, water, telecommunication, drainage and pollution control facilities, roads, banks, raw materials, storage and marketing outlets etc. in a new or existing industrial area or clusters (<https://msme.gov.in/sites/default/files/ModifiedGuidelinesofMSE>).

3.11.3. Financial assistance under the scheme:

The financial assistances for various interventions are:

➤ **Diagnostic Study Report:**

A maximum grant of Rs 2.50 lakh will be provided by the Government of India. For the field organizations (MSME-DIs) of the Ministry of MSME, they will be given a grant of Rs 1.00 lakh.

➤ **Soft Interventions:**

Govt. of India grant of 75% of the sanctioned amount of the maximum project cost of Rs 25.00 lakh per cluster. For NE & Hill States, Clusters with more than 50% of micro or village, women owned, SC/ST units the grant will be 90%.

➤ **Detailed Project Report:**

Govt. of India grant of maximum Rs 5.00 lakh for preparation of a technical feasibility and viability project report.

➤ **Common Facility Center/Hard Interventions:**

Tangible assets like machinery and equipment for critical processes, research, and development, testing, etc. with Govt. grant upto 70% of the cost of project of maximum Rs 15.00 crore. It will be 90% for NE & Hill States, Clusters with more than 50% of micro or village, women owned, SC/ST units.

➤ **Infrastructure Development:**

GoI grant upto 60% of the cost of project of Rs 10.00 crore, excluding cost of land. GoI grant will be 80% for projects in NE & Hill States, industrial areas/ estates with more than 50% of micro , women-owned and SC/ST units

<https://msme.gov.in/sites/default/files/ModifiedGuidelinesofMSE>

3.11.4. Components of the cluster development programme

➤ **There are two components of the MSE-CDP scheme:**

1. Common Facility Centres (CFCs): Here, tangible assets are created as Common Facility Centres (CFCs).
2. Infrastructure Development (ID): This component is for the development of infrastructure in new/existing notified industrial area.

1. Common Facility Centres (CFCs):

This component consists of creation the of tangible assets in the form of Common Facility Centres (CFCs) in Industrial area.

Table 3.6

Funding pattern under this scheme for setting up CFCs

The funding pattern of projects			
Total cost of the Project	Funding Pattern		
	Govt of India	State Govt	SPV
Rs 5 crore to Rs 10 crore	70%	20%	10%
Rs 10 crore to Rs 30 crore	60%	20%	20%

Source: <http://www.dcmsme.gov.in/schemes/New-Guidelines.pdf>

Table 3.7

The funding pattern of projects located in the Aspirational Districts, NER, Hill States and islands

The funding pattern of projects			
The total cost of the Project	Funding Pattern		
	Govt of India	State Govt	SPV
Rs 5 crore to Rs 10 crore	80%	15%	5%
Rs 10 crore to Rs 30 crore	70%	15%	15%

Source: <http://www.dcmsme.gov.in/schemes/New-Guidelines.pdf>

2. Infrastructure Development (ID):

This component is for the development of infrastructure in new or existing notified Industrial areas.

The funding pattern under this scheme for the development of infrastructure is given below:

Table 3.8.*The funding pattern of projects*

Components	Total cost of the Project	Funding Pattern		
		Govt of India	State Govt.	SPV
1 Infrastructure development - New	Rs 5 crore to Rs 15 crore	60%	40% ---	...
2 Infrastructure development - Upgradation of existing Infrastructure	Rs 5 crore to Rs 10 crore	50%	50%	...

Source: <http://www.dcmsme.gov.in/schemes/New-Guidelines.pdf>

Table 3.9

The funding pattern of projects located in the Aspirational Districts, NER, Hill States and islands

Components	Total cost of the Project	Funding Pattern		
		Govt of India	State Govt	SPV
1 Infrastructure development -New	Rs 5 crore to Rs 15 crore	70%	30% ---	...
2 Infrastructure development - Upgradation of existing Infrastructure	Rs 5 crore to Rs 10 crore	60%	40%	...

Source: <http://www.dcmsme.gov.in/schemes/New-Guidelines.pdf>

A CFC project exceeding Rs. 30 crores can be considered, but the Govt.of India assistance will be calculated based on the maximum eligible project cost of Rs. 30 crores.

In the same way, ID projects over Rs. 10 crore/15 crore can also be considered; however, assistance from the Government will be calculated based on the maximum eligible project cost of Rs. 10 crore/15 crore (<https://msme.gov.in/sites/default/files/ModifiedGuidelinesofMSE>)

3.11.5. Approval Process

- a) There should be an appraisal of the DPR by any branch of SIDBI or any commercial bank. The techno-economic feasibility report of the bank and the DPR would be presented to the SLSC.
- b) State Level Steering Committee (SLSC)
 - i) Under the Chairmanship of the ACS/Principal Secretary / Secretary (Industries / MSME), each State Government must form a State Level Steering Committee consisting of all stakeholders. DPRs will be examined by the State Level Steering Committee, recommendations will be made and monitoring will be conducted to ensure satisfactory and time-bound implementation of the approved projects.
 - ii) The State-Level Steering Committee shall consist of the following:

Table 3.10

State Level Steering Committee (SLSC)

ACS/Principal Secretary / Secretary (Industries/MSME)	Chairman
Commissioner / Director of Industries / MSME.	Co Convener
Managing Director or Representative of Implementing Agency	Member
Representative of Finance Department	Member
Director, MSME-Development Institute	Member. Secretary, Convener
General Manager, Concerned District Industries Centre	Member
Special invitees (if any) like representative of SIDBI or any financial institution or any official required for the purpose	Member
A representative from Technical Institution/ MSME Technology Centres of M/o MSME	Member

Source: <http://www.dcmsme.gov.in/schemes/New-Guidelines.pdf>

- iii) After the proposal has been recommended by the State Level Steering Committee, it will be forwarded by the concerned MSME-DI online with its recommendations before being reviewed by the Office of DC MSME. If the SLSC fails to recommend or reject a proposal within the stipulated time for recommendation as given at Annexure 6, the proposal will be treated as deemed recommended by the SLSC

(c) National Project Approval Committee (NPAC)

NPAC shall consider and approve the projects recommended by SLSC. Meetings will be held every two months. Themembers includes:

Table 3.11

National Project Approval Committee (NPAC)

1	Secretary (MSME)	Chairman
2	AS&DC (MSME)	Member
3	Adviser (VSE), NITI Aayog	Member
4	Joint Secretary (ARI), Ministry of MSME	Member
5	Economic Adviser (EA)/IFW	Member
6	Additional Development Commissioner/JS/DDG of the Cluster Division	Member secretary
7	Representative of SIDBI	Member
8	Representative of CSIR	Member
9	Representative of NSIC / KVIC	Member
10	Representative of DPIIT, MoTextile, DoPharma, MeitY, MoRD, MoFPI, MoDefence, DoFisheries, DoAnimal Husbandry and Dairying	Member
11	Director, MSME-DI concerned	Member
12	Principal Secretary / Secretary (Industries/MSME) / Commissioner / Director of Industries / MSME of the State Govt.	Special Invitees
13	Representative(s) of concerned Industry Association(s), Representative from Financial Institution, Programme Management Service Provider, Appraisal Agencies etc.	Special Invitees
14	Director (CD)	Member

Source: <http://www.dcmsme.gov.in/schemes/New-Guidelines.pdf>

3.11.6. Implementing Agencies:**a) Setting up of CFC**

- Offices of Ministry of MSME - MSME-DIs, NSIC, KVIC, Coir Board, Technology Centres, NI-MSME and MGIRI
- Organizations of State Governments
- National and International Institutions which are engaged in the development of the MSE sector.
- Any other institution or agency approved by the Ministry of MSME

b) Infrastructure Development Projects

State or UT Governments through an appropriate State Government or UT Agency or Integrated Industrial Park Development Agency/State Industrial Development Agency.

3.11.7. The status of the CFC in India

- **Year wise achievement**

Table 3.12

Year wise achievement in CFC and ID Project

FY	Project approved			Project complete		
	CFC	ID PROJECTS	TOTAL	CFC	ID PROJECTS	Total
2019 -20	39	35	74	11	11	22
2020-21	26	42	68	8	12	20
2021 -22	17	14	31	3	13	16
2022-23 Till 02/09/2022	5	10	15	1	2	3

Source: (<https://dashboard.msme.gov.in/cdp.aspx>)

Fund sanctioned under the MSE-CDP scheme**Table 3.13***Statement of funds sanctioned under MSE-CDP from 2014-15 to 22/04/2022*

Year	BE / RE	Expenditure (Rs. Crore)
2014-15	93.00 / 84.60	63.18
2015-16	100.00 / 102.95	81.36
2016-17	135.00 / 123.00	121.68
2017-18	184.00 / 157.65	157.11
2018-19	279.00 / 173.40	172.73
2019-20	227.90 / 227.90	226.339
2020-21	390.69 / 116.28	116.28
2021-22	156.60 / 156.60	135.59
2022-23	262.00 / 0.00	0

Source: (<https://cluster.dcmsme.gov.in/>)

Status of industrial clusters in India is shown in Appendix II.

3.12. Industrial Clusters in Kerala

Department of Industries & Commerce, Government of Kerala has introduced the Cluster Development Programme (CDP), which is primarily focused on cost reduction, value addition, technology upgrading, and skill development of Micro Small & Medium Enterprises (MSMEs). Ministry of Micro, Small and Medium Enterprises (MSME), Government of India is providing financial assistance to set up Common Facility Centres (CFC) in clusters under the Micro Small Enterprises - Cluster Development Program (MSE-CDP).

Kerala Bureau of Industrial Promotion (KBIP) coordinates the industrial cluster development activities throughout the state in association with Directorate of Industries & Commerce and District Industries Centres. Kerala Bureau of Industrial Promotion (KBIP) is the Implementing Agency of CFC projects under the MSE-CDP Scheme. At present, there are 12 industrial clusters in Kerala commissioned by the authority which include Rubber Cluster -Kottayam, Plastic Cluster- Aluva, Plywood

Manufactures Cluster- Perumbavoor, Furniture Cluster- Ernakulam, Rice Millers Cluster- Kalady, Ernakulam, Wood Cluster-Perinthalmanna, Malappuram, General Engineering Cluster- Malappuram, Terra Tile Cluster- Thrissur, Wood Cluster- Chadayamangalam, Kollam, Offset Printers Cluster- Kannur, Wood Furniture Cluster- Taliparamba, Kannur and Furniture Cluster- Kadalassery, Thrissur. (<https://www.msmedithrissur.gov.in/msme-dfo-thrissur>)

Kerala is among the top 5 states in the country in implementing the MSE-CDP in an effective manner (CFCs & ID projects). Rs.193.7 Crores have been sanctioned to Kerala under the programme in which Rs.113.81 Crores have already been disbursed as Government of India grant. 12 Common Facility Centres have already been commissioned and 8 Industrial Parks have been developed utilising these funds. Also 4 CFCs and 3 ID projects are under various stages of implementation in the State, of Kerala. MSME Development and Facilitation Office, Thrissur is actively engaged in the promotion and development of clusters in the State in close liaison with the State Government and other stakeholders. (Annual Report, DFO,2021-2022)

Status of Industrial Clusters in Kerala

There are 12 commissioned clusters in Kerala. The status of industrial clusters under MSE-CDP for the year 2021-22 are as follows:

Table 3.14*Status of Activities under MSE-CDP 2021-22*

CFC Projects – Commissioned						
Sl No.	Name of the cluster	Contribution Govt.of India (Rs.in Lakhs)	Contribution Govt.of Kerala (Rs.in Lakhs)	Contribution of Consortium (Rs.in Lakhs)	Total (Rs.in Lakhs)	Status
1	Rubber Cluster, Changanassery	239.89	-	26.65	266.54	Commissioned June, 2007
2	Plastic Cluster, Aluva	315	92	83	490	Commissioned February 2009
3	Plywood Manufactures Cluster, Perumbavoor	235.31	67.23	114.69	417.23	Commissioned January 2010
4	Furniture Cluster, Ernakulam	245.29	98.12	147.17	490.58	Commissioned September 2010 Flood affected the cluster and damage occurred to machineries and raw material.
5	Rice Millers Cluster, Kalady, Ernakulam	472.84	162.72	77.84	713.4	Commissioned December 2011
6	Wood Cluster, Perinthalmanna, Malappuram	160.23	45.78	22.89	228.9	Commissioned July 2012

CFC Projects – Commissioned						
Sl No.	Name of the cluster	Contribution Govt.of India (Rs.in Lakhs)	Contribution Govt.of Kerala (Rs.in Lakhs)	Contribution of Consortium (Rs.in Lakhs)	Total (Rs.in Lakhs)	Status
7	General Engineering Cluster, Malappuram	199	63	53.01	315.01	Commissioned January 2015
8	Terra Tile Cluster, Thrissur	249.65	99.86	149.79	499.3	Commissioned January 2010 (CFC is not functioning due to lack of raw material)
9	Wood Cluster, Chadayamangalam, Kollam	181.67	51.91	25.95	259.53	Commissioned May 2017
10	Offset Printers Cluster, Kannur	855.5	244.43	122.21	1,222.14	Commissioned March 2018
11	Wood Furniture Cluster, Taliparamba, Kannur	811.67	235.38	117.69	1,164.74	Commissioned December 2018
12	Furniture Cluster, Kadalassery, Thrissur	1,002.46	289.01	153.61	1,445.08	Commissioned January , 2021

Source: <https://industry.kerala.gov.in/index.php/details-of-commissioned-common-facility-centres-under-mse-cdp-scheme>

A detailed report is shown in Appendix III

On going CFC projects in Kerala

The CFC projects under processing is depict in table.

Table 3.15

CFC Projects - On going

Sl. No.	Name of the Project	Contribution of GoI (Rs.in Lakhs)	Contribution of GoK (Rs.in Lakhs)	Contribution of Consortium(Rs.in Lakhs)	Total Cost (Rs.in Lakhs)
1	Plywood Cluster, Idukki Parliament Constituency, Ernakulam District (West Malabar Plywood Manufacturers Cluster Services Pvt. Ltd.)	982.884	280.824	140.412	1,404.12
2	Furniture Cluster, Kozhikode	1002.46	289.34	144.67	1,445.08
3	Kalady Steel Consortium, Ernakulam	1050	300	221.71	1571.27
4	Papadam Cluster,	403.25	115.2	57.61	576.06

Source: <https://www.kbip.org/activities/cluster-development>

Table 3.16*Industrial clusters under SFURTI*

Status of Industrial clusters in Kerala under SFURTI					
No.	Cluster Name	Product Category	Agency Name	No.of Artisans	Fund Under SFURTI (Rs.in Lakh)
1	Neyyattinkara Coir Cluster, Trivandrum	Coir	COIRBOARD	2000	144.08
2	Baluserry Coir Cluster,Kozhikode	Coir	COIRBOARD	500	109.02
3	Haripadu Coir Cluster,Thrissur	Coir	COIRBOARD	3000	284.03
4	The Kerala cluster for flavoured coconut milk and virgin coconut oil,Tirur	Agro	NIMSME	750	245.89
5	Ambalapuzha Coir Development Society,Alapuzha	Coir	COIRBOARD	368	159.48
6	Foot & Floor-mat Cluster, Thiruvanthapuram	Handicraft	KVIC	500	75.49
7	Kasaragod Beekeeping Cluster,Kasaragod	Agro	KVIC	579	177.3
8	Guruvayoor Handicrafts Cluster,Thrissur	Handicraft	KVIC	300	206.16
9	Kannur Beekeeping Cluster,Kannur	Agro	KVIC	400	229.67

Source: <https://sfurti.msme.gov.in/SFURTI/Reports/DPR.aspx>

A detailed report is shown in Appendix IV.

3.13. Engineering and Fabrication Sector in India

The engineering and fabrication sector is one of the contributors to manufacturing sector output in the country and its demand is increased due to the expansion in manufacturing and service sector. In India, the engineering industry comprises two main segments, namely, heavy engineering and light engineering. The heavy engineering segment produces products like machine tools, heavy machinery and equipment, mining and quarrying equipment, material handling equipment, and automobiles and automotive components that cater to heavy electrical industries, power generation and distribution, steel firms, and transportation firms.. The light engineering segment also produces goods as inputs by the heavy engineering segment and products manufactured by this segment includes electrical wires and cables, transmission towers, lifts and escalators, cranes, lead acid and dry cell batteries. The important segments in the engineering industry includes the automotive industry, the auto -components industry, machinery and equipment industry, electrical machinery industry, electronic equipment industry and the fabricated metal products industry.

India has an important position in the global steel map, with the establishment of modern steel mills and large-scale capacity acquisition. India has an advantage of good process, product and engineering capabilities that may be applied to tasks as required for re- design of the manufacturing process as make the more intensive and enable firms to reduce costs. The export mix of India engineering goods and services is skewed towards the more developed countries.

Clusters like one at Yamunanagar in Hariyana comprise firms largely in to the machinery and equipment industry and undertaking related fabrication jobs. The more prominent and rather smile ,though larger clusters in Indian context may be viewed in terms of heavy engineering and fabrication clusters of Vadodara in Gujarath and Trichy in Tamil Nadu. The engineering and fabrication clusters at Coimbatore is also a prominent cluster in this context.

An important activity in such light and heavy engineering and fabrication clusters comprise fabrication, which typically involves building metal structures by cutting, bending and assembling. The engineering and fabrication segment is large in

many of the more prominent urban agglomerations of the country like Chennai, Hyderabad, the NCR, Bangalore, Ludhiana and Pune. Some regions such as Kota, Rajasthan have even grown to specialise in particular products and consumables such as welding rods. Large urban agglomerations across the country, even in relatively industrially backward regions like Patna, Bihar have a significant light engineering and steel fabrication cluster.

Steel and related fabricated products are basically made with varying combinations of alloy metals for different applications. Carbon, steel composed of iron and carbon, accounts for over 90 percent steel production. Stainless steels and surgical stainless steels contain a minimum of 11 percent chromium, often combined with nickel, to resist corrosion or rust and differs from carbon steel due to the amount of chromium present. Unprotected carbon steel rusts readily when exposed to air and moisture. Steel may be classified broadly in to two types according to its composition namely alloy steel and non-alloy steel. Alloy steel is produced using alloying elements like manganese, silicon, nickel and chromium. Non alloy steel has no alloying component in it, but for that which is normally present such as carbon. Non alloy steel is mainly of three types that is mild steel (containing up to 0.3 percent carbon) medium steel (containing between 0.3-0.6 percent carbon) and high steel (containing more than 0.6 percent carbon). All types of steel other than mild steel are called special steel.

Fabrication is an industrial term refers to building metal structures by cutting, bending and assembling. The cutting part of fabrication is often via sawing shearing or chiselling manually or powered, torching with handheld torches (such as plasma torches in locations like Guntur, or with CNC cutter using a laser or water jet), drilling and grinding as part of finishing activity. The bending is via hammering (manually or powered) or via press brakes and similar tools. The assembling (joining of pieces) is through welding. Structural steel and sheet metal are vital inputs for fabrication along with welding rod or wire, flux and fasteners to join cut pieces. In related smaller Indian clusters like Guntur and Salem, most actively is manual with a degree of automation.

The clustering phenomena in steel product fabrication is evident across the country. There are more well known clusters like Trichi and Ranipet in Tamil Nadu. Further, Chennai, Bangalore, Mysore, Hyderabad ,Mumbai are also some of other prominent locations. There is a specialisation in many developed clusters such as the one at Trichi and Ranipet in Tamil Nadu engaged in manufacturing of sophisticated heavy electrical power generation equipment and boiler components. Many in Trichi are supported by strong dedicated industry associations. The BIDASS Industrial Service Association in Trichy started steel operations in 1984 and involved in joint sourcing of consumables like welding rods for member units.

The clustering phenomenon is also apparent in locations like Jagadiri stainless steel and Kundli in Hariayana. Most of these locations have a strong base of utensils manufacture. Some of these clusters comprise of small and medium enterprises who are export oriented. (Padmanand & Kurian, 2015)

3.14. General Engineering cluster in Malappuram district, Kerala.

The General Engineering Cluster located in Malappuram district, Kerala consists of 200 general engineering units. These industries are engaged in various kinds of production activities which include the production of grills and gates, furnitures like chairs, tables, shelves, etc. roofing works, welding works, interior designing works, all kinds of fabrication works etc. For supporting this cluster, there is a Common Facility Centre (CFC) named MECON CFC, situated at Manjery in Malapuoram district. It was commissioned in the year 2015 .CFC is established with the contribution of the central and state govt, and also with the contribution of Special Purpose Vehicle (SPV) members in the cluster. There are various kinds of machines arranged at CFC. The facilities arranged at CFC can utilise the members in the cluster with service charges and it also can use non members if the space available.

3.15 Conclusion

This chapter gave theoretical framework for the present study on the working of General Engineering cluster in Kerala .It gave an overview of the theoretical aspects of industrial clusters and covered the meaning and definition of industrial cluster, features, objectives, types and benefits of industrial clustering, MSMEs in India, Industrial clusters in India and in Kerala. This gives a clear picture of the concept of industrial cluster.

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4.1 Introduction

The General Engineering Cluster is located in the Malappuram district, Kerala and it consists of two hundred general engineering units. This chapter explains the present status of the industrial units functioning under this cluster. The present status of these units are analyzed by considering different aspects like demographic profile of the unit holder, demographic profile of the unit, financial aspects, infrastructural aspects, technological aspects, marketing aspects, safety aspect, and performance of the units. It describes the result of the analysis based on the survey.

4.2 Demographic profile of unit holders

It describes the background of the unit holders in the general engineering cluster. The demographic profile of the unit holders was analyzed based on some variables such as age, gender, educational level, technical qualification, community, religion, place of domicile, marital status, ownership of house, experience, generation, and training programmes attended by the unit holders. This analysis is necessary to describe the perception of the unit holders towards the industrial clustering and also to analyse the performance of the units in the General Engineering Cluster.

4.2.1. Age of the unit holders

Unit holders' ages are considered demographic variables since they are important when analyzing the performance of the units and also when analysing how they perceive the industrial clustering. The age group has been classified into three categories i.e., below 40 years, 41 to 50 years, and above 50 years. The frequency distribution of unit holders on the basis of their age is given in table.4.1.

Table 4.1.

Frequency Distribution – Age

Age (Years)	Frequency	Percentage
<= 40	22	36.7
41 – 50	15	25.0
>= 50	23	38.3
Total	60	100

Source: Survey data

In terms of age of all the unit holders, below 40 years constituted 36.7 percent, 41-50 years constituted 25 percent and the remaining 38.3 percent of the unit holders fall under the age group of above 50 years.

Thus, unit holders in the General Engineering Cluster in Malappuram district are mostly below 40 years of age and above 50 years of age.

4.2.2. Gender of the unit holders

This study shows that the General Engineering Cluster is male-dominated.

4.2.3. Educational Qualification of the unit holders

It shows the educational qualification of the unit holders in the General Engineering Cluster in Malappuram District. Educational qualification of unit holders includes elementary, secondary, higher secondary, and graduation.

The frequency distribution of unit holders based on their educational qualification is shown in table .4.2.

Table 4.2*Frequency Distribution - Educational Qualifications*

Educational Qualifications	Frequency	Percent
Elementary	6	10.0
SSLC	37	61.7
Higher Secondary	13	21.6
Graduate	4	6.7
Total	60	100

Source: Survey data

In terms of educational qualification of the unit holders, 10 percent of the unit holders have elementary education, 61.7 percent of the unit holders have a secondary level of education, 21.6 percent of the unit holders have higher secondary education and 6.7 percent have a graduate level. Consequently, it is revealed that the majority of unit holders have completed secondary education.

4.2.4. Technical Qualification

It is useful to analyse the performance of the units under the General Engineering Cluster in Malappuram. The frequency distribution of unit holders based on technical qualification is shown table.4.3.

Table. 4.3.*Frequency Distribution - Technical Qualification*

Technical Qualification	Frequency	Percent
Yes	12	20.0%
No	48	80.0%
Total	60	100

Source: Survey data

This analysis shows that 20 percent of the unit holders are technically qualified and 80 percent are not technically qualified.

4.2.5. Community of unit holders

This study considers community as demographic variable which includes forward caste, OBC, and SC/ST.

The frequency distribution table shows the classification of unit holders based on their community in table .4.4.

Table 4.4.

Frequency Distribution – Community

Community	Frequency	Percent
FC	5	8.3%
OBC	51	85.0%
SC/ST	4	6.7%
Total	60	100

Source: Survey data

This analysis shows that 8.3 percentage unit holders come under forward caste,85 percent come under OBC and 6.7 percentage come under SC/ST category. It revealed that the OBC group is the most dominant group in this cluster.

4.2.6. Religion of unit holders

This study covers religions like Hindu, Muslim, and Christian. The frequency distribution based on religion is shown in table.4.5

Table 4.5

Frequency Distribution – Religion

Religion	Frequency	Percent
Hindu	48	80.0%
Muslim	11	18.3%
Christian	1	1.7%
Total	60	100

Source: Survey data

The table shows that 80 percent of unit holders come under the Hindu religion, 18.3 percent come under the Muslim and 1.7 percent come under the Christian religion.

4.2.7. Place of domicile of unit holders

Since the place of domicile of the unit holders such as rural, semi-urban, and urban influences its performance of the unit, it considered as one of the variables. The following frequency table shows the classification of unit holders based on their place of domicile in the table.4.6.

Table 4.6.

Frequency Distribution - Place of Domicile

Place of Domicile	Frequency	Percent
Rural	53	88.3%
Semi-urban	7	11.7%
Urban	0	0.0%
Total	60	100

Source: Survey data

This analysis shows that 88.3 percent of unit holders are in rural areas and the rest 11.7 percent in semi-urban areas. It revealed that most of the unit holders are in rural areas.

4.2.8. Marital status of the unit holders

This study considered both married and unmarried unit holders. Based on their marital status, the frequency is described in the table 4.7.

Table 4.7

Frequency Distribution - Marital Status

Marital Status	Frequency	Percent
Single	3	5.0%
Married	57	95.0%
Total	60	100

Source: Survey data

This analysis shows that 5 percent of unit holders are unmarried and 95 percent are married.

4.2.9. Experience of the unit holders:

The frequency distribution of unit holders based on their experience is shown in table. 4.8.

Table 4.8

Frequency Distribution – Experience

Experience (Years)	Frequency	Percent
<= 10	6	10.0%
11 – 20	26	43.3%
21 – 30	20	33.3%
> 30	8	13.3%
Total	60	100

Source: Survey data

The frequency table shows that 10 percent of unit holders have below 10 years of experience, 43.3 percentage unit holders included in 11-20 years of experience, 33.3 percent of unit holders constituted under 21-30 and 13.3 percentage unit holders have above 30 years of experience. Hence this study revealed that the majority of unit holders get experience of 11-20 years.

4.2.10. Generation of the unit holders

Generation of unit holder means whether the business is started by the unit holder itself or it has been transferred from their grandparents. The first and second generation of business is considered for this study. It explains the number of generations that the unit holders belong to. The frequency distribution of the same is given in table 4.9.

Table 4.9

Frequency Distribution – Generation

Generation	Frequency	Percent
First Generation	51	85.0%
Second Generation	9	15.0%
Total	60	100

Source: Survey data

The above table shows that 85 percent unit holders are included in first generation and 15 are in second generation. Hence this study revealed that the majority of unit holders are included in first generation.

4.2.11. Training Programmes attended by the unit holders

The training programmes attended by the unit holders also determine the level of performance of their units and also influence their perception towards the clustering. The unit holders are classified based on training programmes attended by them as government sponsored programmes, private programmes, both of these two, and not trained. The distribution of unit holders on the basis of the kinds of training programmes attended so far is shown in table 4.10.

Table 4.10

Frequency Distribution- Training Programmes

Training Programmes	Frequency	Percent
Govt. Sponsored	13	21.7%
Private	10	16.7%
Both	15	25.0%
No Training	22	36.7%
Total	60	100

Source: Survey data

This table shows that out of the 60 unit holders 21.7 percent have attended govt. sponsored training programmes, 16.7 percent attended private programmes, 25 percentage attended both Govt.sponsored programmes and private sponsored programmes, and 36.7 percentage not attended any kind of training programmes. This analysis shows that majority of unit holders are not attended any kind of training programmes.

4.3 Demographic profile of unit

While analysing the linkage of unit holders with various other parties it is considered as variables for the study. The demographic profile of the unit is analysed

by considering the variables such as type of units, age of the units, type of activity and industrial classification.

4.3.1 Type of unit

Types of units functioning under the general engineering cluster is classified into sole proprietorship and partnership . The frequency distribution of units based on their types is shown in table 4.11.

Table 4.11

Frequency Distribution - Types of Unit

Type of Unit	Frequency	Percent
Sole proprietorship	49	81.7
Partnership	11	18.3
Total	60	100

Source: Survey data

In terms of the type of unit, 81.7 percent of units are proprietary type and 18.3 percent of units are doing business as partnership firms. According to this analysis, proprietorships are the most prevalent business type in this cluster.

4.3.2 Age of unit

It is necessary while analysing the linkage of unit with other parties in the cluster. The age group has been classified into three categories i.e., below 15 years, 16 to 20 years, and above 20 years. The frequency distribution of unit based on its age is given in table. 4.12.

Table 4.12

Frequency Distribution – Age of Unit

Age (Years)	Frequency	Percentage
<= 15	21	35.0%
16 – 20	12	20.0%
> 20	27	45.0%
Total	60	100

Source: Survey data

The table depicts that below 15 years constituted 35 percent, 16-20 years constituted 20 percent and the remaining 45 percent of the unit fall under the age group of above 20 years.

Thus, units in the General Engineering Cluster in Malappuram district are mostly above 20 years of age.

4.3.3 Type of activity

This analysis helps to understand the type of activity undertaken by the units under this cluster. The type of activity undertaken by the unit include manufacturing, processing and trading.

The frequency distribution of unit based on the type of activity is shown in table 4.13.

Table 4.13.

Frequency Distribution - Type of activity

Type of Activity	Frequency	Percentage
Manufacturing	60	100.00
Processing	0	0.00
Trading	0	0.00
Total	60	100

Source: Survey data

In terms of the type of activity, all the units functioning under the General Engineering Cluster is undertaking manufacturing activities.

4.3.4. Industrial classification

The industrial classification includes micro units, small units and medium units. It helps to understand the category of industrial units included in the general engineering cluster. The frequency distribution of unit based on the industry classification is shown in table 4.14.

Table 4.14.*Frequency Distribution- Industrial Classification*

Industrial Classification	Frequency	Percent
Micro	60	100.0%
SSI	0	0.0%
Medium	0	0.0%
Total	60	100

Source: Survey data

This study reveals that all the units in General Engineering Cluster are micro units.

4.4. Financial Aspects

The Financial profile of the units has been examined with the help of the value of invested capital, value of fixed assets, value of current assets, sufficiency of working capital, sources of funds, funding institutions, repayment, subsidy for individual unit, perception about rate of interest and profitability.

4.4.1. Invested capital

It is the amount invested by the unit holders in their business. Since the fund invested in business by the unit holders influence the performance of business, it is considered as one of the variables for the study. The capital invested by the unit holders are classified for the present study as less than Rs.5 lakh, 5 – 10 lakhs, 10 – 15 lakhs, 15 - 20 lakhs, 20 -25 lakhs. The frequency distribution of units based on investment is shown in table 4.15.

Table 4.15.*Frequency Distribution- Invested Capital*

Invested Capital	Frequency	Percentage
< 5 Lakhs	41	68.3%
5 - 10 Lakhs	14	23.3%
10 - 15 Lakhs	3	5.0%
15 - 20 Lakhs	1	1.7%
20 - 25 Lakhs	1	1.7%
Total	60	100

Source: Survey data

This table shows that among all unit holders 68.3 percent invested less than 5 lakhs in their business, 23.3 percent of units invested in the range from 5-10 lakhs, 5 percent invested in between 10-15 lakhs ,1.7 percent in 15-20 lakhs and other 1.7 percent in 20-25 lakhs.

4.4.2 Value of fixed assets

It is the amount invested by the unit holders in the fixed asset of their industrial unit. The value of fixed asset is classified as less than Rs.5 lakh, 5 lakh – 10 lakhs, 10 lakhs – 15 lakhs, 15 lakhs - 20 lakhs, 20 lakh -25 lakhs. The distribution of units based on the investment in fixed asset is shown in table 4.16.

Table 4.16.

Frequency Distribution -Value of Fixed Assets

Value of Fixed Assets	Frequency	Percent
< 5 Lakhs	42	70.0%
5 - 10 Lakhs	14	23.3%
10 - 15 Lakhs	2	3.3%
15 - 20 Lakhs	1	1.7%
20 - 25 Lakhs	1	1.7%
Total	60	100

Source: Survey data

The table shows that 70% of unit holders invested below 5 lakhs in fixed asset, 23.3 percent in 5-10 lakh, 3.3 percent in 10- 15 lakhs and balance 1.7 percent each in 15- 20 lakh and in 20-25 lakhs. Hence it revealed that most of the unit holders under study are made investment less than 5 lakhs in fixed assets.

4.4.3. Value of current assets

It is the amount invested by the units in current asset. The value of current asset is classified for the study as less than Rs.5 lakh, 5 lakh – 10 lakhs, 10 lakhs – 15 lakhs, 15 lakhs - 20 lakhs, 20 lakh -25 lakhs. The distribution of units based on the investment in current asset is shown in table 4.17.

Table 4.17*Frequency Distribution -Value of Current Assets*

Value of Current Assets	Frequency	Percent
< 5 Lakhs	55	91.7%
5 - 10 Lakhs	4	6.7%
10 - 15 Lakhs	1	1.7%
15 - 20 Lakhs	0	0.0%
20 - 25 Lakhs	0	0.0%
Total	60	100

Source: Survey data

Among all the unit holders, 91.7 percent of unit holders invest in current assets less than 5 lakhs, 6.7 percent in 5-10 lakhs, and balance 1.7 percent in 10-15 lakhs.

4.4.4. Sufficiency of working capital

Working capital is the amount required to meet day to day affairs of the industrial units. The perception about the sufficiency of working capital is classified as more than sufficient, sufficient, and insufficient. The frequency distribution of units based on the sufficiency of working capital is shown in table 4.18.

Table 4.18.*Frequency Distribution -Sufficiency of Working Capital*

Sufficiency of Working Capital	Frequency	Percent
More than sufficient	5	8.3%
Sufficient	41	68.3%
Insufficient	14	23.3%
Total	60	100

Source: Survey data

Among all the unit holders, 68.3 percent have sufficient working capital, 8.3 percent have more than sufficient and 23.3 percent have insufficient working capital. The majority of the unit holders perceived that the working capital is sufficient for the working of the unit.

4.4.5. Source of fund

The sources of fund of the unit holders are classified for the study as own fund, loan from banks and both. The frequency distribution based on the source of funds is shown in table 4.19.

Table 4.19.

Frequency Distribution -Source of Fund

Source of Fund	Frequency	Percent
Owned Fund	27	45.0%
Borrowed fund – Loan from Banks	6	10.0%
Both	27	45.0%
Total	60	100

Source: Survey data

Among all the unit holders, 45 percent use their own funds, 10 percent use loans from banks and 45 percent use both their own funds and loans from banks.

4.4.6. Repayment

The nature of repayment of the loan is classified as ‘as per schedule, delayed, default and not applicable. The frequency distribution of the unit based the nature of repayment of the loan is given in following table 4.20.

Table 4.20.

Frequency Distribution-Repayment

Repayment	Frequency	Percent
As per Schedule	31	51.7%
Delayed	4	6.7%
Defaulted	1	1.7%
Not Applicable	24	40.0%
Total	60	100

Source: Survey data

Among all the unit holders' 51.7 percent made repayment as per schedule, 6.7 percent delayed in repayment, and 1.7 percent made default in repayment. It also revealed that 40 percent did not take any loans for their work.

4.4.7. Perception about interest rate

It means the perception of unit holders towards the interest rate on their borrowings from banks and other financial institution. It is measured through the points such as affordable, fair, not affordable and not applicable. The frequency distribution of unit holders based on the perception of interest rate is shown in table 4.21.

Table 4.21.

Frequency Distribution-Perception about Interest rate

Perception about Interest rate	Frequency	Percent
Affordable	16	26.7%
Fair	1	1.7%
Not Affordable	18	30.0%
Not Applicable	25	41.7%
Total	60	100

Source: Survey data

The table shows that, among all the unit holders, 26.7 percent perceived the interest rate as affordable, 1.7 percent as fair, 30 percent perceived it as not affordable and 41.7 percent perceived it as not applicable.

4.4.8. Profitability

The profitability of the unit is an indicator to success of the business. The perception of unit holders towards profitability is measured in terms of profitable, breakeven and loss-making units. The distribution of units based on profitability is shown in table 4.22.

Table 4.22.*Frequency Distribution -Profitability*

Profitability	Frequency	Percent
Profitable	42	70.0%
Breakeven	15	25.0%
Loss Making	3	5.0%
Total	60	100

Source: Survey data

This table shows that 70 percent of them are profitable, 25 percent are at break even and 5 percent are loss making units. It reveals that the majority of units under study are making profits.

4.5. Infrastructural Aspects

As the infrastructural facilities available at the unit influence the performance of the business, it is considered for the study. It includes status of the building of the units, additional production facility, number of machines installed, the requirement of the installed machinery, utilisation of machinery, nature of ownership of storage, nature of vehicle used, nature of ownership of vehicle, quality checking facilities and availability of power supply.

4.5.1. Status of building of the units

The status of building of industrial units is studied through three elements such as owned, leased, and rented. The distribution of units based on the status of the building is given in table 4.23.

Table 4.23*Frequency Distribution -Status of Building*

Status of Building	Frequency	Percent
Owned	28	46.7%
Leased	2	3.3%
Rented	30	50.0%
Total	60	100

Source: Survey data

It shows that 46.7 percent of unit holders have ownership in their building, 3.3 percent are working in a leased building and 50 percent are in a rented house. It revealed that the majority of the unit holders are doing their business in a rented building.

4.5.2. Additional Production Facilities

It is the additional production facilities established by the unit holder. The availability of additional production facilities for this study is classified as nil, one, two and more than two. The frequency distribution based on the availability of additional production centre is given in table 4.24.

Table 4.24

Frequency distribution-Additional Production Facility

Additional Production Facility	Frequency	Percent
Nil	54	90.0%
One	4	6.7%
Two	1	1.7%
More than two	1	1.7%
Total	60	100

Source: Survey data

This table shows that among all the unit holders' 90 percent have no additional production facilities, 6.7 percent have one additional facility and 1.7 percent have two and 1.7 percent have more than two production facilities. Hence it revealed that the majority of unit holders do not have any additional production facilities.

4.5.3. Number of Machines Installed

The number of machines installed by the units are classified as nil, one, two, and more than two. The frequency distribution based on the number of machines installed is given in table 4.25.

Table 4.25

Frequency Distribution -Number of Machines Installed

Number of Machine Installed	Frequency	Percent
Nil	2	3.3%
One	0	0.0%
Two	6	10.0%
More than two	52	86.7%
Total	60	100

Source: Survey data

This table shows that among all the unit holders' 3.3 percent have not installed any machine, 10 percent have two and 86.7 percent have more than two machines.

4.5.4. Requirement of Installed Machines

The requirement of the machine installed at the unit is classified for the study as necessary, shortage of machinery and excess. The frequency distribution based on the requirement of the machine installed is given in table.4.26.

Table 4.26

Frequency distribution-Requirement of Installed Machines

Requirement of Installed Machines	Frequency	Percent
Necessary	44	73.3%
Shortage of Machinery	16	26.7%
Excess	0	0.0%
Total	60	100

Source: Survey data

According to the table, 73.3 percent of the unit holders have installed the necessary machinery, while 26.7 percent have a shortage. It revealed that the majority of the unit holders have installed machinery as per their requirements.

4.5.5. Utilisation of Machinery

The utilisation of the machine installed at the unit is measured in terms of fully utilised, partly utilised and unutilised. The frequency distribution based on the utilisation of machine installed is given in table.4.27.

Table 4.27

Frequency distribution-Utilisation of Machinery

Utilisation of Machinery	Frequency	Percent
Fully Utilised	56	93.3%
Partly Utilised	4	6.7%
Unutilised	0	0.0%
Total	60	100.0%

Source: Survey data

This table shows that 93.3 percent of the unit holders fully utilise their machines and only 6.7 percent holder partly utilise the machines. It revealed that the majority of the unit holders are fully utilised their machines.

4.5.6. Nature of Ownership of Storage

The nature of ownership of storage is measured in terms of storage owned by the unit holder, rented, government, and private parties. The frequency distribution based on the nature of ownership of storage is given in table 4.28.

Table 4.28

Frequency Distribution -Nature of Ownership of Storage

Nature of Ownership of Storage	Frequency	Percent
Owned	36	60.0%
Rented	23	38.3%
Government	0	0.0%
Private Parties	1	1.7%
Total	60	100

Source: Survey data

This table shows that 60 percent of the unit holders have their own storage facility, 38.3 percent have rented and only 1.7 percent are utilised private storage facility. It revealed that the majority of the unit holders are using their own storage facilities.

4.5.7. Nature of Vehicle

The nature of the vehicle used is classified for the study as two-wheeler, four-wheeler, van or truck. The frequency distribution based on the nature of vehicle used is given in table 4.29.

Table 4.29

Frequency distribution- Nature of Vehicle

Nature of Vehicle	Frequency	Percent
Two-Wheelers	3	5.0%
Four-Wheelers	18	30.0%
Van/Truck	1	1.7%
Two-Wheelers, Four-Wheelers, Van/Truck	38	63.3%
Total	60	100

Source: Survey data

This table shows that 5 percent of the unit holders use two-wheeler, 30 percent use four-wheelers, 1.7 use vans/trucks, and 63 percent of holders are using all kinds of vehicles. It revealed that the majority of the unit holders are using all kinds of vehicles such as two-wheelers, four -wheelers, vans or trucks.

4.5.8. Nature of Ownership of Vehicles

The ownership of the vehicle used is classified for the study as owned, hire purchased, and rented. The frequency distribution based on the nature of ownership of the vehicle is given in table 4.30.

Table 4.30.*Nature of Ownership of Vehicles*

Nature of Ownership of Vehicles	Frequency	Percent
Owned	13	21.7%
Hire Purchased	17	28.3%
Rented	30	50.0%
Total	60	100.0%

Source: Survey data

This table shows that 21.7 percent of the unit holders are using their own vehicle, 28.3 percent are using hire purchased and 50 percent are using vehicles on rent.

4.5.9. Quality Checking Facilities

The quality checking facilities used by the unit holders is classified for the study as owned, government, and outsourced. The frequency distribution based on the quality checking facilities used is given in table 4.31.

Table 4.31*Frequency Distribution- Quality Checking Facilities*

Quality Checking Facilities	Frequency	Percent
Owned	57	95.0%
Government	2	3.3%
Outsourced	1	1.7%
Total	60	100.0%

Source: Survey data

This table shows that 95 percent of the unit holders are using their own quality checking facilities, 3.3 percent are using government facilities and 1.7 percent are outsourced. It revealed that the majority of the unit holders are using their own quality-checking facilities.

4.5.10. Availability of Power Supply

The availability of power supply is classified for the study as regular and irregular. The frequency distribution based on the availability of the power supply is given in table 4.32.

Table 4.32

Frequency Distribution-Availability of Power Supply

Availability of Power Supply	Frequency	Percent
Regular	4	6.7%
Irregular	56	93.3%
Total	60	100.0%

Source: Survey data

This table shows that 93.3 percent of unit holders are facing irregular power supply and 6.7 percent have regular power supply. It revealed that the majority of the unit holders are facing the problem of irregular power supply.

4.6. Technological aspects

The availability of technical facilities in the unit is an important element in the performance of the business. One of the aims of the formation of industrial clusters is to increase economies of scale through the improvement of technology. So, it is necessary to analyse the technical aspects of the industrial unit. The present study measured the technical aspects with the help of facilities available at the units, the nature of the processing, new products / Technology development, and efforts on research, and development at the units.

4.6.1. Facilities available at the units

The facilities available at the units show technological advancement. The facilities are classified for the study as processing, testing, storage, packing, and assembling. The frequency distribution of units based on the availability of facilities is shown in table 4.33.

Table 4.33*Frequency Distribution-Facilities Available*

Facilities Available	Frequency	Percent
Processing	60	100.0%
Testing	60	100.0%
Storage	60	100.0%
Packing	3	5.0%
Assembling	35	58.3%
Total	60	100.0%

Source: Survey data

This shows that the processing, testing and storage facilities are available at all units under study. 58.3 percent units has assembling facility and only 5 percent units has packing process. Thus, the analysis revealed that the majority of the units are availing combined facilities in order to upgrade their technology.

4.6.2. Nature of Processing in the units

It shows the nature of processing technique adopted by the unit. For the study the nature of processing at the units are classified as manual, semi-automated and fully automated. The frequency distribution of unit based on nature of processing in the unit is shown in table 4.34.

Table 4.34*Frequency Distribution -Processing*

Processing	Frequency	Percent
Manual	10	16.7%
Semi-Automated	50	83.3%
Fully Automated	0	0.0%
Total	60	100.0%

Source: Survey data

According to the table, 16.7 percent of unit holders perform their activities manually and 83.3 percent semi-automatically.

4.6.3. New product / technology development

It shows the development of new product / technology at the units. For this study the new product / technology development is classified into developing and matured. The frequency distribution based on the development of new product /technology is given in the table 4.35.

Table 4.35

Frequency Distribution -New product/technology

New product	Frequency	Percent
Developing	59	98.3%
Matured	1	1.7%
Total	60	100.0%

Source: Survey data

Based on the table, 98.3 percent of unit holders are in the developing stage in new product or technology development, while 1.7 percent are in the matured stage. It revealed that the majority of unit holders are in developing stage in new product or technology.

4.6.4. Research and Development

This analyses the progress of research and development activities at the units. The research and development activities are classified for the study as efforts going on and no effort. The frequency distribution of units based on the research and development activities are given in table 4.36.

Table 4.36

Research and Development

Research and Development	Frequency	Percent
Efforts going on	51	85.0%
No Efforts	9	15.0%
Total	60	100.0%

Source: Survey data

It is seen from the table that 85 percent of unit holders make efforts in research and development, while 15 percent do not make any efforts. It revealed that the majority of unit holders put effort into research and development.

4.7. Marketing aspects

It describes various marketing aspects of the units like brand name, brand promotion, marketing, market coverage, and competition.

4.7.1 Brand name

It describes the nature of brand name used by the units. This study classified the usage of brand name by the units as own brand and consortium brand. The frequency distribution based on the nature of brand name used is given in table 4.37.

Table 4.37

Frequency Distribution -Brand name

Brand name	Frequency	Percent
Own Brand	60	100.0%
Consortium Brand	0	0.0%
Total	60	100.0%

Source: Survey data

It shows that all the unit holders use their own brand names for marketing their products.

4.7.2. Brand promotion

It means various activities undertaken by the unit holders in order to promote their brand name. it is analysed by considering the variables such as no efforts, initial level, developing stage, and matured. The frequency distribution based on brand promotion is given in table 4.38.

Table 4.38*Frequency Distribution -Brand Promotion*

Brand Promotion	Frequency	Percent
No Efforts	4	6.7%
Initial Level	44	73.3%
Developing Stage	11	18.3%
Matured	1	1.7%
Total	60	100.0%

Source: Survey data

In terms of brand promotion 73.3 percent of unit holders are in the initial level, 18.3 percent are in the developing stage, 1.7 percent show matured and 6.7 percent do not take any effort on brand promotion. It revealed that the majority of unit holders are in the initial level of brand promotion.

4.7.3. Marketing

It shows the type of marketing activity carried out by the unit holders. The type of marketing activity classified for the study are own marketing and outsourcing. The frequency distribution of units based on the marketing activity is given in table 4.39.

Table 4.39*Frequency Distribution -Marketing*

Marketing	Frequency	Percent
Owned	59	98.3%
Outsourced	1	1.7%
Total	60	100.0%

Source: Survey data

The table shows that 98.3 percent of unit holders are doing their own marketing activities, whereas 1.7 percent are outsourced. Thus, the majority of unit holders are doing their own marketing.

4.7.4. Coverage

It describes the market coverage of the product produced by the unit holders. The coverage area is classified for the study as regional, entire state, South India, whole India and International. The frequency distribution of units based on its market coverage is given in table 4.40

Table 4.40

Frequency Distribution -Coverage

Coverage	Frequency	Percent
Regional	59	98.3%
Entire State	0	0.0%
South India	0	0.0%
Whole India	1	1.7%
International	0	0.0%
Total	60	100.0%

Source: Survey data

The table shows that 98.3 percent of the units under study cover regional area for marketing their products and 1.7 percent in whole India.

4.7.5. Competition

The competition faced by the unit holders are analysed using the variables such as high, medium and low. The frequency distribution of unit holders based on the competition faced is given in table 4.41.

Table 4.41

Frequency Distribution -Competition

Competition	Frequency	Percent
High	55	91.7%
Medium	4	6.7%
Low	1	1.7%
Total	60	100.0%

Source: Survey data

The table shows that 91.7 percent of unit holders are facing competition in high, 6.7 percent in medium and 1.7 percent in low . It revealed that the majority of unit holders are facing high competition.

4.8. Safety aspects

The safety measures provided at the units are the key profile of the units. So, it includes first aid facility and fire and safety

4.8.1. First aid facility

The availability of first aid facilities at the unit is considered as an important profile of the unit holders. It is measured by considering of the availability and non-availability of first aid facilities at the units. The frequency distribution based on the first aid facilities at the units is given in table 4.42.

Table 4.42

Frequency Distribution-First-aid Facility

First-aid Facility	Frequency	Percent
Available	58	96.7%
Not Available	2	3.3%
Total	60	100.0%

Source: Survey data

The table shows that the first aid facility is available in 96.7 percent of units and not available only in 3.3 percent of units.

4.8.2. Fire safety

It is measured by considering the variables such as adequate, inadequate, and not available. The frequency distribution of the units based on the availability of fire safety at the units is given in table 4.43.

Table 4.43

Frequency Distribution- Fire Safety

Fire Safety	Frequency	Percent
Adequate	53	88.3%
Inadequate	6	10.0%
Not Available	1	1.7%
Total	60	100.0%

Source: Survey data

The table shows that 88.3 percent of unit holders have adequate fire safety measures, 10 percent have inadequate and 1.7 percent have no such facilities. It revealed that the majority of the unit holders have adequate fire and safety measures.

4.9. Performance of the units

It shows the performance of the units in the General Engineering Cluster. This study analyses the performance of the units in terms of production aspects, financial aspects and human resource aspects.

4.9.1. Production aspects

It includes the overall production of the unit. The production of the unit is measured in terms of the volume of production, cost of production, quality improvement, manpower for production, and upgradation of the product.

4.9.1.i. Volume of Production

It means that whether cluster helps to improve production or not. The distribution of units based on the volume of production is shown in the table 4.44.

Table 4.44*Frequency Distribution -Volume of Production*

Volume of Production	Frequency	Percent
Reduced 51 - 100%	0	0.0%
Reduced 31 - 50%	3	5.0%
Reduced 11 - 30%	2	3.3%
Reduced 10%	14	23.3%
No Change	4	6.7%
Improved up to 10%	5	8.3%
Improved 11 - 30%	26	43.3%
Improved 31 - 50%	5	8.3%
Improved 51 - 100%	1	1.7%
Total	60	100.0%

Source: Survey data

This shows that the volume of production of the 8.3 percent of the units improved up to 10 percent, 43.3 percent showed 11-30 percent improvement in production, 8.3 percent showed 31-50 percent and 1.7 percent showed 51-100 percent in the volume of production.

It also showed that 23.3 percent of the units reduced the production up to 10 percent, 3.3 percent reduced to 11-30 percent and 5 percent reduced to 31-50 percent.

4.9.1. ii. Cost of production

The distribution of units based on the cost of production of units are shown in the table 4.45.

Table 4.45

Frequency Distribution - Cost of Production

Cost of Production	Frequency	Percent
Reduced 51 - 100%	0	0.0%
Reduced 31 - 50%	0	0.0%
Reduced 11 - 30%	0	0.0%
Reduced up to 10%	0	0.0%
No Change	0	0.0%
Increased up to 10%	3	5.0%
Increased 11 - 30%	23	38.3%
Increased 31 - 50%	32	53.3%
Increased 51 - 100%	2	3.3%
Total	60	100.0%

Source: Survey data

The table shows that there is no reduction in the cost of production. But there is an increase of 31-50% in the cost of production in majority of firms (53.3%).

4.9.1.iii. Quality improvement

Quality improvement in the units under the cluster is measured in terms of good improvement, moderate improvement, slight improvement and no change. The frequency distribution of units based on the quality improvement is shown in the table 4.46.

Table 4.46

Frequency Distribution - Quality Improvement

Quality Improvement	Frequency	Percent
Good Improvement	26	43.3%
Moderate Improvement	31	51.7%
Slight Improvement	3	5.0%
No Change	0	0.0%
Total	60	100.0%

Source: Survey data

The table shows that the improvement in quality of 43.3 percent of the units is good, 51.7 percent of the units shows moderate improvement, and 5 percent of the units shows slight improvement.

4.9.1. iv. Manpower

The frequency distribution of units based on the availability of man power in the units is shown in the table 4.47.

Table 4.47

Frequency Distribution -Man Power

Man Power	Frequency	Percent
Reduced 51 - 100%	0	0.0%
Reduced 31 - 50%	2	3.3%
Reduced 11 - 30%	3	5.0%
Reduced up to 10%	17	28.3%
No Change	32	53.3%
Improved up to 10%	3	5.0%
Improved 11 - 30%	3	5.0%
Improved 31 - 50%	0	0.0%
Improved 51 - 100%	0	0.0%
Total	60	100.0%

Source: Survey data

The table shows that there is a reduction of up to 10 percent in 28.3 percent of the units and has no change in the case of 53.3 percent of units.

4.9.1.v. Upgradation of Product

The frequency distribution of units based on the upgradation of product in the units is shown in table 4.48.

Table 4.48*Frequency Distribution -Upgradation of Product*

Upgradation of Product	Frequency	Percent
High Improvement	3	5.0%
Nominal Improvement	53	88.3%
No Change	4	6.7%
Total	60	100.0%

Source: Survey data

Here explains that 88 percent of unit holders shows nominal improvement in product upgradation, 5 percent in high improvement and 6.7 percent shows no change in product upgradation.

4.9.2. Financial aspects

It shows the financial performance of the units in the General Engineering Cluster. The financial aspects of the units are measured in terms of sales value, profitability, cost of inputs and economies of scale.

4.9.2.i. Sales value

This section explains the performance of the units based on sales after entered into industrial cluster. It is shown in the table 4.49.

Table 4.49*Frequency Distribution- Sales Value*

Sales Value	Frequency	Percent
Reduced 51 - 100%	0	0.0%
Reduced 31 - 50%	0	0.0%
Reduced 11 - 30%	1	1.7%
Reduced up to 10%	14	23.3%
No Change	6	10.0%
Improved up to 10%	9	15.0%
Improved 11 - 30%	26	43.3%
Improved 31 - 50%	4	6.7%
Improved 51 - 100%	0	0.0%
Total	60	100.0%

Source: Survey data

This shows that 10 percent of the units have no change in sales value, 15 percent of the units have up to 10 percent improvement, 43.3 percent of the units have up to 11-30 percent and 6.7 percent improved up to 31-50 percent.

4.9.2. ii. Profitability

The frequency distribution of units based on profitability is shown in the table 4.50.

Table 4.50

Frequency Distribution -Profitability

Profitability	Frequency	Percent
Reduced 51 - 100%	0	0.0%
Reduced 31 - 50%	0	0.0%
Reduced 11 - 30%	0	0.0%
Reduced up to 10%	16	26.7%
No Change	6	10.0%
Improved up to 10%	10	16.7%
Improved 11 - 30%	25	41.7%
Improved 31 - 50%	3	5.0%
Improved 51 - 100%	0	0.0%
Total	60	100.0%

Source: Survey data

The table shows that the profitability of 10 percent of the units has no change, 16.7 percent of units have a 10 percent improvement, and 41.7 percent have an 11-30 percent improvement in profitability. It also shows that 26.7 percent has a 10 percent reduction in profitability.

4.9.2.iii. Cost of Inputs

The frequency distribution of units based on the cost of inputs is shown in table 4.51.

Table 4.51*Frequency Distribution- Cost of Inputs*

Cost of Inputs	Frequency	Percent
Reduced 51 - 100%	0	0.0%
Reduced 31 - 50%	1	1.7%
Reduced 11 - 30%	0	0.0%
Reduced up to 10%	0	0.0%
No Change	0	0.0%
Improved up to 10%	11	18.3%
Improved 11 - 30%	20	33.3%
Improved 31 - 50%	28	46.7%
Improved 51 - 100%	0	0.0%
Total	60	100.0%

Source: Survey data

It shows that the cost of inputs of 18.3% of the units have increased up to 10 percent, 33.3 percent has 11 -30 percent and 46.7 percent has a 31-50 percent increase.

4.9.2. iv. Economies of Scale

The frequency distribution of units based on the economies of scale is shown in table 4.52.

Table 4.52*Frequency Distribution-Economies of Scale*

Economy of Scale	Frequency	Percent
No Improvement	5	8.3%
Improving	55	91.7%
Improved	0	0.0%
Total	60	100.0%

Source: Survey data

This shows that 8.3 percent of units have no improvement in the economy of scale and 91.7 percent of the units have improvement.

4.9.3. Human resources aspects

Human resource is an important element in the functioning of the industrial unit. All other resources are working only through the effective functioning of this aspect. So, it is considered one of the variables for the study. The human resource aspect is analysed on the basis of availability of manpower, skill improvement, training facility, performance improvement, absenteeism, and wage level

4.9.3.1. Availability of manpower

The availability of manpower for the study is classified as good, average and poor. The frequency distribution of availability of manpower is shown in table 4.53.

Table 4.53

Frequency Distribution -Availability of Manpower

Availability of Manpower	Frequency	Percent
Good	10	16.7%
Average	39	65.0%
Poor	11	18.3%
Total	60	100.0%

Source: Survey data

The above table shows that 16.7 percent of the units have good manpower, 65 percent have average manpower and 18.3 percent have poor manpower.

4.9.3.2. Skill Improvement

The skill improvement considered for the study classified as good, average and poor. The frequency distribution of skill improvement is shown in table 4.54.

Table 4.54

Frequency Distribution - Skill Improvement

Skill Improvement	Frequency	Percent
Good	2	3.3%
Average	51	85.0%
Poor	7	11.7%
Total	60	100.0%

Source: Survey data

The table shows that 3.3 percent of unit has good improvement, 85 percent has average improvement and it is poor in the case of 11.7 percent of units. Hence it revealed that the skill improvement in the majority of the unit are average.

4.9.3.3. Training Facility

The training facility provided in the unit considered for the study is classified as good, average, and poor. The frequency distribution of the training facility is shown in table 4.55.

Table 4.55

Frequency Distribution - Training Facility

Training Facility	Frequency	Percent
Good	1	1.7%
Average	35	58.3%
Poor	24	40.0%
Total	60	100

Source: Survey data

This table shows that 1.7 percent of units proved good training facility and it is average in the case of 58.3 percent of units. Hence this analysis shows that the training facilities provided to workers in the majority of units are average.

4.9.3.4. Performance improvement

The improvement in the performance of the units for the study are classified as good, average and poor. The frequency distribution of improvement in the performance is shown in table 4.56.

Table 4.56

Frequency Distribution -Performance Improvement

Performance Improvement	Frequency	Percent
Good	1	1.7%
Average	55	91.7%
Poor	4	6.7%
Total	60	100

Source: Survey data

This table shows that 1.7 percent of the units have good improvement in performance, 91.7 percent have average and 6.7 percent have poor in performance. Hence, this analysis indicates that most units have shown average improvement in performance.

4.9.3.5. Absenteeism

The absenteeism (leave of workers in units) for the study was classified as reduced, increased, and no change. The frequency distribution of absenteeism of workers in units is shown in table 4.57.

Table 4.57

Frequency Distribution-Absenteeism

Absenteeism	Frequency	Percent
Reduced	46	76.7%
Increased	11	18.3%
No Change	3	5.0%
Total	60	100

Source: Survey data

This table shows that absenteeism was reduced by 76.7 percent of units and it increased by 18.3 percent of units. However, 5 percent unit shows no change. Hence this analysis reveals that absenteeism in the majority of the unit are reduced.

4.9.3.6. Wage Level

The wage level considered for the study is classified as increased, no change and reduced. The frequency distribution of wage level in the unit is shown in table 4.58.

Table 4.58

Frequency Distribution-Wage Level

Wage Level	Frequency	Percent
Increased	57	95.0%
No Change	3	5.0%
Reduced	0	0.0%
Total	60	100

Source: Survey data

This table shows that wage level was increased by 95 percent of units, 5 percent of units shows no change and no one reduced the wage level. Hence this analysis reveals that the wage level is increased in the majority of the unit.

4.10. Analysis of the performance of the units based on the demographic variables and various aspects of the units.

- **Analysis of performance of the units based on demographic variables.**

Here analyses the performance of the units based on the demographic variables of unit holders such as age, educational qualification, experience, generation and training programme attended.

4.10.1. Age with Performance of the unit.

In order to analyse the performance of the units based on age, statistical tool called 'ANOVA' is used. The result of the analysis is explained in below table.4.59.

Ho: There is no significant difference among the age groups with regards to the performance of the unit.

Table 4.59

Age with performance

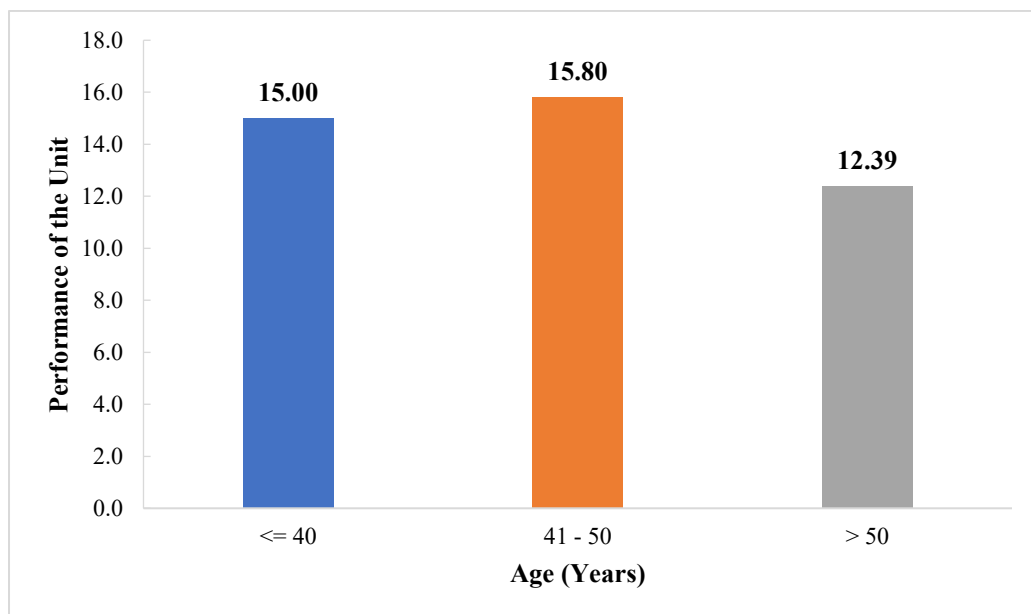
Age (Years)	N	Mean	SD	F - value	p 1- value
<= 40	22	15.00	6.071	2.623	0.081
41 – 50	15	15.80	3.550		
> 50	23	12.39	4.459		
Total	60	14.20	5.068		

Source: Survey data

Here the p-value is greater than the significance level 0.05; the null hypothesis is accepted at 5% level with regard to performance of the unit. Hence it is concluded that there is no significant difference among age groups of unit holders with regard to performance of the units ie, the performance is almost same in cases with age less than or equal to 40 years (15.00 ± 6.071), 41-50 years (15.80 ± 3.550) and more than 50 years (12.39 ± 4.459).

Figure 4.1

Age with performance of units



4.10.2. Educational Qualification with performance of the unit

To check the performance of the units based on educational qualification of unit holders, ANOVA test is carried out. And the result of the same is described below table.4.60.

H₀: There is no significant difference among educational qualification with regard to performance of the unit.

Table 4.60

Relationship between Performance and Educational Qualification

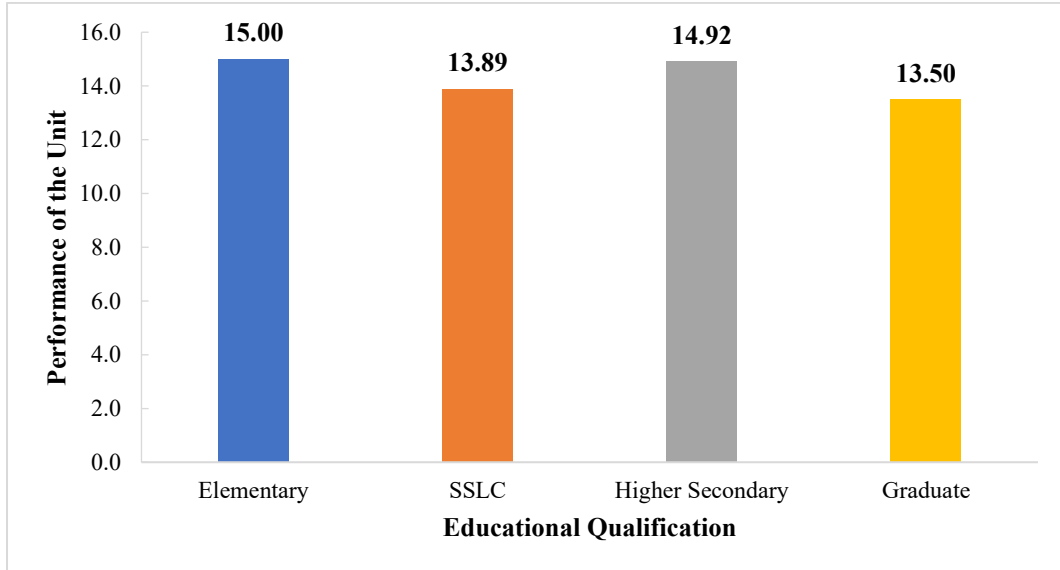
Educational Qualification	N	Mean	SD	F – value	p – value
Elementary	6	15.00	4.050	0.201	0.896
SSLC	37	13.89	5.517		
Higher Secondary	13	14.92	3.989		
Graduate	4	13.50	6.608		
Total	60	14.20	5.068		

Source: Survey data

As the p-value is greater than the significance level 0.05; the null hypothesis is accepted at 5% level with regards to performance of the unit. Hence it is revealed that there is no significant difference among educational qualification of unit holders with regard to performance of the unit. The performance is almost same in elementary (15.00 ± 4.050), SSLC (13.89 ± 5.517), higher secondary (14.92 ± 3.989) and graduates (13.50 ± 6.608).

Figure 4.2

Educational Qualification and Performance



4.10.3. Experience with Performance

ANOVA test is used to analyse the performance of units based on experience. Details of the same is described below.

H_0 : There is no significant difference among experience of unit holders with regards to performance.

Table 4.61

Experience and Performance of the units

Experience (Years)	N	Mean	SD	F – value	p - value
<= 10	6	14.00	6.841	0.480	0.697
11 – 20	26	14.42	5.825		
21 – 30	20	14.75	3.143		
> 30	8	12.25	5.445		
Total	60	14.20	5.068		

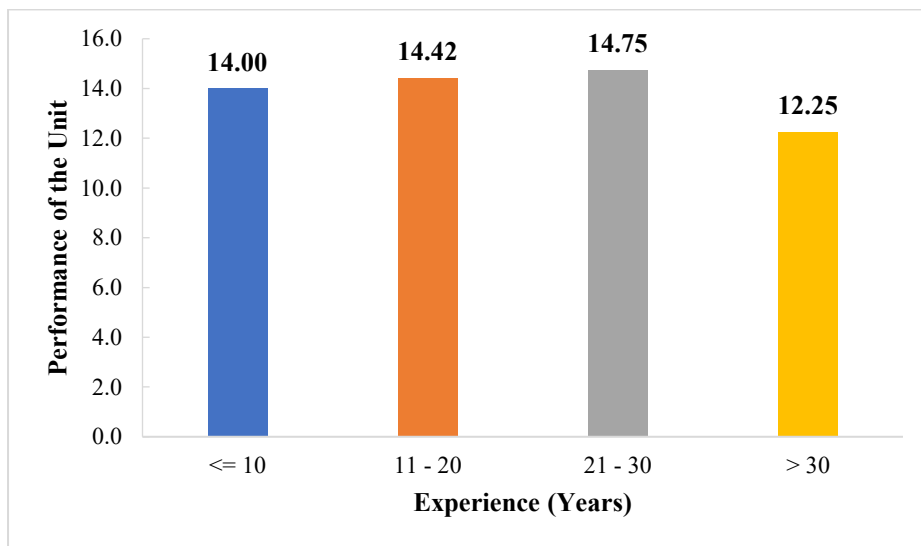
Source: Survey data

As the p-value is greater than the significance level 0.05; the null hypothesis is accepted at 5 % level with regard to performance of the units. Hence it is concluded

that there is no significant difference among experience with regards to performance of the units. Here the performance is almost same in cases with experience less than or equal to 10 years (14.00 ± 6.841), 11-20 years (14.42 ± 5.825), 21-30 years (14.75 ± 3.143) and more than 30 years (12.25 ± 5.445).

Figure 4.3

Experience and Performance of the unit



4.10.4. Generation with Performance of the unit

In order to analyse the performance of the unit based on generation of unit holders, statistical test called ‘t’ test is used. The result of the analysis is shown in below table.4.62.

H₀: There is no significant difference between generation of unit holders with regard to performance of the unit.

Table 4.62

Generation and Performance

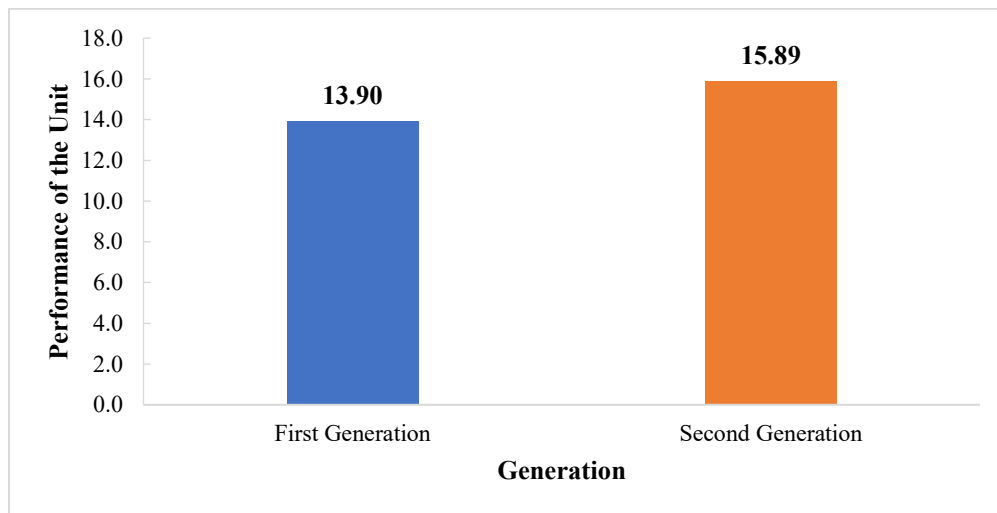
Generation	N	Mean	SD	t - value	p – value
First Generation	51	13.90	5.330	1.086	0.282
Second Generation	9	15.89	2.848		
Total	60	14.20	5.068		

Source: Survey data

As the p-value is greater than the significance level 0.05; the null hypothesis is accepted at 5% level with regard to performance. It is concluded that there is no significant difference between generation with regard to performance of the unit. ie, the performance is almost same in first generation (13.90 ± 5.330) and second generation (15.89 ± 2.848).

Figure 4.4

Generation and Performance of the unit



4.10.5. Training Programmes attended with performance

Here analyses the performance of unit based on training programmes attended by the unit holders. ANOVA is used for analysis purpose. It is shown in table.4.63.

H₀: There is no significant difference among the type of training programme attended by the unit holders with regard to performance of the unit.

Table 4.63

Training Programmes attended and Performance

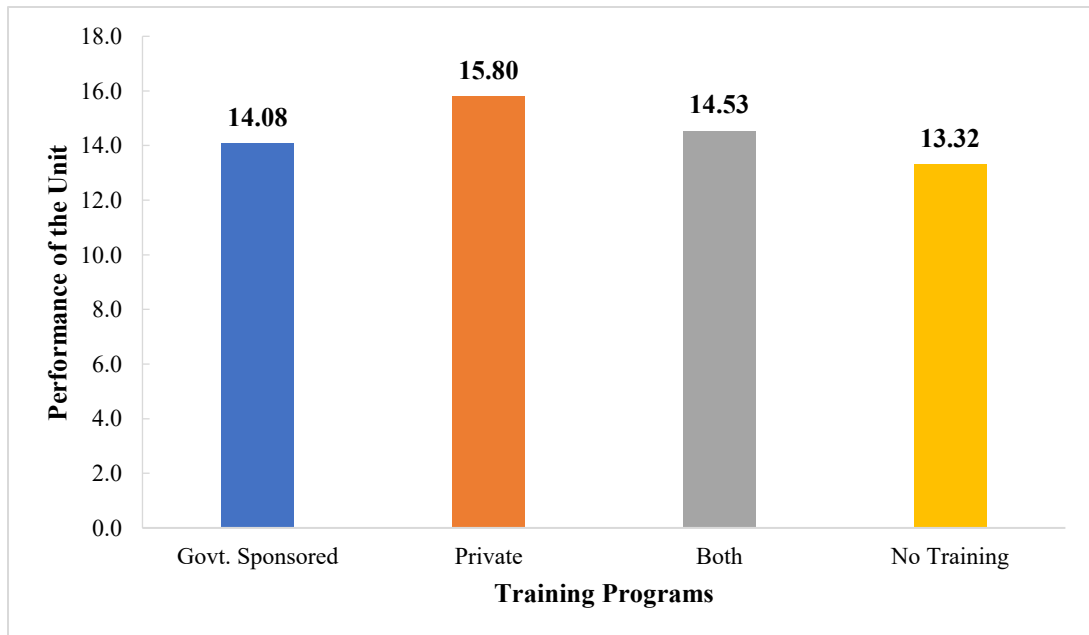
Training Programs	N	Mean	SD	F – value	p - value
Govt. Sponsored	13	14.08	5.737	0.566	0.640
Private	10	15.80	3.458		
Both	15	14.53	5.055		
No Training	22	13.32	5.393		
Total	60	14.20	5.068		

Source: Survey data

Here the p-value is greater than the significance level 0.05; the null hypothesis is accepted at 5% level with regard to performance of the unit. Hence it is revealed that there is no significant difference among training attended with regard to performance of the unit. The table reveals that the performance is almost same in Govt. sponsored (14.08 ± 5.737), private (15.80 ± 3.458), both (14.53 ± 5.055) and no training (13.32 ± 5.393).

Figure 4.5

Training Programmes attended and Performance



4.11. Performance and Demographic variable of the unit.

Here analyses the performance of the units based on demographic variables of the units such as type of units and age of units.

4.11.1. Type of Unit with Performance

Here analyses the performance of unit based on type of unit. t-test is used for analysis purpose. It is shown in table.4.64.

H₀: There is no significant difference between type of units with regards to performance of the units.

Table 4.64

Type of Unit and Performance of the unit

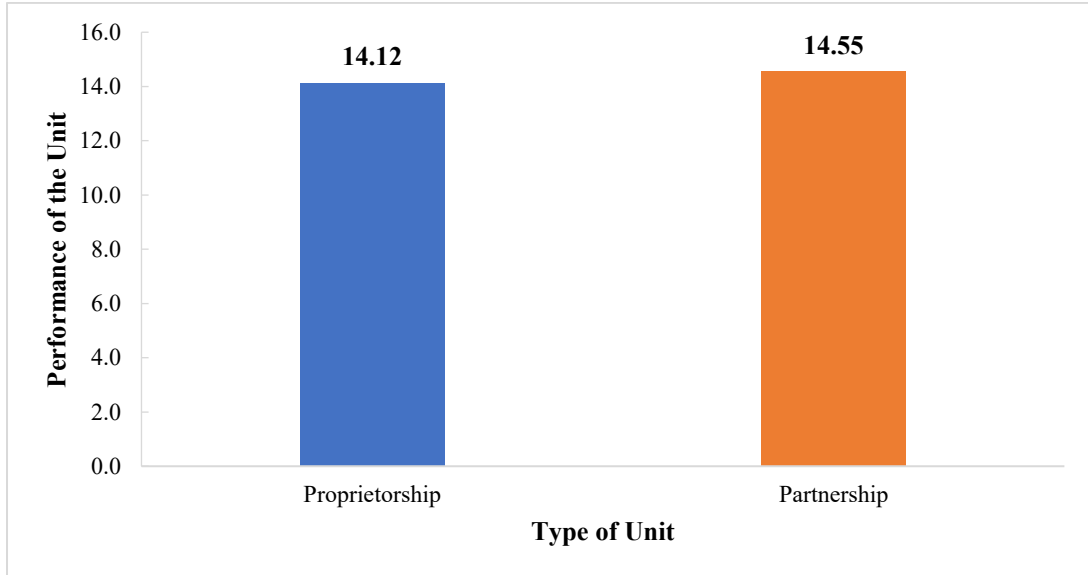
Type of Unit	N	Mean	SD	t - value	p – value
Proprietorship	49	14.12	5.179	0.248	0.805
Partnership	11	14.55	4.762		
Total	60	14.20	5.068		

Source: Survey data

As the p-value is greater than the significance level 0.05; the null hypothesis is accepted at 5% level. Hence it is concluded that there is no significant difference between type of unit with regards to performance. That is the performance is almost same in proprietorship (14.12 ± 5.179) and partnership (14.55 ± 4.762).

Figure 4. 6

Type of Unit and Performance



4.11.2. Age of the Unit with Performance

This section analyses the performance of unit holders with regard to age of the unit. ANOVA is used for analysis purpose. The following hypothesis has been formulated.

H₀: There is no significant difference among age groups of units with regards to performance of the unit

The result of analysis is shown in table.4.65

Table 4.65

Age of the Unit and Performance

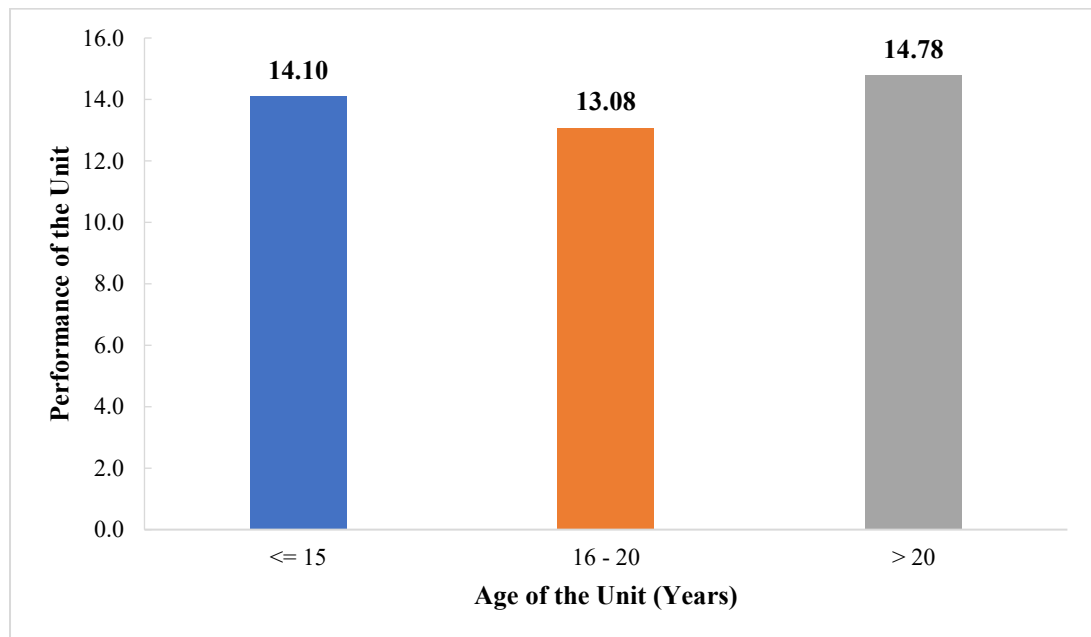
Age of the Unit (Years)	N	Mean	SD	F – value	p - value
<= 15	21	14.10	6.693	0.463	0.632
16 – 20	12	13.08	3.528		
> 20	27	14.78	4.200		
Total	60	14.20	5.068		

Source: Survey data

Here the p-value is greater than the significance level 0.05; the null hypothesis is rejected at 5% level. Hence it reveals that there is no significant difference among age groups of units with regards to performance of the unit. That is the performance is almost same in units with age less than or equal to 15 years (14.10 ± 6.693), 16-20 years (13.08 ± 3.528) and more than 20 years (14.78 ± 4.200).

Figure 4.7

Age of the Unit and Performance



4.12. Financial Aspects with Performance of the unit

Here analyses the performance of the unit based on various financial aspects. It uses t-test and ANOVA for analysis.

H₀: There is no significant relationship between various dimensions of financial aspects of the units and performance of the units.

Table 4.66*Financial Aspects and Performance of the units*

Financial Aspects	N	Mean	SD	F/t – value	p - value
Invested Capital					
< 5 Lakhs	41	14.32	5.303	0.400	0.808
5 - 10 Lakhs	14	14.64	4.378		
10 - 15 Lakhs	3	10.67	7.024		
15 - 20 Lakhs	1	15.00	--		
20 - 25 Lakhs	1	13.00	--		
Value of Fixed Asset					
< 5 Lakhs	42	14.43	5.288	0.234	0.918
5 - 10 Lakhs	14	14.00	4.350		
10 - 15 Lakhs	2	11.00	9.899		
15 - 20 Lakhs	1	15.00	--		
20 - 25 Lakhs	1	13.00	--		
Value of Current Asset					
< 5 Lakhs	55	13.98	5.198	0.666	0.518
5 - 10 Lakhs	4	17.00	2.708		
10 - 15 Lakhs	1	15.00	--		
Sufficiency of Working Capital					
More Sufficient	5	14.80	3.493	1.765	0.180
Sufficient	41	14.88	4.750		
Insufficient	14	12.00	6.051		
Source of Fund					
Own Fund	27	15.04	4.337	0.700	0.501
Loan from Banks	6	13.00	4.336		
Both	27	13.63	5.871		
Repayment					
As per Schedule	31	14.32	5.418	0.749	0.528
Delayed	4	12.25	6.449		
Defaults	1	8.000	--		
Not Applicable	24	14.63	4.431		

Financial Aspects	N	Mean	SD	F/t – value	p - value
Perception about Interest					
Affordable	16	15.75	3.624	1.915	0.138
Fair	1	9.000	--		
Not Affordable	18	12.28	6.452		
Not Applicable	25	14.80	4.425		
Profitability					
Profitable	42	15.07	4.555	3.822	0.028**
Breakeven	15	13.07	5.637		
Loss Making	3	7.667	4.509		
Total	60	14.20	5.068		

Source: Survey data ** Significant at 5% level

Profitability: Here the p-value is less than the significance level 0.05; the null hypothesis is rejected at 5% level with regards to performance of the units. Hence it is concluded that there is a significant difference among profitability of unit with regard to performance. That is the performance is significantly higher in profitable units (15.07 ± 4.555) and breakeven units (13.07 ± 5.637) compared to the loss-making units (7.667 ± 4.509).

However, there is no significant difference among variable of financial aspects such as Invested capital, value of fixed asset, value of current asset, sufficiency of working capital, source of fund, repayment and perception about interest with regards to performance of the unit.

4.13. Infrastructural Aspects with Performance of the unit

Here analyses the performance of the unit based on infrastructural aspects. It uses t-test and ANOVA for analysis. The hypothesis formulated for the study is given below.

H₀: There is no significant difference between the dimensions of the infrastructural aspects of the units and the performance of the units.

The result of analysis is shown in table 4.67.

Table 4.67*Infrastructural Aspects and Performance*

Infrastructural Aspects	N	Mean	SD	F/t – value	p - value
Status of Building					
Owned	28	15.43	3.785	1.607	0.210
Leased	2	14.00	5.657		
Rented	30	13.07	5.919		
Additional Production Facility					
Nil	54	14.15	5.254	0.660	0.580
One	4	14.50	0.577		
Two	1	10.00	--		
More than Two	1	20.00	--		
Number of Machine Installed					
Nil	2	15.50	2.121	0.503	0.608
Two	6	16.00	3.521		
More than Two	52	13.94	5.282		
Requirement of Installed Machines					
Necessary	44	14.25	5.159	0.126	0.900
Shortage of Machinery	16	14.06	4.973		
Utilisation of Machinery					
Fully Utilised	56	14.14	5.150	0.324	0.747
Partly Utilised	4	15.00	4.243		
Nature of Ownership of Storage					
Owned	36	14.17	4.507	0.452	0.639
Rented	23	14.04	5.958		
Private Parties	1	19.00	--		
Nature of Vehicle Used					
Two-wheeler	3	17.00	1.732	0.396	0.756
Four-wheeler	18	13.61	6.335		
Van/Truck	1	13.00	--		
Two, Four, Van/Truck	38	14.29	4.638		

Infrastructural Aspects	N	Mean	SD	F/t – value	p - value
Nature of Ownership of Vehicles					
Owned	13	15.38	5.440	1.407	0.253
Hire Purchase	17	12.53	5.173		
Rented	30	14.63	4.774		
Quality Checking Facilities					
Owned	57	14.16	5.028	0.295	0.746
Government	2	13.50	9.192		
Outsourcing	1	18.00	--		
Availability of Power Supply					
Regular	4	13.00	2.160	0.487	0.628
Irregular	56	14.29	5.214		

Source: Survey data

As p values regarding all the financial aspects are more than the significant level, the null hypothesis accepted at 5% level. Hence it is concluded that there is no significant difference among the variables of infrastructural aspects such as status of building, additional production facility, number of machines installed, requirement of installed machines, utilisation of machinery, nature of ownership of storage, nature of vehicle used, nature of ownership of vehicles, quality checking facilities and availability of power supply with regards to performance of the unit

4.14. Marketing Aspects with Performance of the units

This study analyses the performance of unit based on marketing aspects of units. Here 't-tests and ANOVA' are used for analysis purpose. Details of analysis is given below

H₀: There is no significant difference among various marketing aspects of the units with regards to performance

Table 4.68*Marketing Aspects and Performance*

Marketing Aspects	N	Mean	SD	F/t – value	p - value
Marketing					
Own Marketing	59	14.34	4.995	1.655	0.103
Outsourced	1	6.000	--		
Coverage					
Regional	59	14.34	4.995	1.655	0.103
Whole India	1	6.000	--		
Brand Promotion					
No Efforts	4	11.75	8.180	0.742	0.532
Initial Level	44	14.27	5.013		
Developing Stage	11	14.27	4.197		
Matured	1	20.00	--		
Competition					
High	55	14.42	4.879	0.639	0.532
Medium	4	11.50	8.103		
Low	1	13.00	--		
Total	60	14.20	5.068		

Source: Survey data

The analysis shows that there is no significant difference among the variables of marketing aspects such as marketing coverage, brand promotion, and competition with regard to performance of the units.

4.15. Conclusion

This chapter analyses the present status of industrial units under the General Engineering Cluster. It is analysed by using various aspects such as demographic profile of unit holders and the units, financial aspects of the units, infrastructural aspects, technological aspects, marketing aspects, safety aspects and financial performance of the unit. This chapter also analyses the relationship of demographic variables with the performance of the unit. It shows that there is no significant relationship between performance of the unit with regards to demographic variables of the unit holder and units, financial aspects, infrastructural aspects and marketing aspects.

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5.1. Introduction

A cluster is a spatially concentrated group of entrepreneurs that are simultaneously competing and cooperating in a particular field, as well as interacting with various supporting organizations such as educational and research institutions, government agencies, trade associations, etc (Bialic & Pavelkova, 2010). Clusters offer participants many specific advantages, including economies of scale and reduced costs, a faster transfer of information and technologies, and enhanced innovation opportunities. Trust and willingness to cooperate is an important aspect of the success of clusters. The units in clusters achieve success by implementing mutual projects, such as joint purchases, joint production, and activities in marketing development. (Jircikova, 2010).

While analysing the working of General Engineering Cluster in Malappuram District, it is useful to study the perception of unit holders towards the industrial clustering. Hence this chapter covers the perception of unit holders towards industrial clustering. The perception of unit holders is analysed in three parts; Perception towards the industrial clustering (general point of view) perception towards the support of CFC, and perception towards the support of government and the whole system.

5.2. Perception towards industrial clustering.

This section explains descriptive statistics about the perception of unit holders towards industrial clustering. Higher mean score indicates higher rating by unit holders. The analysis is done based on five-point scale by considering 26 items.

The result of the descriptive analysis regarding perception towards industrial clustering is explained in table.5.1.

Table 5.1

Perception of unit holders towards industrial clustering

Statements	Mean Score
The geographical area is suitable for cluster formation	4.18
Cluster helps to share common resources among units	3.93
Units can utilise the materials of other units	3.83
Timely availability of materials	3.05
Materials are available from material bank	1.62
It reduces inventory cost	1.87
It provides a pool of workers	3.35
It is easier to hire new workers when labour demand increases	3.47
It helps to utilize the services of employees of other units	3.63
Do not face the problems of shortage of workers	3.18
Cluster ensures the service of skilled workers	3.58
It provides opportunity to get expert advice	3.72
It provides good infrastructural facilities	2.77
Cluster ensures easy availability of transportation	2.42
It reduces transportation cost	2.13
It ensures availability of electricity facility	1.92
It helps to compete in the market	2.77
It helps to connect marketers very easily	3.40
We can use common brand name	1.97
We can use common marketing system	1.92
It helps to increase productivity	2.93
It helps to increase sales	2.93
It helps to increase profitability	2.93
Unit holders under the cluster is co-operative	3.65
Unitholders are having mutual trust	3.48
The cluster satisfies its objectives	2.65

Source: Survey data

This table shows the mean score of the items which explains the perception of unit holders towards industrial clustering. In the mean score described above, a score three or more indicates positive perception and below 3 score indicates negative perception. It can be noted that the unit holders perceived positively on the statements such as geographical area is suitable for cluster formation (M= 4.18), cluster helps to share common resources among units (M=3.93), units can utilise materials of other units (M=3.83), timely availability of materials (M=3.05), it provides a pool of workers (M=3.35), easier to hire new workers (M=3.47), helps to utilize the services of employees of other units (M=3.63), it ensures the services of skilled workers (M=3.58), and it provides opportunity to get expert advice (M=3.72).

Unit holders negatively perceived towards some variables which includes materials are available from material bank (M=1.62), it reduces inventory cost (M=1.87), it provides good infrastructural facilities (M=2.77), it ensure easy availability of transportation (M=2.42), it reduces transportation cost (M=2.13), it ensure the availability of electricity facility (M=1.92), it helps to compete in the market (M=2.77), use common brand name (M=1.97), use common marketing system (M=1.92), it helps to increase productivity (M=2.93), it helps to increase sales (M=2.93) and it helps to increase profitability (M=2.93) and the cluster satisfies its objectives (M=2.65).

❖ **Analysis of the perception of unit holders towards industrial clustering based on demographic variables.**

Here analyses the perception of unit holders towards industrial clustering based the demographic variables such as age, educational qualification, technical qualification, place of domicile, experience, generation and training programme attended by the unit holders.

5.2.1. Age with the perception towards industrial clustering

Here analyses the perception of unit holders about industrial clustering based on different age groups. Statistical tool ‘ANOVA’ is used to check the hypothesis and is given below.

H₀: There is no significant difference among the age groups of the unit holders with regard to perception towards industrial clustering.

The result of analysis is shown in table. 5.2.

Table No.5.2

Age with perception towards industrial clustering

Age (Years)	Mean	SD	F/t – value	p-value
<= 40	73.41	17.63	0.935	0.399
41 – 50	77.60	20.18		
> 50	80.78	17.15		

Source: Survey data

Since the p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Here there is no significant difference among age groups with respect to perception towards industrial clustering. It reveals that the perception towards industrial clustering is similar across all age groups.

5.2.2. Educational Qualification with perception towards industrial clustering

This analyses the perception of unit holders about industrial clustering based on their educational qualifications. ANOVA is used for this analysis. For this following hypothesis has been formulated.

H₀: There is no significant difference among educational qualifications of the unit holders with regard to the perception towards industrial clustering

The result of the analysis is shown in the table. 5.3.

Table 5.3*Educational qualification with perception towards industrial clustering*

Educational Qualification	Mean	SD	F/t - value	p-value
Elementary	73.83	14.72	1.327	0.275
SSLC	74.65	14.47		
Higher Secondary	82.69	27.33		
Graduate	89.25	12.20		

Source: Survey data

Since the p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Hence it is concluded that educational qualification is not a determinant factor in developing perception towards industrial clustering.

5.2.3. Technical qualification with perception towards industrial clustering

This analyses the perception of unit holders about industrial clustering based on their technical qualifications. t-test is used for analysis. Hypothesis for the same is given below.

H₀: There is no significant difference between the technical qualification of unit holders with regard to perception towards industrial clustering.

The result of analysis is shown in table.5.4.

Table 5.4*Technical qualification with perception towards industrial clustering*

Technical Qualification	Mean	SD	F/t – value	p-value
Yes	79.58	20.18	0.489	0.627
No	76.71	17.72		

Source: Survey data

Since the p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Hence it is concluded that there is no significant difference between the technical

qualification of unit holders with regard to perception towards industrial clustering. The unit holders irrespective of their technical qualifications have the same perception towards industrial clustering.

5.2.4. Place of domicile with perception towards industrial clustering

It analyses the perception of unit holders about industrial clustering based on their place of domicile. t-test is used for the analysis.

H₀: There is no significant difference between the place of domicile of unit holders with regard to perception towards industrial clustering.

The result of analysis is shown in table.5.5.

Table 5.5

Place of domicile with perception towards industrial clustering

Place of Domicile	Mean	SD	F/t – value	p-value
Rural	78.77	17.80	1.788	0.079
Semi-urban	66.00	17.42		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Hence it is concluded that there is no significant difference among the place of domicile of unit holders with regard to perception towards industrial clustering. Thus, the perception of unit holders towards industrial clustering is the same regardless of the place of domicile.

5.2.5. Experience with perception towards industrial clustering

It checks the perception of unit holders about industrial clustering based on their experience, following hypothesis has been formulated.

H₀: There is no significant difference among experience of unit holders with regard to perception towards industrial clustering.

ANOVA is used for this analysis.

The result of analysis is shown in table.5.6.

Table 5.6

Experience with perception towards industrial clustering

Experience (Years)	Mean	SD	F/t – value	p – value
<= 10	63.17	16.87	1.758	0.166
11 – 20	79.42	16.77		
21 – 30	80.45	20.56		
> 30	73.00	12.87		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Hence it is concluded that there is no significant difference among the experience of unit holders with regard to perception towards industrial clustering.

5.2.6. Generation with perception towards industrial clustering

It analyses the perception of unit holders about industrial clustering based on the generation. Statistical tool ‘t-test’ is used to prove the given hypothesis.

H₀: There is no significant difference between the generation of unit holders with regard to perception towards industrial clustering.

The result of analysis is shown in table.5.7.

Table 5.7

Generation with perception towards industrial clustering

Generation	Mean	SD	F/t - value	p - value
First Generation	77.10	17.95	0.187	0.852
Second Generation	78.33	19.96		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Hence it is concluded that there is no significant difference between the generation of unit holders with regard to perception towards industrial clustering. The first-generation and second generations have the same perception towards industrial clustering.

5.2.7. Training programme with perception towards industrial clustering.

It analyses the perception of unit holders about industrial clustering based on the training programme attended. Statistical tool ‘ANOVA’ is used to check given hypothesis.

H₀: There is no significant difference among training programmes attended by unit holders with regard to perception towards industrial clustering.

The result of analysis is shown in table.5.8.

Table 5.8

Training programme with perception towards industrial clustering

Training Programmes	Mean	SD	F/t – value	p – value
Govt. Sponsored	88.92	16.23	4.483	0.007**
Private	75.40	22.48		
Both	81.33	14.95		
No Training	68.50	15.02		

Source: Survey data

**Significant at 5% level

Since p-value is less than the significance level 0.05, the null hypothesis is rejected at 5% level with regard to perception towards industrial clustering. Hence it is concluded that there is a significant difference between the training programmes attended by the unit holders with regard to perception towards industrial clustering. It reveals that the perception is significantly higher in cases with Govt. sponsored training (88.92 ± 16.23) and both Govt. & private training (81.33 ± 14.95) and significantly lower in cases with no training (68.50 ± 15.02) compared to the cases with private training (75.40 ± 22.48).

5.3. Perception towards the support of Common Facility Centre (CFC)

This section deals with the perception of unit holders towards the support of CFC for the development of units. It is analysed through various statements based on the mean score. If the mean score is 3 and above 3 shows positive perception and below 3 shows negative perception. It also analysed the relationship of the demographic variables of unit holders with the support of CFC. The result of the descriptive analysis is shows in table.5.9.

Table 5.9

Analysis of the perception of unit holders towards the support of CFC

Statements	Mean Score
Utilising the services of CFC	2.90
Aware about the functions of CFC	2.62
CFC fulfils its objectives	2.30
CFC provides technological support	2.18
Reception arrangements at CFC is satisfactory	3.12
Behaviour of the staffs in CFC is satisfactory	3.18
CFC provide opportunities to use the machineries to unit holders	3.33
Charges levied at CFC are normal	3.48
Get financial support through CFC	1.53
Aware about the financial position of CFC	2.02
Avail credit facilities with the support of CFC	1.78
Interested to get more service from CFC	3.77
CFC arranges training programmes for unitholders	2.82
CFC arranges exhibitions and other programmes to unit holders	2.12
CFC support for the growth of the unit	2.40

Source: Survey data

This table shows that the perception of unit holders towards the support of CFC to industrial clusters. Only few variables are positively perceived by the unit holders such as charges levied at CFC are normal (M=3.48), CFC provide

opportunities to use their machineries to unit holders (M=3.33) and reception arrangements at CFC (M= 3.12) and behaviour of staffs at CFC (M=3.18) are satisfactory. Most of the statements are perceived negatively such as utilising the services of CFC (M=2.90), aware about the functions of CFC (M=2.62), CFC fulfils its objectives (M=2.30), CFC provides technical support (M=2.18), get financial support through CFC (M=1.53), aware about the financial position of CFC (M=2.02), avail credit facilities with the support of CFC (M=1.78), CFC arranges training programmes for unit holders (M=2.82), CFC arranges exhibitions and other programmes to unit holders (M=2.12).

❖ **Analysis of the perception of unit holders towards the support of CFC based on the demographic variables.**

This analyses the perception of unit holders towards the support of common facility centre (CFC) for the development of units in the cluster based on the demographic variables such as age, educational qualification, technical qualification, place of domicile, experience, generation and training programme attended by the unit holders.

5.3.1. Age with perception towards the support of CFC

It analyses the perception of unit holders about the support of CFC based on the age groups. Statistical tool ANOVA is used for analysis purpose.

H₀: There is no significant difference among the age groups of unit holders with regard to perception towards the support of CFC.

The result of the analysis is shown in the table.5.10.

Table 5.10

Age with perception towards the support of CFC

Age (Years)	Mean	SD	F/t – value	p-value
<= 40	37.6	15.24	1.223	0.302
41 – 50	36.7	15.07		
> 50	43.2	13.15		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of CFC. Hence it is concluded that there is no significant difference among the age groups of unit holders with regard to perception towards the support of CFC to the cluster.

5.3.2. Educational Qualification with perception towards the support of CFC

It analyses the perception of unit holders about the support of CFC based on their educational qualifications. ANOVA is used for this analysis.

H₀: There is no significant difference among educational qualifications of unit holders with regard to perception towards the support of CFC.

The result of the analysis is shown in the table.5.11.

Table 5.11

Educational Qualification with perception towards the support of CFC

Educational Qualification	Mean	SD	F/t – value	p - value
Elementary	32.5	10.84	0.680	0.568
SSLC	39.4	11.36		
Higher Secondary	42.2	22.87		
Graduate	43.0	11.97		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of CFC. Hence it is concluded that there is no significant difference among educational qualifications of unit holders with regard to perception towards the support of CFC.

5.3.3. Technical Qualification with perception towards the support of CFC

It analyses the perception of unit holders about the support of CFC based on the technical qualification. ‘t-test’ is used for this analysis.

H₀: There is no significant difference between the technical qualifications of unit holders with regard to perception towards the support of CFC.

The result of the analysis is shown in the table.5.12.

Table 5.12

Technical Qualification with perception towards the support of CFC

Technical Qualification	Mean	SD	F/t – value	p – value
Yes	40.0	16.44	0.119	0.905
No	39.4	14.14		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of CFC. Hence it is concluded that there is no significant difference between the technical qualifications of unit holders with regard to perception towards the support of CFC.

5.3.4. Place of domicile with perception towards the support of CFC

It analyses the perception of unit holders about the support of CFC based on place of domicile. ‘t-test’ is used for this analysis.

H₀: There is no significant difference between the place of domicile of unit holders with regard to support of CFC.

The result of the analysis is shown in the table.5.13.

Table 5.13

Place of Domicile with perception towards the support of CFC

Place of Domicile	Mean	SD	F/t – value	p – value
Rural	40.8	14.42	1.897	0.063
Semi-urban	30.0	11.83		

Source: Survey data

Since the p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of CFC. Hence it is concluded that there is no significant difference between the place of domicile of unit holders with regard to perception towards the support of CFC.

5.3.5. Experience with perception towards the support of CFC

It analyses the perception of unit holders about the support of CFC based on their experience. To check the hypothesis statistical tool ANOVA is used.

H₀: There is no significant difference among the experience of unit holders with regard to perception towards the support of CFC.

The result of the analysis is shown in the table.5.14.

Table 5.14

Experience with perception towards the support of CFC

Experience (Years)	Mean	SD	F/t – value	p-value
<= 10	30.0	14.34	1.562	0.209
11 – 20	42.1	15.09		
21 – 30	41.1	14.75		
> 30	34.6	8.991		

Source: Survey data

Since p value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of CFC. Hence it is concluded that there is no significant difference among the experience of unit holders with regard to perception towards the support CFC.

5.3.6. Generation with perception towards the support of CFC

It analyses the perception of unit holders about the support of CFC to the unit holders based on the generation. ‘t-test’ is used for analysis purpose.

H₀: There is no significant difference between the generation of unit holders with regard to perception towards the support of CFC

The result of the analysis is presented in table.5.15.

Table 5.15*Generation with perception towards the support of CFC*

Generation	Mean	SD	F/t – value	p-value
First Generation	40.2	14.70	0.820	0.415
Second Generation	35.9	13.33		

Source: Survey data

Since the p-value is greater than the significance level of 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of CFC. Hence it is concluded that there is no significant difference between the generation of unit holders with regard to perception towards the support of CFC. The first generation and second generation have the same perception towards the support of CFC.

5.3.7. Training programmes with perception towards the support of CFC

It analyses the perception of unit holders about the support of CFC based on the training programmes attended. Statistical tool ‘ANOVA’ is used for analysis purpose.

H₀: There is no significant difference among the types of training programmes attended by the unit holders with regard to perception towards the support of CFC.

The result of the analysis is shown in the table.5.16.

Table 5.16*Technical Qualification with perception towards the support of CFC*

Training Programmes	Mean	SD	F/t - value	p – value
Govt. Sponsored	48.8	12.94	3.058	0.036**
Private	33.0	16.62		
Both	40.3	13.18		
No Training	36.5	13.28		

Source: Survey data

** Significant at 5% level

Since p-value is less than the significance level of 0.05, the null hypothesis is rejected at 5% level with regard to the support of CFC. Hence it is concluded that there is a significant difference among training programmes attended by the unit holders with regard to support of CFC. The table reveals that the perception is significantly higher in case with Govt. sponsored training (48.77 ± 12.94).

5.4. Perception towards the support of the Government.

Here analyses the perception of unit holders towards the support of govt. for the development of units under this cluster. It is analysed through various statements based on the mean score. If the mean score is 3 and above 3 shows positive perception and below 3 shows negative perception. It also analysed the relationship of the demographic variables with the support of govt. The result of the descriptive analysis shows in table.5.17.

Table 5.17

Analysis of the perception of unit holders towards the support of Government

Statements	Mean Score
Govt. provides support for the development of clusters	2.83
Govt. provides infrastructural facilities to unit holders	2.07
Govt. conduct meeting of all unitholders	2.42
Govt. provides training to unit holders	2.08
Govt. arrange exhibitions to market the products of the units	1.87
Govt. provides trade show support to units	1.68
Govt. provides financial support	1.65
Govt. provides marketing support	1.60
Govt. authorities arrange classes of experts	2.00
Govt. helps to interact with other agencies	1.72
Govt. provides support to avail finance from banks	1.77
Govt. makes frequent visits in units	1.37
Govt. authorities make continuous interaction with cluster members	1.47

Source: Survey data

It can be seen from the table that all the variables used to check unit holders' perceptions towards the support of the government are negatively viewed.

❖ **Analysis of the perception of unit holders towards the support of Govt. based on demographic variables.**

Here analyses the perception of unit holders towards the support of Govt. to this cluster based the demographic variables such as age, educational qualification, technical qualification, place of domicile, experience, generation and training programme attended by the unit holders.

5.4.1. Age difference with the perception towards the support of Govt.

Here analyses the perception of unit holders about the support of Govt. to the cluster based on different age groups. Statistical tool 'ANOVA' is used for the analysis purpose.

H₀: There is no significant difference among the age groups of the unit holders with regard to the perception towards the support of Govt. to the cluster.

The result of the analysis is shown in the table.5.18.

Table 5.18

Age with perception towards the support of Govt.

Age (Years)	Mean	SD	F/t – value	p – value
<= 40	22.8	9.215	2.160	0.125
41 – 50	22.0	9.032		
> 50	27.8	10.45		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of Govt. to the cluster. Here there is no significant difference among the age groups with respect to perception towards the support of Govt. to the cluster. Thus, people in all age groups have similar perception towards the support of Govt.

5.4.2. Educational Qualification with perception towards the support of Govt.

Here analyses the perception of unit holders about the support of Govt. based on their educational qualifications. Statistical tool ‘ANOVA’ is used for the analysis purpose.

H₀: There is no significant difference among the educational qualification of the unit holders with regard to the perception towards the support of Govt. to the cluster.

The result of the analysis is shown in the table.5.19.

Table 5.19

Educational Qualification with perception towards support of Govt.

Educational Qualification	Mean	SD	F/t – value	p – value
Elementary	23.2	8.704	1.063	0.372
SSLC	23.1	8.317		
Higher Secondary	28.6	14.28		
Graduate	26.0	5.944		

Source: Survey data

Since the p-value is greater than the significance level of 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of Govt.to the cluster. Here there is no significant difference among educational qualifications of the unit holders with respect to perception towards the support of Govt. to the cluster. Thus, the perception of the unit holders is the same irrespective of their educational qualifications.

5.4.3. Technical Qualification with perception towards the support of Govt.

This analyses the perception of unit holders about the support of Govt. based on their technical qualifications. Statistical tool t-test is used to check the given hypothesis.

H₀: There is no significant difference between the technical qualifications of the unit holders with regard to the perception toward the support of Govt.to the cluster.

The result of the analysis is shown in the table.5.20.

Table 5.20

Technical Qualification with perception towards the support of Govt.

Technical Qualification	Mean	SD	F/t – value	p – value
Yes	27.2	10.99	1.042	0.302
No	23.9	9.561		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of Govt. to the cluster. Here there is no significant difference between technical qualification with respect to perception towards the support of Govt.to the cluster.

5.4.4. Place of Domicile with perception towards the support of Govt.

Here analyses the perception of unit holders about the support of Govt. to the cluster based on their place of domicile. Statistical tool ‘t-test is used for analysing the given hypothesis.

H₀: There is no significant difference between the place of domicile of the unit holders with regards to the perception towards the support of Govt.to the industrial cluster.

The result of the analysis is shown in the table.5.21.

Table 5.21

Place of Domicile with perception towards the support of Govt.

Place of Domicile	Mean	SD	F/t - value	p – value
Rural	25.2	10.04	1.510	0.136
Semi-urban	19.3	6.800		

Source: Survey data

Since p value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of Govt. to the cluster. Here there is no significant difference in place of domicile with regard to perception towards the support of Govt. to the cluster.

5.4.5. Experience with perception towards the support of Govt.

Here analyses the perception of unit holders about the support of Govt. based on their experience. Statistical tool ‘ANOVA’ is used to check the given hypothesis.

H₀: There is no significant difference among the experience of the unit holders with regard to the perception towards support of Govt. to the cluster.

The result of the analysis is shown in the table.5.22.

Table 5.22

Experience with perception towards the support of Govt.

Experience (Years)	Mean	SD	F/t - value	p - value
<= 10	18.0	2.966	1.298	0.284
11 – 20	25.2	9.418		
21 – 30	26.5	12.25		
> 30	22.5	5.928		

Source: Survey data

Since the p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of Govt. to the cluster. Here there is no significant difference among experiences with respect to perception towards the support of Govt. to the cluster. Thus, all the unit holders have similar perception irrespective of their experience in this field towards the support of Govt. to this cluster.

5.4.6. Generation with perception towards the support of Govt. to industrial clusters

Here analyses the perception of unit holders about the support of Govt. based on their generation. Statistical tool ‘t -test’ is used for analysis purpose.

H₀: There is no significant difference between the generation of the unit holders with regard to the perception towards the support of Govt.to the cluster.

The result of the analysis is shown in the table.5.23.

Table 5.23

Generation with perception towards the support of Govt.

Generation	Mean	SD	F/t - value	p – value
First Generation	24.5	9.894	0.049	0.961
Second Generation	24.7	10.22		

Source: Survey data

Since the p-value is greater than the significance level of 0.05, the null hypothesis is accepted at 5% level with regard to perception towards the support of Govt. to the cluster. Here there is no significant difference between generation with respect to perception towards the support of Govt.

5.4.7. Training programmes attended with perception towards the support of Govt.

This analyses the perception of unit holders about the support of Govt. based on the training programmes attended. Statistical tool ‘ANOVA’ is used to test the given hypothesis.

H₀: There is no significant difference among the training programmes attended by the unit holders with regard to the perception towards the support of Govt. to industrial cluster.

The result of the analysis is shown in the table.5.24.

Table 5.24*Training programmes attended with perception towards the support of Govt.*

Training Programmes	Mean	SD	F/t - value	p – value
Govt. Sponsored	31.4	9.828	3.012	0.038**
Private	21.6	9.913		
Both	22.8	10.75		
No Training	23.0	7.792		

Source: Survey data

**Significant at 5% level

As the p-value is less than the significance level 0.05; the null hypothesis is rejected at 5% level with regard to perception towards the support of Govt. to the cluster. Here there is a significant difference among training programmes attended by the unit holders towards the support of gov. The table reveals that the perception is significantly higher in cases with Govt. sponsored training (31.4 ± 9.828) compared to the cases with no training (23.0 ± 7.792), private training (21.60 ± 9.913) and both Govt. & private training (22.80 ± 10.75).

5.5. Analysis of the perception of unit holders towards industrial clustering based on demographic variables.

Here analyses the perception of unit holders towards industrial clustering as a whole, which includes perception towards industrial clustering (general point of view), perception towards CFC and perception towards Govt. The perception is analysed based on demographic variables such as age, educational qualification, technical qualification, place of domicile, experience, generation and training programme attended by the unit holders. Details are given below.

5.5.1. Age with the perception towards industrial clustering.

Here analyses the perception of unit holders about industrial clustering based on different age groups. Statistical tool ANOVA is used for analysis purpose.

H₀: There is no significant difference among age groups of the unit holders with regard to perception towards the clustering.

The result of the analysis is shown in the table.5.25.

Table 5.25

Age with perception towards industrial clustering

Age (Years)	Mean	SD	F/t – value	p – value
<= 40	133.9	38.16	1.411	0.252
41 – 50	136.3	41.61		
> 50	151.8	35.84		

Source: Survey data

Since the p-value is greater than the significance level of 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Hence it is concluded that there is no significant difference among the age groups of unit holders with regard to perception towards industrial clustering.

5.5.2. Educational qualifications with perception towards industrial clustering.

Here analyses the perception of unit holders about the industrial clustering based on educational qualification. Statistical tool ‘ANOVA’ is used to check the given hypothesis.

H₀: There is no significant difference among the educational qualifications of the unit holder with regard to perception towards industrial clustering.

The result of the analysis is shown in the table.5.26.

Table 5.26

Educational Qualification with perception towards industrial clustering

Educational Qualification	Mean	SD	F/t – value	p – value
Elementary	129.5	30.82	1.023	0.389
SSLC	137.2	29.05		
Higher Secondary	153.5	62.32		
Graduate	158.3	17.58		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Hence it is concluded that there is no significant difference among educational qualifications of unit holders with regard to perception towards the clustering.

5.5.3. Technical Qualification with perception towards industrial clustering.

Here analyses the perception of unit holders about industrial clustering based on technical qualifications. To check the hypothesis, statistical tool t-test is used.

H₀: There is no significant difference between the technical qualification of unit holders with regard to perception towards industrial clustering.

The result of the analysis is presented in the table.5.27.

Table 5.27

Technical Qualification with perception towards industrial clustering

Technical Qualification	Mean	SD	F/t – value	p – value
Yes	146.8	42.92	0.541	0.591
No	140.0	37.61		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Hence it is concluded that there is no significant difference between the technical qualification of unit holders with regard to perception towards clustering. All the unit holders have perceived in the same way about industrial clustering irrespective of technical qualification.

5.5.4. Place of domicile with perception towards industrial clustering.

Here analyses the perception of unit holders about clustering based on their place of domicile.

H₀: There is no significant difference between the place of domicile of the unit holders with regard to perception towards industrial clustering.

To check the above hypothesis t-test is used.

The result of the analysis is shown in the table.5.28.

Table 5.28

Place of domicile with perception towards industrial clustering

Place of Domicile	Mean	SD	F/t – value	p – value
Rural	144.8	38.03	1.954	0.056
Semi-urban	115.3	33.19		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Hence it is concluded that there is no significant difference between the place of domicile of unit holders with regard to perception towards industrial clustering.

5.5.5. Experience with perception towards industrial clustering

Here analyses the perception of unit holders towards industrial clustering based on their experience. The hypothesis has been formulated.

H₀: There is no significant difference among the experience of the unit holders with regard to perception towards industrial clustering.

Statistical tool ANOVA is used for analysis.

The result of the analysis is shown in the table.5.29.

Table 5.29

Experience with perception towards industrial clustering

Experience (Years)	Mean	SD	F/t – value	p – value
<= 10	111.2	26.07	1.909	0.139
11 – 20	146.7	37.15		
21 – 30	148.0	45.03		
> 30	130.1	19.59		

Source: Survey data

Since p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Hence it is concluded that there is no significant difference among the experience of unit holders with regard to perception towards industrial clustering.

5.5.6. Generation with perception towards industrial clustering

Here analyses the perception of unit holders towards industrial clustering based on the generation. The statistical tool ‘t-test’ is used for analysis purpose.

H₀: There is no significant difference between generations of unit holders with regard to perception towards the industrial clustering.

The result of the analysis is shown in the table.5.30.

Table 5.30

Generation with perception towards industrial clustering

Generation	Mean	SD	F/t – value	p – value
First Generation	141.8	38.46	0.207	0.837
Second Generation	138.9	40.56		

Source: Survey data

Since the p-value is greater than the significance level 0.05, the null hypothesis is accepted at 5% level with regard to perception towards industrial clustering. Here there is no significant difference between generations with respect to perception towards industrial clustering. It reveals that the perception towards industrial clustering is similar across all generations.

5.5.7. Training programmes with perception towards industrial clustering

Here analyses the perception of unit holders about industrial clustering based on training programs attended. Statistical tool ANOVA is used to check the given hypothesis.

H₀: There is no significant difference among the training programmes attended by the unit holders with regard to perception towards industrial clustering.

The result of the analysis is shown in the table.5.31.

Table 5.31

Training programmes with perception towards industrial clustering

Training Programmes	Mean	SD	F/t – value	p – value
Govt. Sponsored	169.1	35.44	3.988	0.012**
Private	130.0	45.98		
Both	144.5	35.84		
No Training	128.0	30.67		

Source: Survey data

**Not significant at 5% level

As the p-value is less than the significance level of 0.05; the null hypothesis is rejected at 5% level with regard to perception towards industrial clustering. Here there is a significant difference among training programmes attended by the unit holders with regard to perception towards industrial clustering. The table reveals that the perception is significantly higher in cases with Govt. sponsored training (169.1 ± 35.44) and significantly lower in cases with no training (128.0 ± 30.67) and private training (130.0 ± 45.98) compared to the cases with both Govt. & private training (144.5 ± 35.84).

5.6 Conclusions

This chapter described the perception of unit holders towards industrial clustering. It includes perception towards industrial clustering in a general point of view, perception towards the support of CFC, perception towards the support of govt and the perception as a whole. This also made an analysis regarding the relationship between demographic variables and industrial clustering. According to this analysis unit holders are positively perceived with the industrial clustering, but not with the support of the CFC and government. Moreover, it reveals that the CFC and government's support needs to be improved.

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6.1. Introduction

UNIDO's cluster development approach encourages enterprises and institutions to work together to generate benefits for the cluster as a whole and the communities in which it resides (Weisert & Kaibitsch, 2013). This approach is rationale by the fact that joint actions allow cluster stakeholders to overcome limitations and benefit from opportunities beyond their capacities (Russo, Eyvazo, & Kaibitsch, 2020). In clusters, businesses can source inputs more efficiently, access information technology and institutions, coordinate with related firms, and monitor suppliers' performance (Merrilees, Miller, & Herington, 2007).

The development of enterprise networks and business links is a crucial component of cluster development since networks and links are the foundation of collective success. The horizontal network is a group of companies pursuing the same or similar products or processes in order to achieve synergies in the pursuit of common commercial goals. This allows producers to gain economies of scale as well as offer a wider variety of products (Ceglie, 2010). Firms in clusters can develop horizontal cooperation with other firms, share environmental threats, and take advantage of opportunities. Also, they can access specific scaffolds developed by policymakers or other players in the meta-management ecosystem, such as consortia, associations, and consulting firms. Cluster members can share marketing and communication resources and expertise, such as a collective local brand, common image, collective management, and/or consulting (Falcone, 2007).

The vertical integration of cluster-productive value chains can provide firms with specific market advantages. Due to the proximity to the clients and regular interactions, they are able to create relationship-based marketing (Falcone,2007).

Vertical linkage refers to a relationship between enterprises that are located at different levels within a production chain. There are several types of agreements i.e., backward and forward, including subcontracting, supplier development, and establishing international and domestic links between producers and buyers. By improving communication between actors located at different levels of the production chain, producers can improve the quality of the produced goods or services, as well as their performance in terms of timely delivery and reliability (Ceglie, 2010).

A firm's belonging to a cluster enhances its resources and competencies, allowing it to modify its marketing mix with specific consequences for its customer value. As a matter of fact, the customer also benefits through buying from a firm in a cluster, as they have access to a wider range of resources and competitors. As cluster provides direct benefits to customers, cluster firms share their marketing and communication efforts. It is accomplished through better communication and distribution services as well as specific joint initiatives, joint services, and anything else that enriches a firm's value proposition (Falcone, 2007).

This chapter explains the linkage of the unit holder with various parties in the cluster. It is classified as vertical linkage (backward and forward linkage), and horizontal linkage. Backward linkage means the interactions with various parties prior to the production stage. Hence the backward linkage includes linkage with sub-contractors and suppliers. Forward linkage means the interactions of unit holders with buyers. The horizontal linkage includes linkage with other units in the cluster.

6.2. Linkage of unit holders with sub-contractors

This section explains the descriptive statistics about the linkage of unit holders with sub-contractors. A higher mean score indicates higher rating by unit holders. The result of the descriptive analysis regarding the linkage of unit holders with sub-contractors is shown in the table. 6.1.

Table 6.1*Linkage of unit holders with sub-contractors*

Variables	Mean Score
Sharing of information and experience	3.17
Negotiation of payment and delivery conditions	2.92
Product development	2.93
Sharing of innovative ideas	3.08
Easy access to customers	3.45
Easy access to suppliers	2.90
Quality in work and delivery time	2.82

Source: Survey data

The table shows the linkage of unit holders with the subcontractors. The linkage is analysed based on the above-mentioned variables and the result is explained by the mean score, where score 3 or above indicates positive and below 3 indicates negative linkage. Sharing of information and experience (M=3.17), sharing of innovative ideas (M=3.08), and easy access to customers (M=3.45) are the variables which show positive linkage. The variables which show negative linkage include negotiation of payment and delivery conditions (M=2.92), product development (M=2.93), easy access to suppliers (M=2.90), and quality in work and delivery time (M=2.82).

6.2.1. Demographic variables of the units and Linkage with sub- contractors

Here analyse the linkage of unit holders with sub-contractors based on the demographic variables of the units such as type of unit and age of the unit. Statistical tools such as 'ANOVA and t-test' are used to test the significance of the given hypotheses.

H₀: There is no significant difference between the type of units with regard to the linkage with sub-contractors.

H₀: There is no significant difference among age groups of the units with regards to the linkage with sub- contractors.

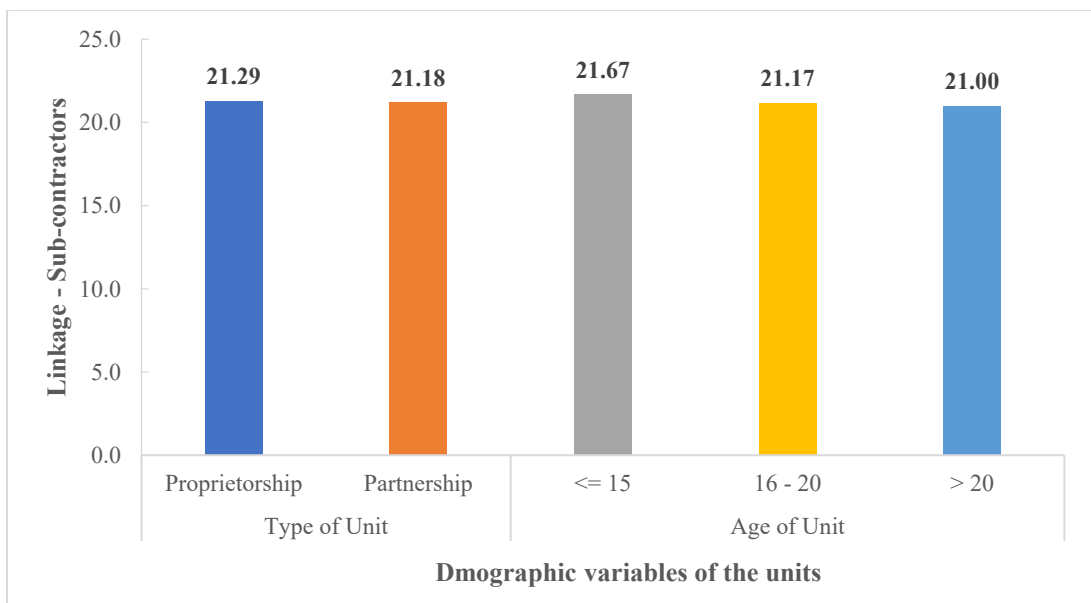
Result of analysis is presented in table 6.2.

Table 6.2*Demographic variables of the units and Linkage with Sub-contractors*

Variables	N	Mean	SD	p - value
Type of Units				
Proprietorship	49	21.29	5.594	0.992
Partnership	11	21.18	6.353	
Age of Units				
<= 15	21	21.67	6.733	0.925
16 – 20	12	21.17	3.738	
> 20	27	21.00	5.684	
Total	60	21.27	5.683	

Source: Survey data

Since the p-values are greater than the significance level 0.05 in both cases, the null hypotheses are accepted at 5% level with regard to linkage with sub-contractors. Here there is no significant difference between the type of unit with regard to linkage with sub-contractors. It also shows that there is no significant difference among age groups of units with regard to the linkage of sub- contractors. It is noted that the linkage score is almost same in all cases.

Figure 6.1*Demographic variables of the units and Linkage with Sub-contractors*

6.2.2. Performance and Linkage with Sub-contractors

Here analyses the relationship between the performance of the units and linkage with sub-contractors by using the statistical tool ‘correlation’ analysis.

H₀: There is no correlation between the performance of the units and linkage with sub-contractors

The result of analysis is shown in table.6.3.

Table 6.3

Relationship between the performance of the units and the linkage with sub-contractors

Variables	Mean	SD	r – value	p – value
Linkage with Sub-contractors	21.27	5.683	0.722	0.000**
Performance of the Units	14.20	5.068		

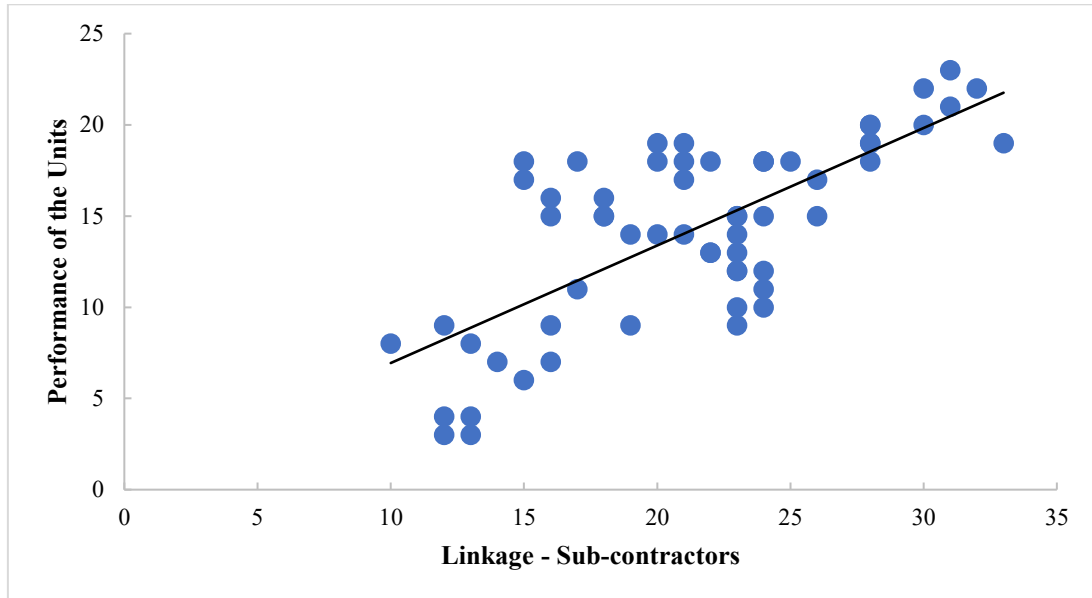
Source: Survey data

**Significant at 5% level

As the p-value is less than the significance level of 0.05; the relationship between performance and linkage is significant and rejected the null hypothesis at a 5% level. It means, there is a correlation between the performance of the unit and the linkage with sub-contractors. The significant and positive correlation indicates that the performance is increasing with an increase in linkage and decreasing with the decrease in linkage.

Figure 6.2

Relationship between Performance of the unit and Linkage with Sub-contractors



6.3. Linkage with suppliers

Here explains the descriptive statistics regarding the linkage of unit holders with suppliers in terms of mean scores. Higher mean scores indicate higher rating by unit holders. The result of the analysis is described in table 6.4.

Table 6.4

Linkage of unit holders with suppliers

Variables	Mean Score
Sharing of information and experience	2.90
Negotiation of payment and delivery conditions	3.00
Support to product development	2.97
Sharing of innovative ideas	3.07
Maintaining improved quality	3.00
Easy access to customers	2.92
Availability of material on time	3.22

Source: Survey data

The table shows the linkage of unit holders with the suppliers. A mean score indicates the presence of positive or negative linkage with suppliers. Scores 3 and above indicate positive linkage, while scores below 3 indicate negative linkage. Positive linkage is shown in statements such as negotiation of payment and delivery conditions (M=3), sharing of innovative ideas (M =3.07), maintaining improved quality (M=3) and availability of material on time (M =3.22). The negative linkage is shown in statements such as sharing of information and experience (M=2.90), support to product development(M=2.97), and easy access to customers (M=2.92).

6.3.1. Demographic variables of the units and Linkage with suppliers

This analysis explains the linkage of unit holders with suppliers based on the demographic variables of the units such as type of units and age of units. In order to test the given hypotheses, statistical tools such as t-tests and ANOVA are used.

H₀: There is no significant difference between the type of units with regard to the linkage with suppliers.

H₀: There is no significant difference among the age group of units with regard to linkage with suppliers.

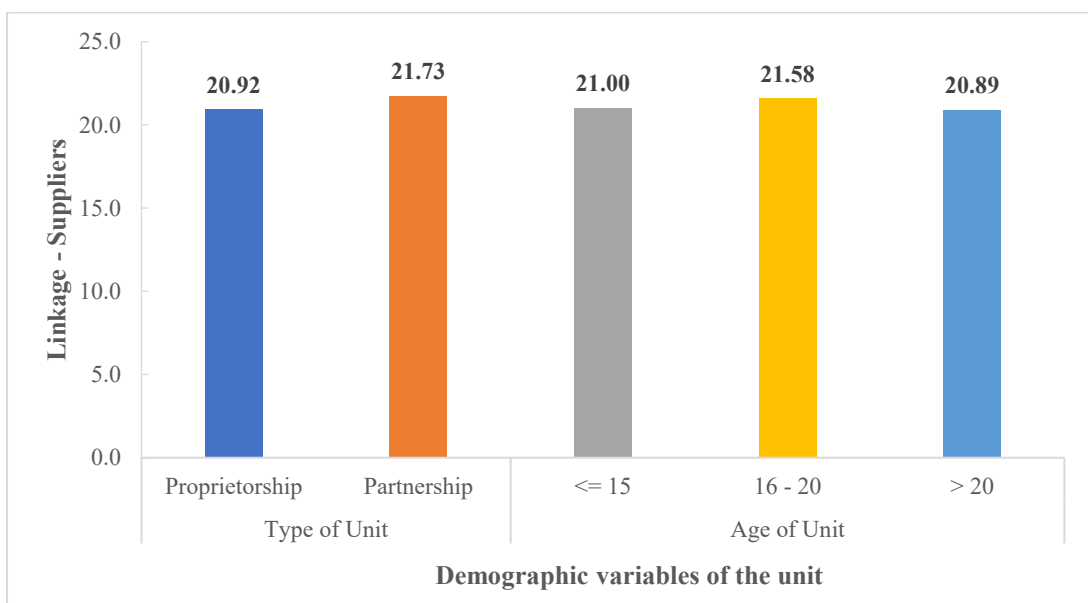
The result of analysis is shown in table. 6.5.

Table 6.5*Demographic variables of the units and linkage with suppliers*

Variables	N	Mean	SD	p – value
Type of Units				
Proprietorship	49	20.92	5.762	0.694
Partnership	11	21.73	6.084	
Age of Units				
<= 15	21	21.00	7.036	0.948
16 – 20	12	21.58	3.502	
> 20	27	20.89	5.686	
Total	60	21.07	5.778	

Source: Survey data

Regarding the linkage with suppliers, the null hypothesis is accepted at 5% level because p values are greater than the significance level 0.05 in both cases. Hence there is no significant difference between the type of units with regard to linkage with suppliers. It also shows that there is no significant difference among age groups with regard to linkage with suppliers. It is noted that the linkage score is almost same in all the categories.

Figure 6.3*Demographic variables of the units and linkage with suppliers*

6.3.2. Performance and Linkage with Suppliers

It analyses the relationship between the performance of the units and the linkage with suppliers using ‘correlation’ analysis.

H₀: There is no correlation between the performance of the units and linkage with suppliers.

The result of the analysis is shown in table.6.6.

Table 6.6

Relationship between the performance of the units and linkage with suppliers

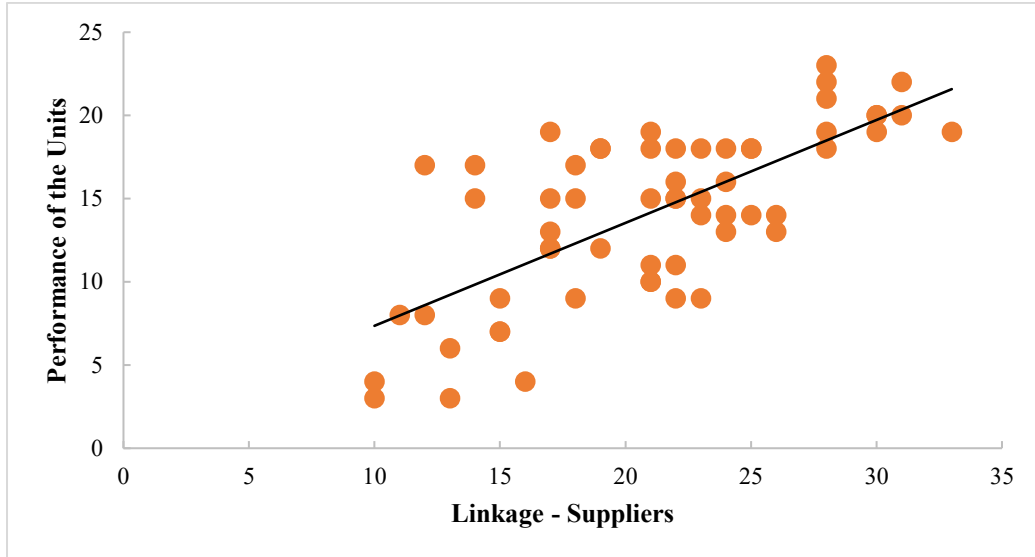
Variables	Mean	SD	r – value	p – value
Linkage – Suppliers	21.07	5.778	0.705	0.000
Performance of the Units	14.20	5.068		

Source: Survey data

Here the p-value is less than the significance level of 0.05; the relationship between the performance of the units and linkage with suppliers is significant and rejected the null hypothesis at 5% level. Hence, there is a significant relationship between the performance of the units and the linkage with suppliers. A significant and positive correlation indicates that the performance is increasing with an increase in linkage and decreasing with the decrease in linkage.

Figure 6.4

Relationship between the performance of the units and Linkage with suppliers



6.4. Linkage with buyers

Here analyze the descriptive statistics about the linkage of unit holders with buyers. The result is presented based on the mean score and it is shown in table 6.7.

Table 6.7

Linkage of unit holders with buyers

Variables	Mean Score
Sharing of information and experiences	3.15
Negotiation of payment and delivery condition	2.90
Technical upgrading	3.07
Quality control	2.90
Setting of product specification	3.38
Organisation of production	3.30
Support to connect new customers	3.13

Source: Survey data

The table shows the linkage of unit holders with buyers. It is described based on the mean score, where score 3 and above indicates positive linkage and below 3 indicates a negative linkage. In this analysis the variables which show positive linkage

includes sharing of information and experiences (M=3.15), technical upgrading (M=3.07), setting of product specification (M=3.38), organization of production (M=3.30), support to connect new customers (M=3.13). The variables which show negative linkage include negotiation of payment and delivery conditions (M=2.90) and quality control (M=2.90).

6.4.1. Demographic variables of the units and Linkage with Buyers

Here analyses the linkage of unit holders with buyers based on the demographic variables of the units such as type of units and age of units. To check the given hypotheses statistical tools such as ‘t-test and ANOVA ‘are used

H₀: There is no significant difference between the type of units with regard to linkage with buyers.

H₀: There is no significant difference among age groups with regard to linkage with buyers.

The result of the analysis is shown in table.6.8.

Table 6.8

Demographic variables of the units and linkage with buyers

Variables	N	Mean	SD	p - value
Type of Unit				
Proprietorship	49	21.73	5.744	0.763
Partnership	11	22.27	6.262	
Age of Unit				
<= 15	21	21.95	6.734	0.940
16 – 20	12	21.33	4.774	
> 20	27	21.96	5.606	
Total	60	21.83	5.791	

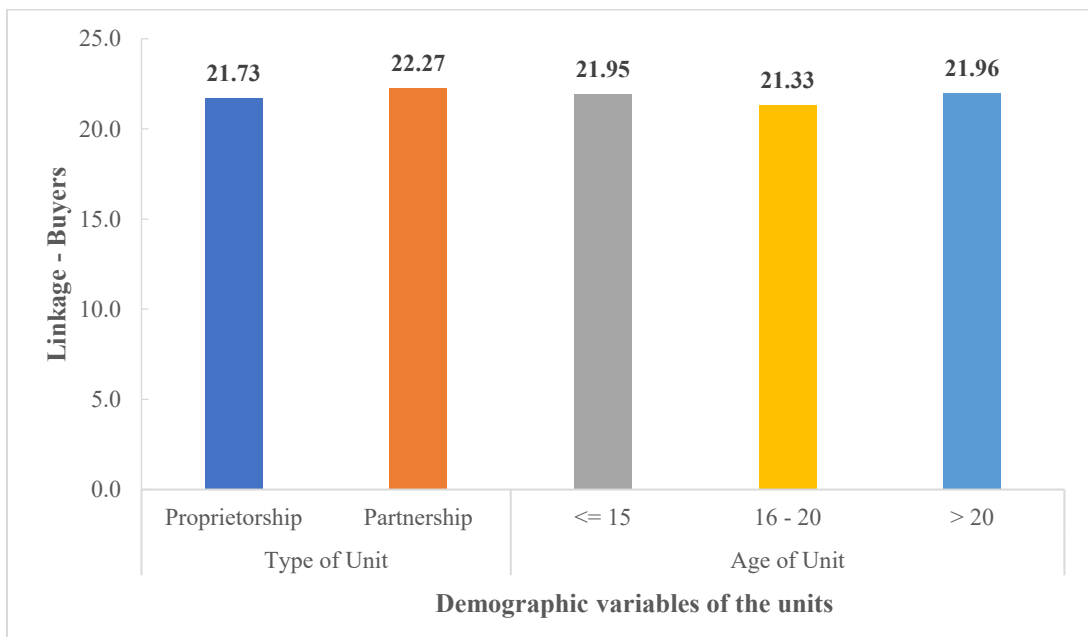
Source: Survey data

Since p values are greater than the significance level of 0.05 in both cases, the null hypotheses are accepted at 5% level regarding the linkage with buyers. Here there

is no significant difference between the type of units with regards to linkage with buyers. It also shows that there is no significant difference among age groups with regards to linkage with buyers. It is noted that the linkage score is almost the same in all the categories.

Figure 6.5

Demographic variables of the units and linkage with buyers



6.4.2. Performance and Linkage with buyers

Here analyses the relationship between the performance of the units and the linkage with buyers using correlation analysis.

H₀: There is no correlation between the performance of the units and linkage with buyers.

The result of analysis is presented in table.6.9.

Table 6.9

Relationship between the performance of the units and linkage with buyers

Variables	Mean	SD	r – value	p – value
Linkage – Buyers	21.83	5.791	0.736	0.000**
Performance of the Units	14.20	5.068		

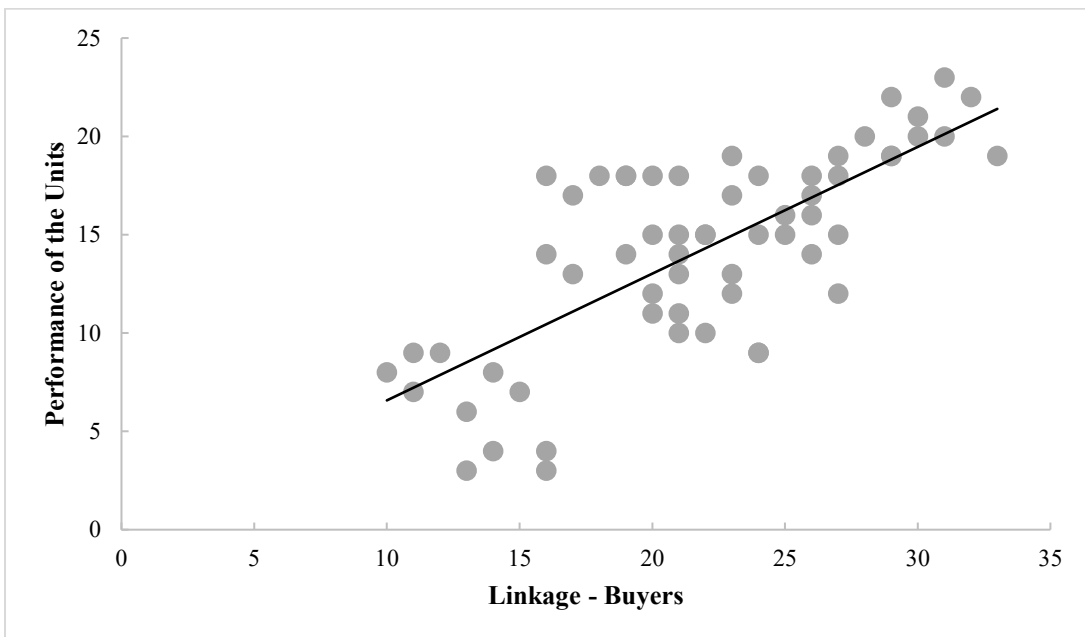
Source: Survey data

** Significant at 5% level

Here the p-value is less than the significance level 0.05; the relationship between performance and linkage is significant, and rejected the null hypothesis at 5% level. i.e., there is a correlation between performance of the unit and the linkage with buyers. A significant and positive correlation indicates that the performance is increasing with an increase in linkage and decreasing with the decrease in linkage.

Figure.6.6

Relationship between Performance of the unit and Linkage with buyers



6.5. Linkage with other units

This section explains the linkage of unit holders with other units. The result of the analysis is explained based on mean score and is presented in table 6.10.

Table 6.10*Linkage of unit holders with other units*

Variables	Mean Score
Lending machinery	2.83
Product development	2.88
Marketing support	3.03
Sharing of information and experience	2.83
Joint labour training	2.87
Joint purchase of inputs	2.98
Sharing of orders.	3.15

The table shows the linkage of unit holders with other units in the cluster and it is analysed based on variables with mean scores. The mean score 3 and above indicates positive linkage among unit holders which includes the variables such as marketing support (M=3.03) and sharing orders (M=3.15). The variables with below 3 score include lending machinery (M=2.83), product development (M=2.88), sharing of information and experience (M=2.83), Joint labour training (M=2.87), joint purchase of inputs (M=2.98).

6.5.1. Demographic variables of the units and linkage with other units

Here analyses the linkage of unit holders with other units based on the demographic variables of the units such as type of units and age of units. Statistical tools such as 't-test and ANOVA 'are used for analysis purpose.

H₀: There is no significant difference between the type of units with regard to linkage with other units.

H₀: There is no significant difference among age groups with regard to linkage with other units.

The result of analysis is presented in table.6.11.

Table 6.11*Demographic variables of units and linkage with other units*

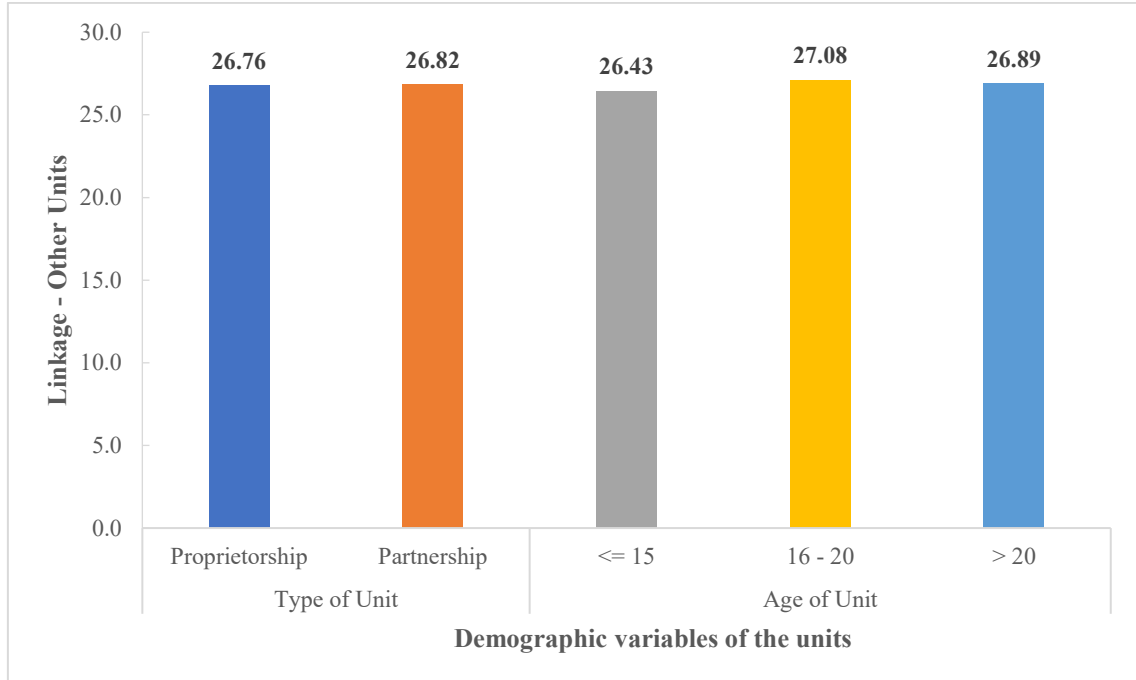
Variables	N	Mean	SD	p – value
Type of Units				
Proprietorship	49	26.76	7.440	0.984
Partnership	11	26.82	7.278	
Age of Units				
<= 15	21	26.43	8.755	0.965
16 – 20	12	27.08	5.452	
> 20	27	26.89	7.132	
Total	60	26.77	7.349	

Source: Survey data

Since p values are greater than the significance level of 0.05 in both cases, the null hypotheses are accepted at 5% level in relation to linkage with other units. Here there is no significant difference between the type of units with regard to linkage with other units. It also shows that there is no significant difference among the age group of units with regard to linkage with other units. It is noted that the linkage score is almost same in all the categories.

Figure 6.7

Demographic variables of the units and linkage with other units



6.5.2. Performance and Linkage with other units

It analyses the relationship between the performance of the units and the linkage with other units using correlation analysis.

H₀: There is no correlation between the performance of the units and linkage with other units

The result of analysis is shown in table.6.12.

Table 6.12

Relationship between the performance of the units and linkage with other units

Variables	Mean	SD	r – value	p – value
Linkage with other Units	26.77	7.349	0.593	0.000**
Performance of the Units	14.20	5.068		

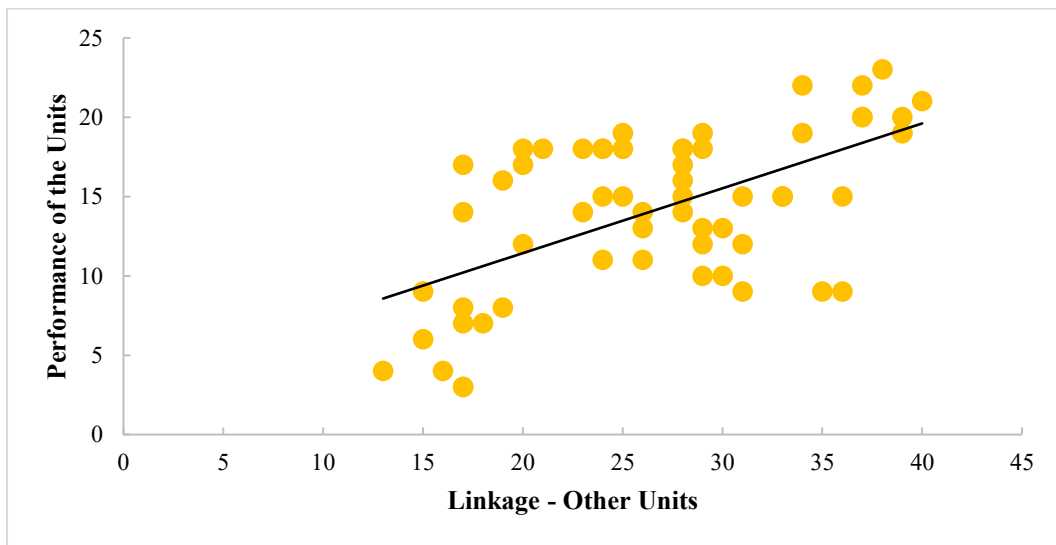
Source: Survey data

** Significant at 5% level

Here the p-value is less than the significance level 0.05; the relationship between performance and linkage is significant and rejected the null hypothesis at 5% level, i.e., there is a correlation between performance of the units and the linkage with other units. A significant and positive correlation indicates that the performance is increasing with increase in linkage and decreasing with decrease in linkage.

Figure 6.8

Relationship between performance of the unit and linkage with other units



6.6. Relationship between Performance and Linkage

The relationship between performance of the units and linkage is measured by using Regression analysis. The result of the analysis is given 6.13.

Table 6.13

Relationship between Performance and Linkage

Linkage	Unstandardized Coefficients		Standardized Beta	t – value	p – value
	Beta	SE			
Constant	-2.206	1.771		-1.246	0.218
Sub-contractors	0.279	0.125	0.313	2.233	0.030**
Suppliers	0.237	0.115	0.271	2.069	0.043**
Buyers	0.298	0.126	0.340	2.370	0.021**
Other Units	-0.039	0.089	-0.056	-0.436	0.665

Source: Survey data

** Significant at 5% level

Sub-contractors: The table shows that there is a significant relationship between the performance of the units and their linkage to subcontractors, as the p-value is less than 0.05. The unstandardized beta indicates that a unit change in linkage will lead to 0.279 unit increase in performance.

Suppliers: A significant relationship exists between the performance of units and the linkage with suppliers, as the p-value is less than 0.05. The unstandardized beta indicates that a unit change in linkage will lead to 0.237 unit increase in performance.

Buyers: In the case of buyers, the table shows that there is a significant relationship between the performance of units and the linkage with buyers because the p-value is less than 0.05. The unstandardized beta indicates that a unit change in linkage will lead to 0.298 unit increase in performance.

Other Units: Here the p-value is greater than the significance level 0.05; Hence the relationship between performance and linkage is not significant.

The final formula indicating the relationship between performance and linkage as follows:

$$\text{Performance} = 0.279 * L_{\text{Sub}} + 0.237 * L_{\text{Sup}} + 0.298 * L_{\text{Buy}}$$

6.7. Conclusion

This chapter depicts the linkage of unit holders with various parties in the cluster. It covers the backward linkage, forward linkage, and horizontal linkages of unit holders. In backward linkage, it analyses the interactions and co-operation of sub-contractors and suppliers. The forward linkage is analysed through the interaction of unit holders with the buyers and horizontal linkage is analysed through the interaction with other units in the cluster. This study also analysed how these interactions support the performance of the units. Then it is found that the performance of the unit is related with the interaction of all these parties. However, the relationship with sub-contractors, suppliers, and buyers more influence the performance of unit holders than the interactions with other units.

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7.1. Introduction

An industrial cluster is an agglomeration of companies, suppliers, service providers, and associated institutions in a particular field (Shakya, 2009). It emphasises the importance of related institutions that are fundamental for cluster activities. The related institutions include financial providers, various levels of government, trade associations and educational institutions such as universities, research centres, and training centres etc. (Luiz C. R. & Rafael H. P., 2013).

Generally, industry clusters are a group of businesses and non-business organizations whose membership within the group contributes significantly to the competitiveness of each member organization. 'Buyer-supplier relationships, common technologies, common buyers, or shared distribution channels, or common labor pools' bind the cluster together.

A non-business organization might be a trade association, a community or technical college with specialized industry programs, a university, a government industrial extension program, or a network broker. Cluster literature defines these entities as "related and supporting institutions". The cluster's success is often determined by these institutions. (Bergman & Feser, 2020)

Clusters can be considered as a network of firms that are strongly interdependent (including specialized suppliers), knowledge-producing entities (universities, research institutions, engineering companies), bridging organizations (brokers, consultants), and customers that are interconnected in a value-adding production chain (Nasir, Bulu, & Eraslan, 2007).

Business Development Service Providers (BDS) such as technical institutions, industry associations, NGOs etc. have an important role in the development of industrial clusters. They provide information to cluster firms on the availability of various services. The various services that provide to cluster firms include counselling, information dissemination, training, business plan development for credit access, advice on technology, the establishment of shared facilities etc. (Ceglie, 2010)

As part of many cluster projects, UNIDO cooperates with support institutions to create educational programs that improve the quality and/or marketability of cluster products.

This chapter covers the institutional support for strengthening the General Engineering cluster in Malappuram District, Kerala. There are number of institutions which provide support for the development of units in the industrial cluster.

The institutions that support the development of the cluster include:

- Common Facility Centre
- District Industrial Centre
- MSME Development and Facilitation Office
- Kerala Bureau of Industrial Promotion (K-BIP)
- Directorate of Industries and Commerce
- Industry Association
- Educational Institution

7.2. Common Facility Centre (CFC)

As part of the Micro Small Enterprises Cluster Development Programme (MSE-CDP) the Ministry of Micro Small & Medium Enterprises (MSME), Government of India, is providing financial assistance for the establishment of Common Facility Centres (CFCs) in clusters.

As the Implementing Agency for CFC projects, the Kerala Bureau of Industrial Promotion (KBIP) under the MSE-CDP Scheme, coordinates all activities

related to industrial cluster development in association with the Directorate of Industries & Commerce and District Industries Centres.

As per MSE-CDP Scheme a maximum of 70% financial assistance is provided by Govt.of India,20 % provided by the State and the balance by SPV.

The Ministry of MSME, Government of India, has sanctioned 16 CFC projects to the State. Out of these, 12 CFC projects have been commissioned, and 4 CFC projects are in various stages of implementation.

7.2.1. Malappuram Metals & Engineering Consortium Pvt. Ltd., (MECON)-CFC

Malappuram Metals & Engineering Consortium Pvt. Ltd., (MECON) was formed under the Cluster Development Programme of Govt. of India and Govt. of Kerala. This institution aims to enhance the technological and quality capabilities of General Engineering Industries in the Malappuram district so as to compete with global standards.

Governments, both central and state, have provided adequate funding for the establishment of MECON CFC (Common Facility Production and Training Centre). The centre provides higher-end machinery, trained skilled workers, and soft interventions to raise awareness of industrial culture among new entrepreneurs and members of the public for the development of small engineering industries.

It was commissioned on 5th March 2015. The cost of the project is Rs.315.01 lakh with Govt. of India assistance of Rs.199.00 lakh, State Govt. contribution of Rs.63 lakh, SPV and bank contribution of Rs.53.01 lakh.

7.2.2. Infrastructure Facilities at CFC

There are over two crores of rupees worth of machines arranged in the area of 15000 square feet and also have 20000 square feet for storing the finished and unfinished products. The various types of machinery installed at CFC are:

- Sheet Shearing Facility

- Sheet bending Facility
- Sheet rolling Facility
- Pipe bending Facility
- Pipe Cutting Facility
- Radial and Axial drilling Facility
- Hacksaw cutting Facility
- Band saw Facility
- Shot Blasting Facility
- Powder coating Facility
- Spray painting Facility
- Power press Facility
- EOT Crane Facility
- Fork lift Facility
- Lathe works
- TIG, MIG, and Arc Welding Facility
- CNC Lathe Facility.



Common Facility Centre (MECON CFC)

7.2.3. Services provided at CFC

The MECON provides various services to industrial units within the cluster and outside the cluster. There are various kinds of machinery installed at MECON CFC with the support of state government and central government and also the contribution of cluster members. In addition to cluster members, non-cluster members can also use the CFCs' services based on the availability of free capacity and payment of user charges.

Services provided by the CFC are:

➤ **Technical support-**

CFC provides an experienced team of entrepreneurs and engineers to boost technical knowledge to a benchmark level. Using their guidance, any kind of technical difficulty is reduced.

➤ **Financial support-**

CFC provides guarantees to acquire finance from banks and other financial institutions for implementing the ideas of entrepreneurs. This helps entrepreneurs in investing in innovative ideas.

➤ **For Technical Students**

Most Engineering graduates, Diploma Engineers, and ITI holders only have theoretical knowledge of machineries and production. As a remedy for this lack of knowledge about the practical production process, MECON offers 3-6 months of training in the plant. This will help the freshers to increase their level of confidence in their performance. After completing the training satisfactorily, an experience certificate is provided by MECON.

➤ **For 8th/SSLC/Plus Two Students**

Students with less formal education can also enter to the field of fabrication through an excellent program. With the help of the District Industrial Centre (DIC, Malappuram), students were selected for job-oriented practical training. This will help

students to acquire employment-oriented theoretical and practical training. MECON employs these individuals in its 200 member units after their successful completion of the training.

➤ National Apprenticeship Certificate (NAC) courses were launched for youth and students under the STRIVE-IAI project, jointly led by the Central and State Governments and using World Bank funds.

➤ **Skill Strengthening for Industrial Value Enhancement (STRIVE)**

The Skills Strengthening for Industrial Value Enhancement (STRIVE) project is an initiative by the World Bank in collaboration with the Government of India to improve the relevance and efficiency of skills training provided in Industrial Training Institutes (ITIs) and apprenticeship programs. Government of India and International Bank for Reconstruction and Development (IBRD) have signed a financial agreement on 19th December, 2017 and the closing date of the project is November, 2022.

This programme marks a change in the government's implementation strategy from inputs to results in vocational education and training. It aims to improve long term vocational education and training quality and market relevance by reforming institutional structures and improving skill development training programs. SMEs, business associations, and industry clusters will be involved in the program in order to motivate ITIs to improve overall performance, including apprenticeships. As part of this project, institutions such as the State Directorate of Training and Employment, CSTARI, NIMI, NSTIs, ITIs, etc., will be strengthened to deliver high quality skill development training.

➤ It is a Central Sector Scheme (CSS) with a budget outlay of INR 2200 Crore (US \$ 318 million) covering the following 4 result areas:

- Improved performance of ITI.
- Increased Capacities of State Governments to support ITIs and Apprenticeship Training
- Improved Teaching and Learning.

- Improved and Broadened Apprenticeship Training.

General Engineering Cluster (MECON-CFC -Malappuram Metals and Engineering Consortium PVT. LTD) has been nominated as an Industry Cluster (IC) by the Directorate General of Training (DGT) of India and the Department of Employment and Training (DET) of Kerala for implementing the Industry Apprenticeship Initiative under STRIVE Project.

Under this project, General Engineering Cluster (MECON-CFC) is the first pilot project in Kerala to implement this concept. Currently, two courses are being conducted, Gas & Electric Welder and Sheet Metal Worker. A stipend of Rs. 7000 is paid for the training period of one to two years. At the time of training, safety equipment, working tools, study materials, uniforms, and insurance coverage will be provided, and an exclusive study tour will be offered as an additional benefit. These trainees will receive National Apprenticeship Certificate (NAC) when they have completed the training and passed the online exam. This Certificate (NAC) is valuable to most government and private employers. (<http://meconcluster.in/>)

7.2.4. Performance of CFC

The MECON CFC conducting various activities such as job work, training and consultancy services to members and non- members and also conducting seminars related to various topics for improving the performance of the member units. The performance of CFC for the last five years is shown in table 7.1.

Table 7.1

Performance of MECON CFC (in numbers)

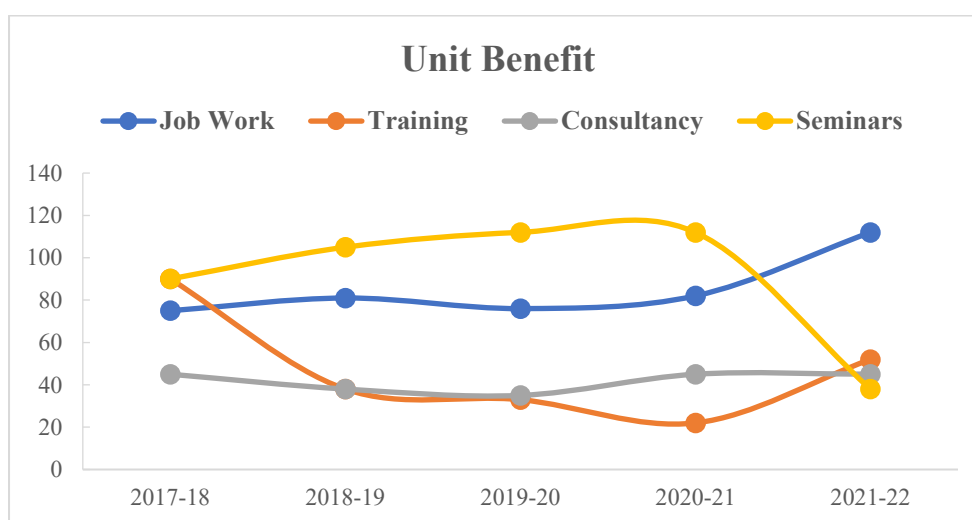
Year	Job Work	Training	Consultancy	Seminars
2017-18	75	90	45	90
2018-19	81	38	38	105
2019-20	76	33	35	112
2020-21	82	22	45	112
2021-22	112	52	45	38

Source: Records from CFC and DIC Malappuram

The table shows the performance of the CFC for the last five years. The main activities undertaken by the CFC are job work for cluster member units and non-member units, training and consultancy services provided to both members and non-members and conducting seminars on various topics. The performance based on these activities for the last five years shows that the job work is high in 2021-2022 period and shows an increasing trend. However, training provided at CFC shows a decreasing trend. In the case of consultancy services, it shows a stagnant effect and regarding the seminar conducted, the last year shows very low in numbers as compared to last 3 previous years.

Figure 7.1

Performance of MECON CFC



7.2.5. Revenue of the CFC

There are various kinds of machines are arranged at CFC. The members and non-members can utilise the machines for their work with a service charge. The service charge received for undertaking their job work is the main earnings of the CFC. CFC also provides training with a small amount of contribution to members and non-members. The revenue of the CFC through training and job work for the last five years is shown in table 7.2.

Table.7.2.*Revenue of the MECON CFC*

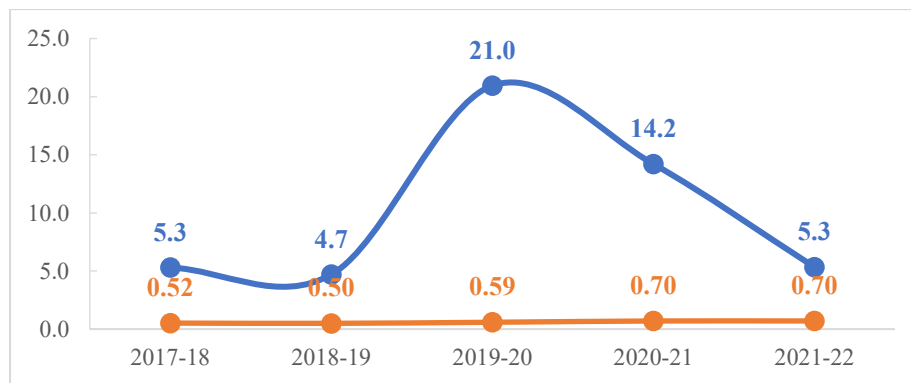
Revenue (Lakh)		
Year	Job Work	Training
2017-18	5.3	0.52
2018-19	4.7	0.50
2019-20	21.0	0.59
2020-21	14.2	0.70
2021-22	5.3	0.70

Source: Records from CFC and DIC Malappuram

The revenue of MECON CFC for the last five years is shown in the above table. The main source of earnings of the CFC is service charges for the job work and fees for training. It shows that the return is high during the period 2019-20 regarding jobwork and through training in 2021-2022.

Figure 7.2

Revenue of CFC (in Lakh)



7.3. District Industrial centres

District Industries Centre is a district-level institution that provides support services to entrepreneurs to establish Micro, Small, and Medium Enterprises. It includes entrepreneurial capacity building through training programmes, identification of suitable schemes, preparation of feasibility reports, arrangements for credit facilities, machinery and equipment, provision of raw materials and development of industrial

clusters, organising various industry fairs to find markets etc. Registration and development of industrial cooperatives are also offered by this centre.

Since 1978, the Central government has initiated the 'District Industries Centres (DICs) programme with the goal of promoting small, tiny, cottage and village industries in a particular area and ensuring that all necessary services and facilities are available at one place to entrepreneurs.

There are Taluk Industries Offices under the District Industries Centres (DIC) where Assistant District Industries Officers are responsible for directing activities. Industries Extension Officers are deployed in all Block Panchayaths, Municipalities and Corporations.

The functioning of DICs and their achievement is monitored by the Additional Chief Secretary (Industries) and Director of Industries & Commerce. The Review of the General Managers is organized frequently to evaluate the performance and also help in resolving difficulties in implementation of different schemes. (<http://industry.kerala.gov.in/index.php/district-industries-centre>).

The DIC monitors the performance of CFC and evaluate the reports of CFC. The CFC prepares quarterly reports and submit to DIC and the DIC forward this report to MSME Development and Facilitation Centre, K-BIP and Directorate of industries.

Key role in cluster development

According to Kerala's Industries Policy, DICs are to serve as key resource groups for the development of the cluster.

- Provide critical intervention services throughout the programme's lifecycle,
- Serve as a mentor for CDAs
- Organize and coordinate cluster development activities
- Suggest mid-course corrections
- Provide refresher courses and interactive sessions to the CDAs

- Assist in developing and maintaining close working relationship with all major players in the cluster development program, including national and international agencies.
- The cluster development activities are primarily carried out by the DICs (Cherukara & Manalel, 2007)

7.4. MSME Development and Facilitation Office, Thrissur

The MSME Development and Facilitation Office, Thrissur, serves as the field office for the Office of the Development Commissioner (MSME) in the Ministry of MSME, Government of India. It provides technical, economic, and managerial consultancy services for MSME sectors in Kerala and Lakshadweep. Under the Ministry of MSME, Government of India, the Office of Development Commissioner (MSME), headed by the Additional Secretary & Development Commissioner (MSME), is the apex body and nodal agency for establishing, coordinating and monitoring policies and programmes to promote and develop Micro, Small and Medium Enterprises.

The MSME Development and Facilitation Office in Thrissur, Kerala, was established in 1956 and serves all 14 districts in the state. In addition to consulting and support services, the Institute offers Entrepreneurial, Technical, and Managerial training programmes for prospective and existing entrepreneurs. It mainly assists existing entrepreneurs in increasing productivity as well as prospective entrepreneurs in setting up new businesses. The MSME-Development Institute, Thrissur, Kerala, has established a Nucleus Cell on the island of Amini of Lakshadweep to provide services to MSME entrepreneurs in the Union Territory, Lakshadweep.

In order to strengthen the MSME sector, the Institute focuses on the following areas:

- Implementation of Programmes and Policies of Ministry of MSME at State level
- Cluster Development Programmes
- Intellectual Property Facilitation Cell

- Marketing Assistance
- Promotion of Export
- Central Workshop facilities
- Business/Technical/Managerial/Entrepreneurial Consultancy and Services

Apart from the above-mentioned activities, the Institute provides various services for nourishing the MSMEs in the State. The Institute closely coordinates with other State and Central Government organizations, NGOs, Financial Institutions etc. to frame strategies for the development of the MSME sector. ([https://www.msmedi-thrissur.gov.in/msme-dfo-thrissur,](https://www.msmedi-thrissur.gov.in/msme-dfo-thrissur))

The MSME Development and Facilitation Office, Thrissur is actively involved in cluster promotion and development in close coordination with the State Government and other stake holders. In 2020-21, MSME Development and Facilitation Office, Thrissur, Government of India conducted 18 trainings or courses to benefit 776 individuals (Economic Review, 2021)

This institution supports the General Engineering Cluster in the contribution of the fund to set up MECON CFC by evaluating the diagnostic report. It also arranges training programmes and classes of experts for the development of this cluster. It evaluates the quarterly report on the performance of the Common Facility Centre.

7.5. Kerala Bureau of Industrial Promotion (K-BIP)

Kerala Bureau of Industrial Promotion (K-BIP) was established in the year 1991 as an Autonomous Body under the Department of Industries & Commerce of the Government of Kerala. It is a registered society under the Travancore Cochin Scientific Literary & Charitable Societies Act, 1955. Its aim is to showcase Kerala's ideal business climate to prospective entrepreneurs and promote its potential business opportunities. K-BIP works closely with other industries development agencies focusing on strategic advantages, government support and other incentives offers in different sectors. K-BIP also serves as a link between the prospective entrepreneurs

and other State Agencies. It acts as a support mechanism for the Department of Industries & Commerce, Government of Kerala.

K-BIP is an implementing Agency for Cluster Development Projects of the Ministry of MSME, Govt. of India. It coordinates the industrial cluster development activities throughout the state in association with the Ministry of MSMEs. As part of its industrial cluster development program, K-BIP promotes industry clusters in different sectors such as food processing, terra tile, wood, plastic, bamboo & cane, garments, etc., which meet the specific needs of their corresponding industries. K-BIP coordinates cluster development activities on behalf of the Directorate of Industries & Commerce (<https://www.kbip.org/>).

7.6. Directorate of Industries and Commerce

The Directorate of Industries and Commerce, Govt. of Kerala is located at Vikas Bhavan, Thiruvananthapuram and it works under the Industries and Commerce Department of Govt. of Kerala to promote micro, small and medium-sized enterprises in Kerala. The Directorate has been engaged in identifying and developing entrepreneurs by providing infrastructure support, assisting entrepreneurs in getting licenses and clearances, providing financial assistance through various schemes, identifying marketing avenues, resolving disputes, and revitalizing stressed and defunct units.

The Directorate of Industries and Commerce of the Government of Kerala is headed by the Director of Industries and Commerce.

The main activities of the Directorate of Industries and Commerce include

One of the activities of this institution is to assist in the formation of industrial clusters and co-operative societies. The other main activities include:

- Identify and motivate entrepreneurs through awareness programmes, Entrepreneurship Development Clubs, etc.
- Assist in facilitating project ideas, project profiles, feasibility advice, and interfacing with financial institutions.

- Providing information on infrastructure, markets, and machinery details, as well as suppliers and dealers.
- Organize seminars, entrepreneurship development programmes, technology clinics, and investor meetings.

7.7. Industry Association

➤ Kerala Iron Fabrication & Engineering Unit Association (KIFEUA)

It is a non-profit organisation established in 2014. This association support the general engineering industrial units in Kerala. There is a branch in Malappuram district which support all general engineering industrial units in Malappuram district including units in the general engineering cluster. The association arranges meetings, classes of experts in this field, exhibitions and other programmes. This helps the industrial cluster in different ways such as developing personal relationships among the members of the units, updating market information, sharing information about other units, sharing work orders. advice in legal matters conducting classes and seminars and information through bulletins. The support provided by this association to the unit holders in this cluster is ranked in table.7.4.

Table.7.3.

Support of Kerala Iron Fabrication & Engineering Unit Association (KIFEUA)

Benefits	Average	Rank
Personal relationships	1.77	1
Updating market	1.85	2
Information of other units	3.22	3
Work order sharing	3.68	4
Advice in legal matters	4.98	5
Conducting classes and seminars	5.78	6
Information bulletins	7.47	8

Source: Survey data

The table shows the support of the association for the development of the cluster and it described that they conducted various classes and other programmes by arranging meetings of the unit holders. The benefits of the meeting are ranked by the unit holders shown in the above table. It includes personal relationship with all the parties in the cluster, helps to update the market situation, sharing the information with other units, helps to share work orders, gets advice in legal matters. It also helps in getting information through the information bulletin.

7.8. Educational Institution

The various educational institutions provide support to the General Engineering cluster. The educational institutions send students to the industrial units in cluster and at CFC for apprentice training. These students include technically qualified and others. They not only learn from this industrial units but also contribute to these industries by providing their ideas and efforts.

The students in nearby colleges such as MEA Engineering College, Perinthalmanna, Govt. Industrial Training Institute-Areacode, Majlis Polytechnic College Puramannur, Eranad Knowledge City, Government Polytechnic College, Perinthalmanna etc. came to this cluster as part of apprentice training.

The students contacted for apprentice training for the last year (2021-2022) at the common facility centre and industrial unit are given in table 7.4.

Table 7.4

Students contacted for Apprentice Training-2021-2022

Educational Institutions	Number of Students
MEA Engineering College, Perinthalmanna	19
Govt. ITI, Areecodu	20
Majlis Polytechnic	15
Eranad Knowledge City	6
Government Polytechnic	10

Source: Survey data

7.9. Conclusion

The General engineering cluster in the Malappuram district performs with the support of various institutions. This institution includes the Common Facility Centre at cluster, District Industrial Centre, Malappuram, MSME Development and Facilitation Office, Thrissur, Kerala Bureau of Industrial Promotion (K-BIP), Directorate of Industries and Commerce, Kerala Iron Fabrication & Engineering Unit Association (KIFEUA), and Educational Institutions. These institutions provide support to the industrial cluster but it needs to improve for the better performance of the cluster.

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8.1. Introduction

The concept of industry clusters refers to the tight connections that demonstrate common behaviour among firms and industries, such as geographic location, innovation sources, suppliers and factors of production, and so on (Bergman & Feser, 2020). Clusters are defined as geographic concentrations of economic activity producing similar and closely related goods. Clustering is a process of firms and other actors co-locating close together within a concentrated geographical area, cooperating around a specific functional niche, and forming close links and strategic alliances in order to increase their collective competitiveness (Andersson, Serger, Sörvi, & Hansson, 2004).

For MSEs, industrial clusters provide scale advantages by providing relatively easier and cheaper access to resources such as credit and inputs. Industrial clusters have received considerable attention from policymakers around the world because of their established advantage for the enterprises that belong to them. Since clusters give access to specialised inputs, skilled labour and other various services nearby, they are beneficial to units in clusters. The clusters facilitate the easy flow of information and knowledge. Trust within clusters enables joint action to invest in common facilities, facilitate smoother commercial transactions and reduce risk and uncertainty.(Ali, Coniglio, & Seric, 2013)

This study analyses the working of the General Engineering Cluster in Malappuram district. This cluster consists of 200 general engineering units and it has a common facility centre named MECON CFC. This study consider 60 industrial units as sample and made an in-depth study on the 60 units, This covered status of the units, their perception towards industrial clusters, how they link with other parties and also

the support provided by various institutions. The study revealed that industrial clustering is beneficial to units in the general engineering cluster

The last seven chapters discussed the problem and significance of the study, literature reviewed and analysis and interpretation of the hypotheses based on the objective of the study. Thus this chapter summarises the study, describes the major findings, suggestions provided for improvement, and areas for further research.

8.1.1. Research Problem at a Glance

MSMEs are often unable to realize economies of scale due to their small size, so they find it difficult to take advantage of market opportunities requiring large stocks of standardized products or compliance with international standards (Russo, Eyvazo, & Kaibitsch, 2020). Industrial clusters could help micro and small enterprises to overcome these constraints and to improve their productivity and market access. It gives MSMEs the opportunity to access resources such as credit or inputs relatively easier and cheaper since they are geographic concentrations of economic activities producing similar and closely related products.

Studies have been conducted worldwide on industrial clusters which explain the benefits of industrial clustering to micro, small, and medium-sized businesses. In the preliminary study, the researcher found that some unit holders get benefited from being part of this cluster and some did not get benefited. So, it is necessary to study the performance of units in the cluster and the development of units in the cluster due to interaction with all other parties in the cluster. It is necessary to understand how the industrial cluster mitigates the constraints of MSMEs

Hence this study analyses the working of the General Engineering Cluster in the Malappuram district, Kerala. It includes the present status of the unit holders and their perception towards industrial clusters. It also analyzes the backward, forward, and horizontal linkage and support of various institutions to the development of the cluster.

8.1.2. Research Questions

The following research questions were developed by the researcher.

- What is the present status of the units in the industrial cluster?
- What is the perception of unit holders towards industrial clustering?
- Is there any linkage occurring in this cluster?
- Is there any positive linkage with sub-contractors?
- Is there any positive linkage with suppliers?
- Is there any positive linkage with customers?
- Is there any positive linkage with other units?
- What are the institutional supports received?
- Is the cluster system useful to industrial units?

8.1.3. Significance of the Study

The cluster aims to facilitate the growth of the MSME sector. It helps in overcoming several challenges of the MSMEs like small size, technological aspects, skill levels, etc. through co-operative efforts. The industrial units in clusters which are concentrated in a particular geographical area can speed up the dissemination of best practices and also reduces fixed cost by distributing among a large number of beneficiaries. The General Engineering Cluster in the Malappuram district is functioning based on the objective of the industrial clusters. In this context, it is useful to study the General engineering cluster in the Malappuram district, Kerala.

8.1.4. Scope of the Study

This study covers the workings of the General engineering cluster and it includes the analysis of the present status of the unit which covers demographic profile of unit holders, demographic profile of unit, financial aspects of the unit, Infrastructural aspects, technological aspects, marketing aspects, safety aspects and

performance of the unit and analyze how these aspects affect the performance of the units.

This study covers perception of unit holders towards industrial clustering. This includes the unit holders' perception towards the industrial clustering (from general point of view), the CFC, and the government. It also includes the analysis of the linkage of the unit holders in the cluster with the participants. It includes backward linkage, forward linkage, and horizontal linkages. Scope of the study also includes evaluation of the support provided by various institution to the cluster.

8.1.5. Objectives of the Study

1. To study the present status of units in the industrial cluster.
2. To analyse the perception of unit holders towards industrial clustering.
3. To study the linkage (forward, backward & horizontal) of unit holders with the various parties in the industrial cluster.
4. To understand the institutional support to the industrial cluster.

8.1.6. Hypotheses of the Study

Based on the objective stated the following hypotheses were developed.

1. There is no significant difference between the demographic variables of the unit holders and the performance of the units.
2. There is no significant difference between the demographic variables of the unit and the performance of the units
3. There is no significant difference between various dimensions of the financial aspects of units and the performance of the units.
4. There is no significant difference between various dimensions of the infrastructural aspects of the units and the performance of the units.

5. There is no significant difference between the various dimensions of marketing aspects of the units and the performance of the units.
6. There is no significant difference between the demographic variables of the unit holders and their perception towards industrial clustering.
7. There is no significant difference between the demographic variables of the unit holders and their perception towards the support of CFC.
8. There is no significant difference between the demographic variables of the unit holders and their perception towards the support of Govt.
9. There is no significant difference between the demographic variables of the units and linkage with subcontractors.
10. There is no correlation between the performance of the units and linkage with sub-contractors
11. There is no significant difference between the demographic variables of the units and linkage with suppliers.
12. There is no correlation between the performance of the units and linkage with suppliers.
13. There is no significant difference between the demographic variables of the units and linkage with buyers.
14. There is no correlation between the performance of the units and linkage with buyers.
15. There is no significant difference between the demographic variables of the units and linkage with other units
16. There is no correlation between the performance of the units and linkage with other units.

8.1.7. Research Methodology

This study is descriptive in nature and based on primary and secondary data. The primary data was collected from the unit holders under the cluster and the secondary data required for the study was collected from the records of District Industrial Centre (DIC) Malappuram, MECON Common Facility Centre (CFC), annual reports of MSME and other records, periodicals, books related to this study area, etc.

The General Engineering Cluster consists of 200 general engineering units and is considered as population for the study. A sample of 60 units was selected based on simple random sampling method. The data for the study was collected by using structured questionnaire.

8.1.8. Design and structure of the questionnaire

The questionnaire consists of three parts. The first part is related with status of industrial unit which includes demographic variable of the unit holders, demographic variable of unit, financial aspects, infrastructural aspects, marketing aspects, safety aspects and performance of the units. The second part deals with perception of unit holders towards industrial clustering. And the third part is related to linkage of unit holders with various parties in the cluster which includes sub-contractors, suppliers, buyers and other units. Moreover, it covers industry associations.

8.1.9. Tools used for data analysis

Following are the statistical tools applied for primary data analysis.

The data gathered from a sample of 60 general engineering units were analyzed using descriptive and inferential statistics with the help of Statistical Packages for Social Sciences (SPSS 20)

The primary data is analysed by using mean, standard deviation, percentage, Independent sample t-test, ANOVA ,correlation analysis and regression analysis

8.1.10. Limitations of the study

- This study considers only a single cluster
- The area covered for the study was only the Malappuram district.
- The sample unit under the study is 60 industrial units only.
- There are no accounting records available in the cluster.
- Cluster deals with general engineering units are only included in this study

8.1.11. Chapter Scheme

Chapter 1: Introduction

Chapter 2: Literature Review

Chapter 3: Industrial cluster – Theoretical framework

Chapter 4: Present status of industrial units in the cluster.

Chapter 5: Perception of unit holders towards industrial clustering.

Chapter 6: Linkage of industrial unit holders with other parties

Chapter 7: Institutional support to industrial cluster.

Chapter 8: Summary, Findings, Suggestions, and conclusion

8.2. Review of Literature

A detailed review of previous studies in this area is presented in the second chapter. Based on previous literature, core theme of the study is divided into three sub-parts such as studies related to industrial clusters in the international arena, studies related to Industrial clusters in the Indian context, and studies related to industrial clusters in Kerala. It is useful to develop a plan for the study.

8.3 Theoretical Framework

The theoretical framework of the study is consolidated in chapter 3. It includes the concept of industrial clusters, its definition, characteristics, and types of industrial clusters, benefits of industrial clusters, phases in cluster development, MSME sector in India and Kerala, and industrial clusters in India and in Kerala.

8.4. Findings

The researcher analysed the working of the General Engineering Cluster in Malappuram district, Kerala. This section summarizes the major findings of the study based on the objectives.

8.4.1. Demographic profile of unit holders.

1. The majority of unit holders (36.7%) under the General Engineering Cluster come under the age group of below 40, 25 percent included under 41-50 and 23 percent included in the age group of above 50 years.
2. This study shows that the General Engineering cluster is male-dominated.
3. The majority of unit holders have completed secondary education (61.7%), 21.7 percent unit holders have completed higher secondary education and only 6.7 percent have got graduation.
4. Eighty percent of the unit holders are not technically qualified and 20 percent are technically qualified.
5. The majority of unit holders belong to the community of OBC (85%), 8.3 percent belong to the forward caste and 6.7 percent come under the category of SC/ST.
6. Majority of unit holders come under the Hindu religion (80%), 18.3 percent come under the Muslim and only 1.7 percent come under the Christian religion.

7. The majority of unit holders are in rural area (88.3%) and the rest 11.7 percent in semi-urban areas.
8. 95 percent of unit holders are married and 5 percent of unit holders are unmarried.
9. The majority unit holders have 11-20 years of experience (43.3%), 33 percent of unit holders included in 21-30, 13.3 percent of unit holders have above 30 years of experience and 10 percentage unit holders have below 10 years of experience.
10. Most of the unit holders are included in first generation (85%) and only 15 percent included in second generation.
11. Most of the unit holders have not attended any kind of training programme (36.7). However 21.7 percent have attended govt. sponsored training programme, 16 percent attended private programmes ,25 percent attended both Govt. sponsored programme and private sponsored programme.

8.4.2. Demographic profile of unit

1. The majority of units in cluster is sole proprietorship type (81.7) and only 18.3 percent of units are in partnership form.
2. Majority of units working under the General Engineering Cluster is come under the age group of above 20 years.
3. All the units functioning under the General Engineering Cluster in Malappuram district are undertaking manufacturing activities.
4. All the units in General Engineering Cluster are micro units.

8.4.3. Financial Aspects Analysis

1. The majority of unit holders invested in their business below five lakhs. All the units under study come under the classification of micro units.

2. Most of the unit holders made an investment of less than 5 lakhs in fixed asset (70%), 23.3 percent in 5-10 lakhs, 3.3 percent in 10-15 lakhs, and balance 1.7 percent each in 15-20 lakhs and 20-25 lakhs.
3. Most of the unit holders under study made investment of less than 5 lakhs, in current assets (91.7%), 6.7 percent in 5-10 lakhs and balance of 1.7 percent in 10-15 lakhs
4. The majority of the unit holders perceived that the working capital is sufficient for the working of the unit (68.3%), 8.3 percent have more than sufficient and 23.3 percent have insufficient working capital.
5. 45 percent of unit holders use owned fund, 10 percent use loans from banks and 45 percent use both owned funds and loans from banks.
6. 51.7% of unit holders make repayments as scheduled, 6.7% delayed repayments, 1.7% defaulted, and 40% have no loans.
7. The majority of unit holders have not taken any loan at present (41.7). The 30 percent perceived that interest rate as not affordable and 1.7 percent perceived as fair.
8. The majority of units under study are making profits (75%), 25 percent are at break even and 5 percent are loss-making units.

8.4.4. Infrastructural Aspects Analysis

1. The majority of units in industrial cluster is working at rented building (50 %), 46.7 percent of unit holders are working in their own building and 3.3 percent is working in leased building.
2. Most of the unit holders have no additional production centre (90%), 6.7 percent have one additional centre, 1.7 percent have two and 1.7 percent has more than two centres.
3. This study also shows that 3.3 percent of units have no installed machinery, 10 percent have two machines and 86.7 percent have more than two machines.

4. The majority of the unit holders installed machinery as per their requirement (73.3%)
5. Most of the unit holders fully utilise their machines (93.3%) and only 6.7 percent of unit holders partly utilise the machines.
6. Majority of the unit holders have their own storage facilities (60%), 38.3 percent have used rented and only 1.7 percent have used private storage facilities.
7. The majority of the unit holders are using all kinds of vehicles such as two-wheeler, four-wheeler, and truck (63%), 30 percent are using four-wheelers and 1.7 use van or truck.
8. The majority of the unit holders are using rented vehicles (50%), 21.7 percent of the unit holders are using their own vehicle and 28.3 percent have vehicles purchased on hire.
9. The majority of the unit holders are using their own quality checking facilities (95%), 3.3 percent are using government facilities and 1.7 percent are outsourced.
10. The majority of the unit holders are facing irregular power supply (93.3%) and 6.7 percent of the unit holders responded that the power supply is regular.

8.4.5. Technological aspects

1. The processing, testing and storage facilities are available in all units under study. 58.3 percent units have assembling process and only 5 percent units have packing process.
2. Most of the unit holders (83.3%) undertake their activities by using semi-automated machines and 16.7 percent of undertake manually.
3. New product and technology development of the majority of unit holders are in the developing stage (98.3 %) and only 1.7 % are in matured stage.

4. Majority of unit holders take efforts to research and development (85%) and 15% did not take any efforts.

8.4.6. Marketing aspects analysis

1. All the unit holders are using their own brand name for marketing their products.
2. The brand promotion activities of the majority of units in the initial stage (73.3%), 18.3 percent of units in the developing stage, and 1.7 % in the matured stage.
3. The area of coverage of the majority of units in the cluster is regional and only 1.7 percent in the whole India.
4. Most of the unit holders are facing high competition (91.7%)

8.4.7. Safety aspects

1. Most of the units are providing first aid facilities (96.7%).
2. Most of the units have adequate fire and safety measures (88.3%).

8.4.8. Performance of the units

1. The volume of production of 8.3 percent of the units improved up to 10 percent, 43.3 percent showed 11-30 percent improvement in production and 1.7 percent showed 51-100 percent improvement in the volume of production. 23.3 percent of the units reduced the production up to 10 percent, 3.3 percent reduced to 11-30 percent and 5 percent reduced to 31-50 percent.
2. It showed that there is no reduction in the cost of production. But there is an increase of 31-50% in the cost of the majority of firms (53.3%).
3. 43.3 percent of the units showed good improvement in quality, 51.7 percent of the units showed moderate improvement, 5 percent of the units showed slight improvement.

4. The availability of manpower is not changed in 53.3 percent of the units, 5 percent of the units have 10% improvement, 5 percent of the units have 11-30 percent improvement. The availability of manpower is reduced up to 10 percentage in 28.3 percent of unit, in 5 percent of units reduced 11-30 percent and 3.3 percent of units reduced 31-50 percent.
5. Most of the units showed nominal improvement in product upgradation (88%), 5 percent showed high improvement and 6.7 percent showed no change in the upgradation of the product.
6. It showed that 10 percent of the units have no change in sales value, 15 percent of the units have up to 10 percent improvement, 43.3 percent of the units have up to 11-30 percent and 6.7 percent improved up to 31-50 percent.
7. The profitability of 10 percent of the units have no change, 16.7 percent of the units have improved up to 10 percent, 41.7 percent of the units have improved up to 11-30 percent and 5 percent of units improved up to 31-50 percent. The profitability of 26.7 percent of units has reduced up to 10 percent.
8. The cost of inputs of 18.3% of the units has increased up to 10 percent, 33.3 percent have 11-30 percent and 46.7 percent have 31-50 percent increase.
9. The economy of scale in majority of the units are improved (91.7%) and 8.3 units have no improvement.
10. 16.7 percent units have good manpower, 65 percent have average manpower and 18 % showed poor manpower.
11. 3.3 percent units have good skill improvement, 85 % have average improvement and it is poor in the case of 11.7% units.
12. 1.7 percent of units have good training facility and it is average in the case of 58.3% units.
13. 1.7 percent units have good improvement in performance, 91.7 percent have average and 6.7 percent have poor improvement in performance

14. The absenteeism was reduced by 76.7 percent units and it increased by 18.3 percent units. However, 5 percent of units showed no change.
15. The wage level is increased in majority of the units (95 %) and 5 percent of units have no change in wage level.

8.4.9. Analysis of performance of the units

1. The hypothesis tests show that there is no significant difference exists in the performance of the units with regard to the age, educational qualification, experience, generation of unit holders and also with training programmes attended by the unit holders.
2. The result of hypothesis tests shows, there is no significant difference exist in the performance of the units with regards to type of the unit and age of the unit.
3. The hypothesis tests show that there is no significant difference exist in the performance of units with regards to invested capital, value of fixed assets, value of current assets, sufficiency of working capital, source of fund, repayment and perception about interest rate.
5. The results of analysis shows that there is no significant difference in the performance of units with regards to infrastructural aspects of the units such as status of building, additional production facility, number of machines installed, utilisation of the machinery and availability of power supply.
6. There is no significant difference exists in the performance of the units with regards to marketing aspects such as nature of marketing, coverage, brand promotion and competition.

8.4.10. Perception towards the industrial clustering

1. It has been found that unit holders perceived positively on the statements such as geographical area is suitable for cluster formation (M= 4.18), cluster system helps to share common resources among units (M=3.93), units can utilise

materials of other units (3.83), helps to utilize the services of employees of other units (M=3.63) ensure the service of skilled workers (M=3.58), easier to hire new workers (M=3.47), this system provide a pool of workers (M=3.35),and timely availability of materials (M=3.05).

Materials are available from material bank (M=1.62), it reduces inventory cost (M=1.87), it provides good infrastructural facilities (M=2.77), this system reduces transportation cost (M=2.13), this system ensure availability of electricity facility (M=1.92), it helps to compete in the market (M=2.77),use common brand name (M=1.97), use common marketing system (M=1.92), it helps to increase productivity (M=2.93), it helps to increase sales (M=2.93) and it helps to increase profitability (M=2.93) are the statements to which the unit holders negatively responded.

2. The result of the analysis shows that there is no significant difference in the perception of unit holders towards industrial clustering with regard to demographic variables such as age, educational qualification, technical qualification, community, religion, place of domicile, experiences, and generation.
3. There is a significant difference in the perception of unit holders towards industrial clustering with regard to the training programme attended.

8.4.11 Perception towards the support of Common Facility Centre (CFC)

1. Only few statements are positively perceived by the unit holders such as charges levied at CFC are normal (M=3.48), CFC provide opportunities to use their machineries to unit holders(M=3.33), reception arrangements at CFC are satisfactory (M=3.12) and they are interested to get additional benefits from CFC. Most of the statements are perceived negatively such as utilising the services of CFC (M=2.62), CFC fulfil its objectives(M=2.30), CFC provide technological support (M=2.18), get financial support through CFC (M=1.53), aware about the financial position of CFC (M=2.02), avail credit facilities with the support of CFC(M=1.78), CFC arranges training programmes for unit

holders (M=2.82), CFC arranges exhibitions and other programmes to unit holders (M=2.12).

2. The hypothesis test shows that there is no significant difference in the perception of unit holders towards the support of CFC with regard to demographic variables such as age, educational qualifications, technical qualifications, community, religion, place of domicile, experience, and generation.
3. The hypothesis test shows that there is a significant difference in the perception of unit holders towards industrial clustering with regards to training programmes attended. The p value is less than the significance level 0.05 and shows the perception is significantly higher in cases with Govt. sponsored training (48.77 ± 12.94).

8.4.12. Perception towards the support of the Government.

1. Unit holders negatively perceived all the statements regarding perception towards support of the Govt. which includes Govt. provides support for the development of the clusters (M=2.83), Govt. provide infrastructural facilities to unit holders (M=2.07), Govt. conduct meeting of all unitholders (M=2.42), Govt. provide training to unit holders (M=2.08), Govt. arrange exhibitions to market the products of the units (M=1.87), Govt. provide trade show support to units (M=1.68), Govt. provide financial support (M=1.65) Govt. provide marketing support (M=1.60), Govt. authorities arrange classes of experts (M=2.00), Govt. helps to interact with other agencies (M=1.72), Govt. provide support to avail finance from banks (M=1.77), Govt. makes frequent visit in units (M=1.37), Govt. authorities make continuous interaction with clusters (M=1.47).
2. The hypothesis tests shows that there is no significant difference in the perception of unit holders towards the support of govt. with regard to the demographical variables such as age, educational qualification, technical

qualification, community, religion, place of domicile, experience, and generation.

3. It has been found that there is a significant difference in the perception of unit holders towards the support of govt. with regard to the training programme attended. The p-value is less than the significance level 0.05. Hence the relationship between perception and training programmes is significant. The perception is significantly higher in cases with Govt. sponsored training (31.38 ± 9.828) compared to the cases with no training (22.95 ± 7.792), private sponsored training (21.60 ± 9.913) and both Govt. & private training (22.80 ± 10.75).

8.4.13 Linkage of unit holders with sub-contractors

1. There is a positive linkage with sub-contractors in respect of the statements such as sharing of information and experience ($M=3.17$), sharing of innovative ideas ($M=3.08$) and ease of access to customers ($M=3.45$). There is negative linkage with sub-contractors regarding the statements such as negotiation of payment and delivery conditions ($M=2.92$), product development ($M=2.93$), easy access to suppliers ($M=2.90$), quality in work, and delivery time ($M=2.82$).
2. The hypothesis tests show that there is no significant difference between the demographic variables of the units such as type of the units and age of the unit with regards to linkage with sub-contractors.
3. The analysis shows that the relationship between performance of the unit and linkage with sub-contractor is significant.
4. The regression analysis shows that the relationship between performance and linkage with sub contractor is significant. The unstandardized beta indicates that a unit change in linkage with sub contractor will lead to 0.279 unit increase in performance.

8.4.14. Linkage with suppliers

1. There is a positive linkage between unit holders and suppliers regarding the variables such as negotiation of payment and delivery conditions (M=3), sharing innovative ideas (M=3.07), maintaining improved quality(M=3) , availability of material on time(M=3.2) and negative linkage with suppliers which includes sharing of information and experience (M=2.90), Support to product development (M=2.97) and easy access to customers (M=2.92).
2. The hypothesis tests shows there is no significant difference between the demographic variables such as type of the unit and age of the units with regards to linkage with suppliers.
3. The correlation analysis shows there is a significant relationship between performance of the units and linkage with suppliers.
4. The regression analysis shows that there is a significant relationship between performance of the unit and linkage with suppliers. The unstandardized beta indicates that a unit change in linkage with suppliers will lead to 0.237 unit increase in performance.

8.4.15. Linkage with buyers

1. While analysing the linkage, the variables shows positive linkage such as sharing of information and experiences (M=3.15), technical upgrading (M=3.07), setting of product specification (M=3.38), organisation of production (M=3.30), support to connect new customers (M=3.13). There is a negative linkage with buyers in respect of the statements such as negotiation of payment and delivery conditions (M=2.90) and quality control (M=2.90).
2. The hypothesis tests show that there is no significant difference between the demographic variables of the units such as type of the units and age of the units with regards to linkage with buyers.
3. The correlation analysis shows that, there is a significant relationship between performance of the unit and the linkage with buyers. A significant and positive

correlation exist between performance and linkage with buyers which indicates that the performance is increasing with increase in linkage with buyers and decreasing with decrease in linkage with buyers.

4. The regression analysis shows the relationship between the performance of the unit and linkage with buyers is significant. The unstandardized beta indicates that a unit change in linkage with buyers will lead to 0.298 unit increase in performance of the unit

8.4.16. Linkage with other units

1. Variables that show positive linkage among unit holders are marketing support (M=3.03) and sharing of orders (M=3.15). Variables that show negative linkage with other units include lending machinery (M=2.83), product development (M=2.88), sharing of information and experience(M=2.83), Joint labour training of workers(M=2.87), joint purchase of inputs (2.98).
2. The hypothesis tests show that there is no significant difference between demographic variables of the unit such as type of units and age of the units and the linkage with other units. It is noted that the linkage score is almost same in all the categories.
3. The correlation analysis shows that there is a significant relationship between performance of the units and linkage with other units. A significant and positive correlation indicates that the performance is increasing with increase in linkage and decreasing with decrease in linkage.
4. However, the regression analysis shows the relationship between performance and linkage with another unit is not significant.

8.5. Suggestions

The researcher points out the following suggestion for the betterment of this cluster.

- Arrange need based training facility frequently for the unit holders and members in CFC
- Take measures to attract youngsters, ladies, and technically qualified people to this field
- Take initiation to develop common or collective brand name and marketing system for the cluster.
- Take measures to improve infrastructural facilities in units and CFC
- Ensure the availability of continuous power supply
- Create awareness among unit holders about the industrial cluster.
- Create a work group including unit holders, govt. authorities, financial institutions and other associations
- Improve intervention of govt. to clusters in the form of arranging meetings, visit in cluster, arranging classes of experts etc.
- Arrange motivating classes for unit holders in cluster to improve the trust among them.
- Conduct frequent visit by govt authority in units and CFC to evaluate the performance
- Take measures to arrange additional fund to CFC to implement advanced machines.
- Increase interaction with other units for developing trust among them.
- Conduct exhibitions regards technological advancement
- Conduct courses, seminars and classes for the betterment of the performance of the unit holders.

- Build cluster internet portal
- Launching collective advertising campaigns
- Production of information materials
- Arrange events and special evening organisation
- Arrange facility to participate in international industry fairs
- Organize industry fairs and adhoc promotional initiatives
- Form a capable management group of clusters
- Recruit leaders for cluster.
- Develop work group for specific purpose e.g. group for human resource development, group for marketing, group for concentrating research and development.
- Establish joint information system including creation of data base of relevant information about all members, creation of its own web page, news programmes in the form of news letters mails and magazines.
- Develop personal contacts of participants through work shop ,general meeting of cluster, personal visits in member units etc.
- Arrange utilisation of support programmes and securing transition from public to private sources of financing.
- Connection of cluster to the existing research network and educational institution
- Provide support for mutual co-operation of clusters
- Encourage Joint purchase of materials
- Encourage Joint research and development
- Joint participation in trade fairs, training programmes
- Develop Cluster Mapping database through the intersection of the units, clusters region and sectors.

- Increase interactions by CFC with unit holders
- Unit holders should try to attend training programs introduced by government.

8.6. Conclusion

Industry clusters are acknowledged today as an important tool for fostering industrial development, innovation, competitiveness, and growth. Clusters are primarily driven by private companies and individuals but are influenced by a variety of stakeholders, including governments and governmental agencies (Andersson, Serger, Sörvi, & Hansson, 2004). Industrial clusters are the geographical concentration of inter-connected companies, suppliers and associated institutions in a particular field. It consists of similar firms within a defined geographical area that has common markets, technologies, and worker skill needs, as well as buyer-seller relationships.

Industry clusters provide firms and workers with a competitive advantage due to proximity to competitors, skilled workers, specialized suppliers, and sophisticated knowledge about their industry (<https://oregonbusinessplan.org/industry-clusters/industry-clusters-faq/>). In Michael Porter's view, clusters have the potential to affect competition in three ways: they increase the productivity of the companies in the cluster, they accelerate innovation, and they promote the creation of new businesses. (https://en.wikipedia.org/wiki/Business_cluster). The effects of clustering might result in a significant increase in productivity, profitability, and competitiveness of enterprises, especially MSEs, which, at least partly, overcome their small size disadvantages (Ali, Coniglio, & Seric, 2013). Trust within clusters enables joint action (cooperation) to invest in common facilities and facilitate smoother commercial transactions, reducing risk and uncertainty.

This study analyses the working of the General engineering cluster in Malappuram district which consist of two hundred general engineering units and common facility centre. It analysed the working in different point of view which includes the present status of the units, their perception towards industrial clustering ,how they link with other parties related to cluster and also analyse the support

provided by various institutions for effective functioning of the cluster. The perception of unit holders is analysed in three parts. i.e. perception towards industrial clustering, perception towards the support of CFC and perception towards the support of govt. The study shows perception of unit holders towards the industrial clustering is better as compared to support of CFC and support of govt. So it needs to improve the support of CFC and govt. for better performance of the units in the cluster.

Then it analyses the linkage of unit holders with other parties that relate to the cluster. It includes horizontal and vertical linkage. Horizontal linkage means the interactions of the unit holders with other units in cluster. The vertical linkage includes backward and forward linkage. Backward linkage means the interactions with sub-contractor and supplier and forward linkage means the linkage with buyers. It also analyse that is the linkage affects the performance of the units. The mean score shows that the linkage with sub-contractors suppliers and buyers is better than the linkage with other units. It also shows that there is a significant relationship between the linkage of unit holders with the parties related to the cluster. That means the interactions with the various parties in the cluster influence the performance of the units. However the interaction with other units less influence the performance of the units.

This study also evaluates the support provided by various institutions to the cluster. It is found that there is a support of various institutions for the development of the cluster. But it needs to improve the support of the institution. The result of the study shows that the industrial clustering is beneficial to industrial units to strengthen their performance but it needs more improvements.

8.7. Scope for Further Research

- Study the performance of other clusters under MSME
- Analyse the success factors of industrial clusters in other states and other countries and make a comparative study
- A comparative study regarding the performance of the units within and outside the cluster

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QUESTIONNAIRE

A STUDY ON WORKING OF GENERAL ENGINEERING CLUSTER IN KERALA

Name of Unit		Name of Proprietor/Partner/Director	
Address of unit		Name of Respondent and Designation	
		Contact Details:	
Name and address of the cluster		Phone:	
		Mobile:	
		E- Mail	

1) This section relates to your demographics. We need Information about you to make meaningful interpretation of the data obtained from this study. Kindly tick your response to the following questions. This Information will only use for classification purpose and will be kept confidential.

1.1 Gender:

- a) Male
- b) Female

1.2 Age Group:

- a) Less than 40Years
- b) 41-50 Years
- c) Above 50 Years

1.3 Educational Qualification:

- a) Elementary
- b) SSLC
- c) Higher Secondary
- d) Graduate

1.4 Technical Qualification:

- a) Technical Qualification
- b) Non- Technical Qualification

1.5 Community:

- a) FC
- b) OBC
- c) SC/ST

1.6 Religion:

- a) Hindu
- b) Muslim
- c) Christian

1.7. Place of Domicile:

- a) Rural
- b) Semi urban
- c) Urban

1.8. Marital status:

- a) Single
- b) Married

1.9. Experience:

- a) Below 10 years
- b) 11-20 years
- c) 21-30
- d) Above30 years

1.10. Generation:

- a) First Generation
- b) Second Generation

1.11. Training Programs:

- a) Govt. Sponsored Prog
- b) Private Prog.
- c) Both
- d) No Training

2. Demographic variables of the unit**2.1 Type of unit**

- 1. Proprietorship
- 2. Partnership

2.2. Age of the unit.....**2.3 Type of activity**

1. Manufacturing
2. Processing
3. Trading

2.4 Industrial Classification

1. Micro
2. SSI
3. Medium

3. FINANCIAL ASPECT OF THE UNIT (Please note your response in the respective column)**3.1 Invested capital**

1. In Rs. <5 Lakh
2. 5-10 Lakh
3. 10-15 Lakh
4. 15-20 Lakh
5. 20-25 Lakh
6. 25-30 Lakh
7. 30-35 Lakh

3.2 Value of Fixed Assets

1. In Rs. <5 Lakh
2. 5-10 Lakh
3. 10-15 Lakh
4. 15-20 Lakh
5. 20-25 Lakh
6. 25-30 Lakh
7. 30-35 Lakh

3.3 Value of Current Assets

1. In Rs. <5 Lakh
2. 5-10 Lakh
3. 10-15 Lakh
4. 15-20 Lakh
5. 20-25 Lakh

6. 25-30 Lakh

7. 30-35 Lakh

3.4 Sufficiency of Working Capital

1. More Sufficient

2. Sufficient

3. Insufficient

3.5 Source of fund

1. Own fund

2. Loan from banks

3. Both

3.6. Repayment

1. As per Schedule

2. Delayed

3. Defaulted

4. Not applicable

3.7. Perception about interest rate

1. Affordable

2. Fair

3. Non affordable

4. Not applicable

3.8. Profitability

1. Profitable

2. Breakeven

3. Loss Making

4. Infrastructural aspects of the unit.

4.1 Status of building of the unit

1. Owned

2. Leased

3. Rented

4.2 Additional production facility

1. Nil

2. One

3. Two

4. More than two

4.3. Number of machine installed

1. Nil
2. One
3. Two
4. More than two

4.4. Requirement of installed machinery in the firm.

1. Necessary
2. Shortage of machines
3. Excess

4.5 Utilization of machinery (in numbers)

1. Fully utilized
2. Partly utilized
3. Unutilized

4.6 Nature of ownership of storage

1. Owned
2. Rented
3. Govt.
4. Private parties

4.7 Nature of vehicle used (with number)

1. Two wheeler
2. Four wheeler
3. Van / Truck
4. Two, Four, Van/Truck

4.8 Nature of ownership of vehicle used:

1. Owned
2. Hire purchase
3. Rented

4.9 Quality checking facilities:

1. Owned
2. Govt.
3. Outsourcing

4.10 Availability of power supply:

1. Regular
2. Irregular

5. Technology aspects**5.1. Facilities available**

1. Processing
2. Testing
3. Storage
4. Packing
5. Assembling

5.2 Processing

1. Manual
2. Semi automated
3. Fully automated

5.3 New product /Technology

1. Developing
2. Matured
3. Nil

5.4. Research and development :

1. Efforts going on
2. No efforts

6. Marketing aspects of the unit.**6.1 Brand Name :**

1. Own Brand
2. Consortium brand
3. Others Brand

6.2 Marketing:

1. Own
2. Out sourced

6.3 Coverage:

1. Regional
2. Entire state
3. South India

4. Whole India

5. International

6.4. Brand Promotion :

1. No efforts

2. Initial level

3. Developing Stage

4. Matured

6.5. Competition:

1. High

2. Medium

3. Low

7. Safety aspects

7.Safety aspects		
Variable	Responses	Answer code
First aid facilities	Available =1,Not available =2	
Fire safety	Adequate=1, Inadequate=2,Not available=1	

8. Performance of the units.

Production		
Volume of production	No change =1, Reduced up to - 10% =2 ,11-30% =3, 31-50%=4, 51-100=5 Improved up to- 10%=6,11-30%=7,31-50%=8 51-100%=9,Above 100%=10	
Cost of production	No change =1, Reduced up to - 10% =2 ,11-30% =3, 31-50%=4, 51-100=5 Improved up to- 10%=6,11-30%=7,31-50%=8 51-100%=9,Above 100%=10	
Quality improvement	Good improvement=1, Moderate improvement=2, Slight improvement=3, No change=4	
Man power	No change =1, Reduced up to - 10% =2 ,11-30% =3, 31-50%=4, 51-100=5	

	Improved up to- 10%=6,11-30%=7,31-50%=8 51-100%=9,Above 100%=10	
Upgradation of product	High improvement=1, Nominal improvement=2, No change=3	
Financial aspects		
Sales Value	No change =1, Reduced up to - 10% =2 ,11-30% =3, 31-50%=4, 51-100=5 Improved up to- 10%=6,11-30%=7,31-50%=8 51-100%=9,Above 100%=10	
Profitability	No change =1, Reduced up to - 10% =2 ,11-30% =3, 31-50%=4, 51-100=5 Improved up to- 10%=6,11-30%=7,31-50%=8 51-100%=9,Above 100%=10	
Cost of inputs	No change =1, Reduced up to - 10% =2 ,11-30% =3, 31-50%=4, 51-100=5 Improved up to- 10%=6,11-30%=7,31-50%=8 51-100%=9,Above 100%=10	
Economy of scale	No improvement=1, Improving=2,Improved=3	
Human resource		
Availability of manpower	Good=1, Average=2, Poor=3	
Skill improvement	Good=1, Average=2, Poor=3	
Training facility	Good=1, Average=2, Poor=3	
Performance improvement	Good=1, Average=2, Poor=3	
Absenteeism	Reduced=1, Increased=2, No change=3	
Wage level	Increase=1, Same level=2, Reduced=3	

9. We are interested to know your attitude towards Industrial Clusters. Please tick below a number for each statement that you agree:

(5- Strongly agree, 4-Agree, 3- Undecided, 2- Disagree, 1-Strongly disagree)

	Variables	5	4	3	2	1
1	The geographical area is suitable for cluster formation.					
2	Cluster system helps to share common resources among units.					

	Variables	5	4	3	2	1
3	It helps to utilize the resources of other units					
4	It helps to get materials on time.					
5	Materials are available from the material bank.					
6	It reduces inventory costs.					
7	This system provides a pool of skilled workers					
8	It is easier to hire new workers when labour demand increases					
9	It helps to utilize the services of employees of other units.					
10	Do not face the problem of shortage of workers.					
11	This system ensures the service of skilled workers					
12	It provides an opportunity to get expert advice					
13	It provides good infrastructural facilities					
14	It ensures easy availability of transportation					
15	This system reduces transportation cost					
16	This system ensures availability of electricity facility.					
17	It helps to compete in the market					
18	It helps to connect customers very easily					
19	We can use common brand name					
20	We can use common marketing system					
21	It helps to increase productivity					
22	It helps to increase sales.					
23	It helps to increase profitability.					
24	Unit holders under the system is very co-operative					
25	Unitholders are having mutual trust.					
26	The cluster system satisfies its objectives.					
27	We are utilizing the services of CFC					
28	We are aware about the function of CFC					
29	CFC fulfills its objectives					
30	CFC provides technological support					
31	Reception arrangements at CFC is satisfactory					

	Variables	5	4	3	2	1
32	Behaviour of the staffs in CFC is satisfactory					
33	CFC provide opportunities to use their machineries to unitholders.					
34	Charges levied at CFC are normal					
35	Get financial support through CFC					
36	Aware about the financial position of CFC					
37	Avail credit facilities with the support of CFC					
38	We are Interested to get more service from CFC					
39	CFC arranges training programmes to unitholders					
40	CFC arranges exhibitions and other programmes to unit holders					
41	CFC support for the growth of the unit					
42	Govt provides support for the development of the clusters					
43	Govt provide infrastructural facilities to unit holders					
44	Govt conduct meeting for all unitholders					
45	Govt provide training to unitholders					
46	Govt arrange exhibitions to market the products of the units					
47	Govt provides trade show support to units					
48	Govt provides financial support					
49	Govt provides marketing support					
50	Govt authorities arrange classes of exports to unit holders.					
51	Govt helps to interact with other agencies					
52	Govt provide support to avail finance from banks and other agencies					
53	Govt makes frequent visit in units					
54	Govt authorities make continuous interaction with clusters.					

10. If any other matters, Please specify

.....

11. Do you have any interaction with other industrial units or other parties?

Yes

No

12. If yes, to which parties do you interact for smooth running of business

a) Sub contractors

b) Suppliers

c) Marketers

d) Other industrial units

e) Consumers

f) Other parties

13. Do you have any involvement in subcontract agreement for carrying out your business?

Yes No

14. What is your impression towards the co. operation with sub - contractors?

(Please tick your response in your respective column)

(5. Strongly agree 4. Agree 3. Neutral 2. Disagree 1. Strongly disagree)

Variables	5	4	3	2	1
1. Sharing of information and experience					
2. Negotiation of payment and delivery conditions					
3. Product development					
4. Sharing innovative ideas					
5. Easy access to customers					
6. Easy access to suppliers					
7. Quality in work and delivery time					

15. Do you maintain any relation with suppliers? Yes No

16. What is your impression towards the co-operation of suppliers?

(Please tick your response in your respective column)

(5. Strongly agree 4. Agree 3. Neutral 2. Disagree 1. Strongly disagree)

Variables	5	4	3	2	1
1.Sharing of information and experience					
2.Negotiation of payment and delivery conditions					
3.Support to product development					
4.Sharing innovative ideas					
5.Maintaining improved quality					
6.Easy access to customers					
7.Availability of material on time					

17. What is the impression about the co-operation buyers?

(Please tick your response in your respective column)

(5. Strongly agree 4. Agree 3. Neutral 2. Disagree 1. Strongly disagree)

Variables	5	4	3	2	1
1.Sharing of information					
2.Negotiation of payment and delivery condition					
3.Technical upgrading					
4.Quality control					
5.Setting of product specification					
6.Organisation of production					
7.Support to connect new customers					

18. Do you have a common brand name under the cluster? Yes No

19. Do you have any interaction with other units? Yes No

20. Do you visit other units? Yes No

21. What is the frequency of visiting other units?

a) Frequently

b) Occasionally

c) Never

22. Do the heads of other units visit your firm? Yes No

23. What is the frequency of visiting other units?

- a) Frequently
- b) Occasionally
- c) Never

24. What is your impression about the co-operation of other units?

(Please tick your response in your respective column)

(5. Strongly agree 4. Agree 3. Neutral 2. Disagree 1. Strongly disagree)

Variables	5	4	3	2	1
1.Lending Machinery					
2.Product development					
3.Marketing support					
4.Sharing of information and experience					
5.Joint labour training of workers.					
6.Joint purchase of inputs					
7.Sharing of orders.					
8.Sharing labours					
9.Sharing innovative ideas.					

25. Whether the unit has any membership in any business associations?

- Yes No

26. If yes, please describe which kind of association is that one.

.....

27. If yes, what is the purpose of such membership?

- a) For advice in legal matters
- b) Information on other units
- c) Courses and seminars
- d) Bargaining with trade unions
- e) Information bulletins
- f) Lobbying with the government
- g) Updating market
- h) Personal relationship
- i) Work order sharing
- g) Others (specify) -----

28. Can you give suggestions for the betterment of the cluster?

(Please tick your response in your respective column)

(5. Strongly agree 4. Agree 3. Neutral 2. Disagree 1. Strongly disagree)

Variables	5	4	3	2	1
1) Make continuous relationship with unit holders					
2) Arrange meeting of unit holders frequently					
3) Arrange classes frequently at CFC					
4) Provide opportunity to unit holders to undertake their work at CFC					
5) Make arrangement to visit the units of unit holders					
6) Give chance to unit holders to express their views					
7) Govt. authorities make continuous interaction					
8) Increase the support of Govt.					
9) If any other					

STATUS OF INDUSTRIAL CLUSTERS IN INDIA

S.No	STATE/UT	Common Facility Centres (CFCs)			Infrastructure Development (ID) Projects			Grand Total (CFC+ID)
		Approved CFCs	In Progress	Completed	Approved ID Centres	In Progress	Completed	
1	Andhra Pradesh	8	6	2	14	6	8	22
2	Arunachal Pradesh	0	0	0	1	0	1	1
3	Assam	1	0	1	16	2	14	17
4	Bihar	2	1	1	0	0	0	2
5	Chattisgarh	0	0	0	9	3	6	9
6	Goa	2	1	1	0	0	0	2
7	Gujarat	12	10	2	2	0	2	14
8	Haryana	10	7	3	28	0	28	38
9	Himachal Pradesh	1	1	0	2	1	1	3
10	Jammu & Kashmir	1	0	1	9	3	6	10
11	Jharkhand	1	1	0	2	2	0	3
12	Karnataka	24	13	11	5	1	4	29
13	Kerala	16	1	12	12	4	8	28
14	Madhya Pradesh	3	3	0	25	11	14	28
15	Maharashtra	28	14	14	5	0	5	33

S.No	STATE/UT	Common Facility Centres (CFCs)			Infrastructure Development (ID) Projects			Grand Total (CFC+ID)
		Approved CFCs	In Progress	Completed	Approved ID Centres	In Progress	Completed	
16	Manipur	3	3	0	8	2	6	11
17	Meghalaya	1	1	0	0	0	0	1
18	Mizoram	1	1	0	2	0	2	3
19	Nagaland	2	2	0	2	1	1	4
20	Odisha	7	4	3	9	6	3	16
21	Punjab	6	4	2	20	17	3	26
22	Rajasthan	1	0	1	35	7	28	36
23	Sikkim	1	1	0	0	0	0	1
24	Tamilnadu	45	19	26	44	9	35	89
25	Telangana	1	1	0	19	16	3	20
26	Tripura	0	0	0	4	0	4	4
27	Uttar Pradesh	11	7	4	15	7	8	26
28	Uttarkhand	0	0	0	3	0	3	3
29	West Bengal	13	7	6	9	4	5	22
30	A&N Islands	0	0	0	0	0	0	0
31	Chandigarh	0	0	0	0	0	0	0
32	Dadra and Nagar Haveli	0	0	0	0	0	0	0

S.No	STATE/UT	Common Facility Centres (CFCs)			Infrastructure Development (ID) Projects			Grand Total (CFC+ID)
		Approved CFCs	In Progress	Completed	Approved ID Centres	In Progress	Completed	
33	Daman and Diu	0	0	0	0	0	0	0
34	Delhi	0	0	0	8	8	0	8
35	Lakshadweep	0	0	0	0	0	0	0
36	Puducherry	0	0	0	1	1	0	1
	Total	201	111	90	309	111	198	510

Source: (<https://cluster.dcmsme.gov.in/>)

Appendix III

STATUS OF INDUSTRIAL CLUSTERS IN KERALA

SI No.	Name of the cluster	Name of Consortium	No. of units in cluster	No. of units in consortium	Common Facility Center	Commissioned date	Contribution of fund			
							Gov.of India (Rs.in Lakhs)	Gov.of Kerala (Rs.in Lakhs)	Consortium (Rs.in Lakhs)	Total (Rs.in Lakhs)
1	Rubber Cluster, Changanassery	Natural Rubber & Fibre Products Manufacturing Consortium (P) Ltd.	52	49	Centralized Mixing Plant	June 1, 2007	239.89		26.65	266.54
2	Plastic Cluster, Aluva	Aluva Plastic Consortium (P) Ltd.	108	36	Tool Room for mould making / repairing	February 27, 2009	315	92	83	490
3	Plywood Manufactures Cluster, Perumbavoor	Perumbavoor Plywood Manufactures Consortium (P) Ltd.	450	23	High density plywood pressing & glue manufacturing	January 11, 2010	235.31	67.23	114.69	417.23
4	Furniture Cluster, Ernakulam	Kerala Furniture Consortium (P) Ltd.	450	36	Facilities of Panel Saw Cutting Machines, AutoCopying Lathe, Belt Sanding Machines, Edge Banding Machines and Moisture Metre	September 1,2010	245.29	98.12	147.17	490.58
5	Rice Millers Cluster, Kalady, Ernakulam	Kalady Rice Millers Consortium Pvt. Ltd.	125	36	Rice Bran Oil Refining Unit	01-12-2011 December 1,2011	472.84	162.72	77.84	713.4
6	Wood Cluster, Perinthalmanna, Malappuram	Valluvanad Wood Consortium Pvt. Ltd., Malappuram	100	38	Training Centre for value added & processing of Wood.	July 25, 2012	160.23	45.78	22.89	228.9

SI No.	Name of the cluster	Name of Consortium	No. of units in cluster	No. of units in consortium	Common Facility Center	Commissioned date	Contribution of fund			
							Gov.of India (Rs.in Lakhs)	Gov.of Kerala (Rs.in Lakhs)	Consortium (Rs.in Lakhs)	Total (Rs.in Lakhs)
7	General Engineering Cluster, Malappuram	Malappuram Metals & Engineering Consortium (P) Ltd.	200	42	Value addition in iron & steel products	January 5, 2015	199	63	53.01	315.01
8	Terra Tile Cluster, Thrissur	Terra Tile Consortium (P) Ltd.	50	20	Blending of different clay samples with non-clay earth & a Common Laboratory for testing the properties of clay.	January 11, 2010	249.65	99.86	149.79	499.3
9	Wood Cluster, Chadayamangalam, Kollam	Wood Empire Consortium (P) Ltd.	120	33	Value addition & processing of Wood.	May 23, 2017	181.67	51.91	25.95	259.53
10	Offset Printers Cluster, Kannur	North Malabar Offset Printers Consortium (P) Ltd., Kannur	245	24	Designing facility, Training facility, Quality finishing facility	March 2018	855.5	244.43	122.21	1,222.14
11	Wood Furniture Cluster, Taliparamba, Kannur	Malabar Furniture Consortium (P) Ltd.	320	34	Facilities of Panel Saw Cutting Machines, AutoCopying Lathe, Belt Sanding Machines, Edge Banding Machines and Moisture Metre	November 3, 2020	811.67	235.38	117.69	1,164.74

SI No.	Name of the cluster	Name of Consortium	No. of units in cluster	No. of units in consortium	Common Facility Center	Commissioned date	Contribution of fund			
							Gov.of India (Rs.in Lakhs)	Gov.of Kerala (Rs.in Lakhs)	Consortium (Rs.in Lakhs)	Total (Rs.in Lakhs)
12	Furniture Cluster, Kadalassery, Thrissur	Thrissur Traditional Furniture Cluster Chevoor Pvt. Ltd.	400	41	Designing Facility, Value added Component Facility, Primary Processing Line facility, Finger Joint Development Facility	January 27, 2021	1,002.46	289.01	153.61	1,445.08

Source: <https://industry.kerala.gov.in/index.php/details-of-commissioned-common-facility-centres-under-mse-cdp-scheme>

Appendix IV

STATUS OF INDUSTRIAL CLUSTERS IN KERALA UNDER SFURTI

No.	Cluster Name	Product Category	Technical Agency	Implementing Agency	Agency Name	District Name	No. of Artisans	Fund Under SFURTI (Rs.in Lakh)
1	Neyyattinkara Coir Cluster	Coir	EDI	Gram Seva Bhawan	COIRBOARD	Trivandrum	2000	144.08
2	Baluserry Coir Cluster	Coir	M/s.EDI ,P.O. Bhat 382 428, Dist. Gandhinagar, Gujarat, India	Technology Business Incubator, National Institute of Technology Calicut, NIT Campus P.O.Kozhikode-673 601	COIRBOARD	Kozhikode	500	109.02
3	Haripada Coir Cluster	Coir	M/s.EDI ,P.O. Bhat 382 428, Dist. Gandhinagar, Gujarat, India	Directorate of Coir Development, Coir Bhavan,Palayam, Nandavanam,Trivandrum, Kerala-695 034	COIRBOARD	Thrissur	3000	284.03
4	The Kerala cluster for flavoured coconut milk and virgin coconut oil	Agro	IL&FS	Tirur Coconut Producer Company	NIMSME	Tirur	750	245.89
5	Ambalapuzha Coir	Coir	EDIA	Coir Boucle Consortium	COIRBOARD	Alapuzha	368	159.48

No.	Cluster Name	Product Category	Technical Agency	Implementing Agency	Agency Name	District Name	No. of Artisans	Fund Under SFURTI (Rs.in Lakh)
	Development Society							
6	Foot & Floor-mat Cluster	Handicraft	EDI,Gandhinagar	Bharat Sewek Samaj, Thiruvananthapuram	KVIC	Thiruvanthapuram	500	75.49
7	Kasaragod Beekeeping Cluster	Agro	CBRTI,Pune	The Mellifera Bee Keeping Society	KVIC	Kasaragod	579	177.3
8	Guruvayoor Handicrafts Cluster	Handicraft	EDII, Ahmedabad	Nava Bharat Trust, North Thrissur, Kerala	KVIC	Thrissur	300	206.16
9	Kannur Beekeeping Cluster	Agro	CBRTI, Pune	Kannur Rural Devepopment Society, Kannur, Kerala	KVIC	Kannur	400	229.67

Source: <https://sfurti.msme.gov.in/SFURTI/Reports/DPR.aspx>