International Journal of Enhanced Research in Management & Computer Applications,
ISSN: 2319-7471, Volume 14 Issue 7, July 2025

Exploration of MSMEs Effective Production System: Evidence from Bengaluru Province-Karnataka

Dr. B. Adhinarayanan[1], Dr. Ghatty Radhakrishna Murthy[2]

[1,2]Faculty-MBA, Patel Institute of Science and Management, Bangalore, India

ABSTRACT

Micro, Small and Medium Enterprises (MSMEs) in Bangaluru is a critical contributor to the economic escalation and employment generation. This study aims to explore the issues in implementing effective production system. The study is descriptive in nature, both primary and secondary data collected for the study to analyze the issues in implementing the effective production system among MSMEs. Structured questionnaire and survey used to collect primary data from the MSMEs in Bengaluru. Secondary data collected from existing sources like websites, company and government record. Appropriate statistical tools employed to draw the inherent facts about effective implementation of production system in MSMEs. Primary data collected from the sample micro, small, medium scale units has been tabulated using the various and well-known tools and simple statistical techniques like percentage, comparisons, mean , chi-squire test and Factor analysis has been used to deduce the association among variables, in order to reach conclusions. Forecasting the financial needs, Potential demand and supply, QC (Quality Control) mechanism, Optimum utilization of capacity, Inventory management procedures, Maintenance management, Optimization of wastages, Working capital management, and Implementation & monitoring are the nine variables considered for the study. The study divulged that out of nine variables considered for the analysis, Estimation of financial requirements and Estimation of demand and supply are the only two variables are influencing at high level for choosing good production system in MSME Industries. Both state and central government while framing the policies can ensure support to market research related activities in MSMEs.

Keywords: Msmes, Production System, Forecasting, Quality, Optimum Utilization.

INTRODUCTION

Karnataka state is the place for close to one million, Micro, Small and Medium Enterprises (MSMEs) through which generated over 5.5 million employments. In Karnataka over the recent five years, around Rs.400000 crores has been invested because of all these things state obtains 5th place in industrial growth all over the country. In generating huge employment opportunities and economic growth by nurturing entrepreneurship MSMEs plays vital role. MSMEs contributing to the industrial development by extending support to bigger player as auxiliary units. The state's industries recently have incurred losses from lockdown and stagnant exports caused by the pandemic Covid-19. Some industries have vanished. In the interim, both the state and central governments have extended assistance. However, these industries still need support to excel better position. MSMEs face many obstacles that may be addressed through the subsequent measures: easy access to capital, mixture of Equity Capital, productivity enhancement through the best practices, and ensuring Ease of Doing of Business. Karnataka is known as a typical place for industries.

Today there are close to one million Micro, Small and Medium Enterprises (MSMEs) in Karnataka which employ close to six million people. The major industries are food processing industry, engineering industry, garments manufacturing industry, automobile industry, chemical industry, handicrafts plants and so on. Lineage industries also there in Karnataka as follows handicrafts and small-scale industries like, khadi and rural plants. With Peenya, bommasandra, and whitefield Industrial Areas in Bengaluru becomes one of the Asia's biggest industrial areas and holds many MSMEs. The products produced here are globally well-known. Karnataka has pride be named as Aerospace capital, Apparel and Silk Hub, Automobile Hub, Bio tech capital and Silicon Valley. Karnataka Economic Survey (21-22) In Karnataka over the past five years, about Rs. 400000 crores invested in MSME sector. The state has pride to hold fifth place over economic and industrial growth in the country. Here role of MSMEs is significant in the economic development of Karnataka. Next to Agriculture largest employment comes from MSMEs to the country, and its contribution to the economy is 4/10. The state has been giving importance for the economic and industrial advancement with a progressive view for changing needs over the period. In the globalization era, in order to incorporate and succeed in a competitive environment, entrepreneurship qualities, finance availability, technology usage, quality production system, and competitiveness in the market will be the

major obstacles. For all these issues the State Government has formulated specific programs to provide cushion and help to the new generation of entrepreneurs. The Department of Industry and Commerce runs a number of programs on how to start self-employment and help unemployed graduates learn about self-employment. The Government of Karnataka has set up and distributed sites and stores through the Karnataka Industrial Area Development Board and Karnataka State Small Industrial Development Corporation Ltd to facilitate new comers to set up industries. Karnataka ranks first in shaping industrial policy. For ensuring the optimum resource utilization, employment generation and economic growth Karnataka state government implemented the industrial policy in 1980s. Consequently other states set their own industrial policies. By giving importance to holistic industrial development, Government of Karnataka implemented the New Industrial Policy - 2020-2025 commencing from August '20 in Tier II and Tier III cities of the state. Many incentives and concessions offered.

RESEARCH METHODOLOGY

Descriptive research method was used for this study. Bearing in mind the objective of the research and primary data analysis was carried out using a structured questionnaire. The samples were selected from Bengaluru. Primary sources of data and secondary sources of data are collected for the study. Primary data were collected through a structural interview schedule by using questionnaires. The primary data were collected from sample of micro and small enterprises. Secondary data collected from available literature and published sources like industry department of micro small and medium enterprises, books, journal, website, government records etc. 200 samples were taken for the research. By using convenient sampling method 200 respondents from different MSMEs across Bengaluru was taken into account. The collected data arranged and examined with appropriate statistical tools to draw the inherent facts. In analyzing the data, Primary data collected from the sample micro, small, medium scale units has been tabulated using the various and well-known tools and simple statistical techniques like percentage, comparisons, mean , chi-squire test and Factor analysis has been used to deduce the association among variables, in order to reach conclusions. The main need of the study is to analyses the issues in implementing effective production system by MSMEs (Micro, Small and Medium Enterprises) in Bengaluru. First, MSMEs are the backbone of the Indian economy, and they play a crucial role in generating employment, promoting innovation, and supporting economic growth. In addition to that Bengaluru is one of the most important MSME hubs in India, and understanding the challenges in implementing effective production system by MSMEs in this region can help policy makers and entrepreneurs develop targeted intervention and strategies to support the growth of these businesses.

Objectives of the Study

1. To explore the factors creating challenges to implement effective production system in MSMEs at Bengaluru.
2. To ascertain the first hand opinion on various issues, perception of subsidies & support available to implement effective production system in MSMEs
3. To give appropriate suggestions for the enrichment of the Production system in MSMEs at Bengaluru.

RESULT AND DISCUSSION

MSMEs serve as crucial drivers of economic growth worldwide, offering significant employment and income opportunities. The Karnataka government has implemented supportive schemes, notably the Karnataka MSME Policy, to foster the growth of MSMEs in Bengaluru. Financial abet is available through entities like the Karnataka State Finance Corporation and the Small Industries Development Bank of India to bolster MSMEs in the city. These initiatives aim to create an enabling environment for MSMEs, enhancing their contribution to the state's economic development.

Factors Chosen For Analysis

To choose good production system in MSMEs, certain factors need to be considered. For this reason, nine factors (Statements) with a five point scaling have been selected and applied. The statements chosen for this study are given below:

X_1 – Forecasting the financial needs
X_2 – Potential demand and supply
X_3 – QC (Quality Control) mechanism
X_4 – Optimum utilization of capacity
X_5 – Inventory management programme
X_6 – Maintenance management
X_7 – Optimization of wastages
X_8 – Working capital management
X_9 – Implementation and monitoring

STATISTICS ASSOCIATED WITH FACTOR ANALYSIS

Bartlertt's test of sphericity
Bartlertt's test of sphericity can be used to test the null hypothesis that the variables are not correlated with the population. The test of sphericity is based on the chi-square transformation of the determinant of correlation matrix. The large value of the nine statistics will have the regression of null hypothesis.

Kaiser-Mayer-Olkin – Measure Of Sampling Adequacy
This index compares the magnitude of observed correlation co-efficient to the magnitude of the partial correlation co-efficient. Small values indicate that correlation between pairs of variable cannot be explained by the other variables and that factor analysis will not be appropriate.

Eigen values and communalities
A factor's Eigen value or latent root is the sum of the squares of its factor loadings. It helps us to explain how well a given factor fits the data from all respondents on all statements. Communality is the sum of squares of statements' factor loadings it expresses how much each variable is accounted for the factors considered together.

Factor loading
Simple correlation between the variables and factors is studied with the help of factor matrix, containing the factor loading on the factors. In the present study, factor analysis has been applied to assess the major attributes to be considered before choosing good production system. A correlation matrix has been constructed based on the ratings. The analytical process is based on the matrix of correlation among the variables. Valuable insight can be gained from an examination of this matrix. To evaluate the appropriateness of factor analysis, the variables must be correlated. If the correlation among all the variables is small factor analysis may or may not be appropriate. In the inter correlation matrix the correlation of all the variables are in good fit and factor analysis may be appropriate.

Table 1 - Component Matrix[a]

Parameters	Component	
	1	2
Maintenance management	0.726	-0.107
Working capital management	0.723	-0.218
Optimum utilization of capacity	0.708	-0.205
Implementation and monitoring	0.685	-0.159
Reducing the wastages	0.683	-0.265
Inventory management procedures	0.670	-0.227
QC mechanism	0.608	0.239
Potential demand and supply	0.566	0.549
Forecasting the financial needs	0.564	0.648

Source : Primary data
Extraction Method:1. Principal Component Analysis
2 components extracted.

Component Matrix
The above table is a correlation matrix on the ratings. The analytical process is based on a matrix correlation among the variables. It can be divulged from an examination of this matrix. For factor analysis to be apposite, the variables should be correlated. If the correlations among all the variables are small, factor analysis may not be apposite.

Table 2 - KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.878
Bartlett's Test of Sphericity	Approx. Chi-Square	1.297E3
	Df	36
	Sig.	0.000

Source: Primary data

The above table shows the result of Bartlett's test of sphericity and Kaiser- Meyar-Olkin measure of sampling adequacy. These measures are used to test the appropriateness of the factor mode. Bartlett's test is employed to test the null hypothesis is not correlated with the variables. Since the appropriate chi-square statistic is 1.297E3 which is significant at 1% level, the test leads to rejection of null hypothesis. The value of KMO statistic (0.878) is also high (greater than 1% level), Hence the factor analysis may be considered as an appropriate technique for analyzing.

Table 3 – Communalities		
Parameters	**Initial**	**Extraction**
Forecasting the financial needs	1.000	0.738
Potential demand and supply	1.000	0.621
QC mechanism	1.000	0.427
Optimum utilization of capacity	1.000	0.544
Inventory management procedures	1.000	0.500
Maintenance management	1.000	0.538
Reducing the wastages	1.000	0.536
Working capital management	1.000	0.570
Implementation and monitoring	1.000	0.494
Source: Primary data. Extraction Method: Principal Component Analysis		

Table 4 - Total Variance Explained									
Component	**Initial Eigen values**			**Extraction Sums of Squared Loadings**			**Rotation Sums of Squared Loadings**		
	Total	%of Variance	Cumulative %	Total	%of Variance	Cumulative %	Total	%of Variance	Cumulative %
1	3.943	43.809	43.809	3.943	43.809	43.809	3.137	34.852	34.852
2	1.026	11.396	55.205	1.026	11.396	55.205	1.832	20.353	55.205
3	0.751	8.348	63.552						
4	0.707	7.859	71.412						
5	0.615	6.830	78.242						
6	0.582	6.463	84.705						
7	0.514	5.716	90.421						
8	0.470	5.226	95.647						
9	0.392	4.353	100.000						
Extraction Method: Principal Component Analysis.									

It is observed that the labeled Eigen value for a factor indicates total variance attributed to the factor. Factor one account for 3.943 which is 43.809 percent of total variance. Likewise the second factor accounts for 1.026 which is 11.396 percent of total variance. The two factors show the variance of 1.026.The cumulative value 55.205 percent represents combination of these two factors.

Determination of factors based on Eigen values

Factors having the Eigen values greater than 1.0 are only retained in this approach. The other factors are not included in this model. Since there are two components that possess Eigen values which are greater than 1.0, two components are said to be extracted from the total of nine factors. The data are given in the table below.

Table 5 - Rotated Component Matrix[a]

Parameters	Component	
	1	2
Working capital management	0.730	0.195
Reducing the wastages	0.720	0.134
Optimum utilization of capacity	0.710	0.198
Inventory management programme	0.689	0.159
Maintenance management	0.673	0.291
Implementation and monitoring	0.666	0.225
Forecasting the financial needs	0.139	0.848
Potential demand and supply	0.193	0.764
QC mechanism	0.392	0.523

Source: Primary data
Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

It is perceived from the above table that the rotated component matrix indicates the relationship between the factors and individual variables. It is observed that many factors are having high degree of correlation with the same component. For better interpretability, the next step is considered. The above table reflects the variance procedure of factor rotation. Rotation doesn't have an effect on the percentage of the total variance explained. However the different methodologies rotation may result in the identification of different factors.

Interpretation is made by identifying the variable that has large loadings on the same factors. Those factors can be interpreted in terms of variables that have high values on them.

Rotated component matrix

From the rotated component matrix table, two distinct components are extracted based on their Eigen values which are greater than one. In the rotated component matrix table the factors are arranged based on the loading associated with them.

The respondents were asked to highlight their views on factors to be considered before choosing good production system. For this purpose nine check statements were selected and likert's scale technique was employed among the nine variables. It is found that only two variables are influencing at high level for choosing good production system in Small Scale Industries. They are estimation of financial requirements and estimation of demand and supply which show 55.205 level of variance.

CONCLUSION

To conclude, The research recommends that both the sate and the central government while framing the policies if they give attention to MSMEs estimation of financial requirements for the effective production system and estimation of demand and supply will be handy to the MSMEs optimize their performance in Bengaluru province. Growth and prospects of MSMEs in the services sector locks very positive, driven by expanded demand, online platforms, government aids, globalization, shift in consumer taste and preferences etc. By espousal innovation, collaboration, sustainability, talent

management, market variations, customer-centricity, agility, resilience, continuous improvement, adoption of emerging technologies, focus on data analytics, expansion into niche markets, and adoption of flexible business models, MSMEs can attain their full potential and achieve sustainable augmentation and success in the dynamic and competitive global scenario. The future growth and prospects of MSMEs in the services industry looks promising. With the right support, resources, and strategies, MSMEs can take advantage of the growing demand for services and emerging opportunities in the digital economy to achieve sustained growth and success

REFERENCES

[1]. Biswas, A. 2015. Impact of Technology on MSME Sector in India, EPRA International Journal of Economic and Business Review 3(2): 129-134. Viewed at: https://www.academia.edu/36116459/IMPACT_OF_TECHNOLOGY_ON_MSME_S ECTOR_IN_INDIA.

[2]. Fanelli, R.M. 2021. Barriers to adopting new technologies within rural, small and medium Enterprises (SMEs). Social Sciences 10(11),430. Viewed at: https://www.mdpi.com/2076-0760/10/11/430

[3]. Goyal, T. M., P. Kukreja, and M. Kedia. 2022. MSMEs going digital - Leveraging Technology to sustain in Covid-19 crisis. Indian Council for Research on International Economic Relations, New Delhi. Viewed at: https://icrier.org/pdf/MSMEs_Go_Digital.pdf

[4]. Khurana S., B. Mannan, and J. Khan. 2012. Enablers & Barriers to Implement Technology Transfer Projects: Study of SMEs in India. Emerging Paradigms in Marketing: Conference Paper, October 2012. Viewed at: https://www.academia.edu/27657533/Enablers_and_Barriers_for_Implementing_Tech nology_Transfer_Projects_A_Study_of_SMEs_in_India

[5]. Mukherjee, S. 2018. Challenges to Indian Micro and Small Scale and Medium Enterprises in the era of globalization. Journal of Global Entrepreneurship Research 8(28): 1-19. Viewed at: https://link.springer.com/article/10.1186/s40497-018-0115-5

[6]. Mweta, D. E., and F. Suwadi. 2021. Barriers to Product Innovation Among the Manufacturing Micro, Small and Medium Enterprises in Malawi. African Journal of Business Management 15(9): 211-218. Viewed at: https://academicjournals.org/journal/AJBM/article-full-text-pdf /9B564BC67659

[7]. Singh, P., and D. Singh. 2014. Technology development in MSMEs. International Journal of Application or Innovation in Engineering & Management 3(3): 164-170. Viewed at: https://www.ijaiem.org/volume3issue3/IJAIEM-2014-03-17-047.pdf

[8]. Tafor, M. 2020. Barriers to Technology Innovation of SMEs in Cameroon. Master's Thesis. School of Business and Economics, Jyväskylä University. Viewed at: https://jyx.jyu.fi/bitstream /handle/123456789/72573/1/URN%3ANBN%3Afi%3Ajyu202011126607.pdf .