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Analysing The Performance Of A Manufacturing Firm Using Hierarchical Approach

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ABSTRACT

There is a growing demand for manufacturers from within and outside the company to embrace stakeholder-satisfying production techniques. As a result, companies undertake a wide range of assessments as part of their strategic planning and performance monitoring processes. The Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is used in strategic planning that help businesses evaluate their current standing. In addition, through the Analytic Hierarchy Process (AHP), a pairwise comparison may be made between elements or criteria to prioritise them, making the SWOT analysis and multicriteria decision making method more effective. The purpose of the combined approach is to raise the effectiveness of strategic planning inside a business. This paper does a SWOT analysis of a process industry, outlining its strengths, weaknesses, opportunities, and threats. First, the company's strengths, weaknesses, opportunities, and threats (SWOT) are determined via an internal poll. Then, the AHP (analytic hierarchy process) compares alternatives by contrasting them head-to-head. The results of the company-wide poll of experts landed on seventeen distinct elements. With this information, the manufacturing firm can decide how best to boost its operations.

Key words: Analytic Hierarchy Process, Pairwise comparison, Small and Medium Enterprises SWOT analysis

1. INTRODUCTION.

Small and medium-sized enterprises (SMEs) in India are second only to those in China (Micro, Small, and Medium Enterprises). This sector produces almost 6,000 products and services, spanning the gamut from every day to the cutting edge. With the government's "Make in India" policy and a drive to attract more FDI, India's MSME sector is poised for tremendous expansion and integration with critical global value chains. According to official figures, there are 63.05 million micro industries, 0.33 million small firms, and 5,000 large businesses. According to estimates, 14.20 percent of all MSMEs in the nation are located in Uttar Pradesh. As a close second, West Bengal has 14%, followed by Tamil Nadu (8%) and Maharashtra (8%). However, the spread of COVID-19 in India and the ensuing shutdown have impeded national economic growth and imposed a financial burden on businesses. Since then, the government has indicated that it would modify the criteria used to identify MSMEs[1].

In recent years, academics and professionals have received much interest in performance measurement and management (PMM)[10]. Despite PMM systems' expanding popularity, several challenges make

deployment challenging for enterprises, raising the risk of just partial benefits or complete failure. Many large organisations started using the Balanced Scorecard (BSC)[2,3] as it became apparent that it helped them enhance performance by bringing together their departments and employees to work toward the company's overarching goals and objectives. To help organisations satisfy stakeholder expectations, articulate and communicate strategic goals, and assess their execution, the BSC is a helpful tool for choosing a balanced set of indicators and objectives that define the organization's strategic vision [4]. It increases service quality, allows for ongoing feedback and learning, and operationalizes the purpose and strategic goals[5]. It displays a harmony between external metrics that affect shareholders and customers and internal metrics that affect fundamental activities like innovation, learning, and growth. Despite the many positives associated with BSC implementation, several studies have identified several downsides. Several potential roadblocks have prevented it from being broadly implemented in many organisations.

There is a strong correlation between the success of a country's SMEs and that nation's overall economic and social development. However, a lack of efficient and effective performance management frameworks may be to blame for many firms' subpar results today. Allocating resources effectively and efficiently is crucial for every organisation to achieve its objectives. Therefore, most SMEs are clueless about how they stack up against competitors and where they may improve. That is why it is essential to use performance assessment to zero in on problems and find solutions that can boost business results. A manufacturing company uses SWOT analysis and an analytic hierarchy method to detect and critically prioritise issues. Manufacturing and supply chain strategies that satisfy the expectations of diverse value chain stakeholders are becoming more critical to the success of companies, both from inside and beyond. There is a favourable correlation between sustainable development strategies and business performance, but manufacturers, especially SMEs, have been sluggish in implementing sustainable practices. The recycling sector was discovered to respond effectively to all elements, including strengths, weaknesses, opportunities, and problems, and it was discovered to face strong development opportunities. [6].

MSMEs have been called "the engine of economic development for nations" due to their ability to create many jobs at a cheap cost of capital, advance economically depressed areas, and more fairly distribute national income and wealth. The potential for MSMEs to alleviate poverty, increase exports, and contribute to societal and economic growth is enormous. More than 11 crore people are employed by India's MSME sector, and in 2018-19, SMEs accounted for 48.1% of India's total exports. According to the MSME Annual Report 2018-19, Kerala is home to roughly 23.79 lakh MSMEs, of which 23.58 are micro-enterprises that provide jobs for approximately 44.64 lakh people. Although Kerala's land banks are too small to support the development of large-scale businesses, the state government is working to overcome this obstacle by exploiting this land to promote the expansion of MSMEs [7].

SMEs may vary widely regarding revenue or turnover, staff count, and industry focus. Most importantly, MSMEs outnumber Multinational corporations (MNCs) in India. As a result, the success or failure of SMEs may have far-reaching consequences for the whole global economy. The country's economy benefits from its growth and prosperity just as much as it does. Therefore, SMEs should assess their current performance and identify the challenges they must overcome to maximize their potential. As a result, SMEs contribute to economic growth by providing goods and services to the country's largest corporations [8]. However, many SMEs today have underachieved compared to their counterparts because they lack an understanding and an effective and efficient framework for their performance.

Moreover, since they lack a well-structured marketing strategy, SMEs have trouble competing with and responding to the market tactics of large corporations. The lack of competitiveness in India's SMEs is an intangible issue. Therefore competitiveness helps to explain why small enterprises can create output income. Because of this, SMEs may see how it stacks up against similar businesses and improve in areas where it falls short by measuring its performance and showcasing this as a quantifiable value that can be compared across other organisations [9].

Kerala has made significant investments in infrastructure, skill development, and communication

and transportation networks, giving the state a natural edge in this area. So far, 52,137 MSMEs have been established since 2016. Over 1.8 million people are now gainfully employed thanks to the state of Kerala's MSME sector, which has attracted investments of over INR 4,500 crore. Credit availability, connection, and electricity are the key components necessary for development in the MSME industry [10].

The past several decades have seen a surge in interest in using multiple-criterion decision making applications. Every day, we have to deal with various decision-making challenges, from the most basic to the most complicated. This kind of thing seldom affects anybody, much less the entire company. Using a multi-factor optimization approach may help you make the best choice. One of the most popular techniques for determining decisions is Saaty's Analytic Hierarchy Process (AHP) [11]. The goal is to use the proper value scale to measure the relative importance of the provided collection. Decisions are often made 4 based on the perceptions of the person tasked with making the final call and weighing priorities, highlighting the significance of the consistency and correlation of the alternatives evaluated throughout the decision-making process. Because it provides a straightforward means of determining how several criteria relate to each available option, the AHP methodology offers excellent adaptability. In complicated situations with multiple criteria and a reasonably significant number of options, this technique may be used to evaluate the criterion's practical applicability and the interaction between the criteria. The implementation of this technique allows for the decomposition of complicated issues into granular hierarchies, allowing for the incorporation of both quantitative and qualitative considerations into the study. Furthermore, the AHP bridges the gap between all hierarchical levels. This makes it possible to see how modifying one criterion influences the behaviour of the other criteria and the available options.[12]

2. LITERATURE REVIEW

In India, some states have a robust industrial sector, while others have a strong agricultural sector. While the western and southern sections of India are industrial hubs, the eastern and northern parts of the nation are primarily agrarian. The job situation in the nation has gotten significantly more

complicated during the reform period or after 1991. Although agriculture's share of national GDP has decreased from more than 50% at independence to just over 10%, it is still the most prominent job producing industry. The percentage of GDP and jobs held by the industrial sector has been relatively stable during the last several decades.

In contrast, while the services industry's contribution to national production has grown dramatically, relatively few people are employed in the sector. Some method is required to move the excess labour force from the agriculture sector to other sectors since the agriculture sector accounts for a disproportionately large share of national production without a corresponding share of total employment. It is a truth that despite its outstanding productivity, the service industry cannot provide enough jobs to meet demand. This is an ideal time for the country's industrial sector to grow, attracting a more significant share of the economy's output and the workers. A decrease in unemployment may be possible if the manufacturing sector does well. [13]Through reducing industrial pollution and preserving natural resources, "green" manufacturers prioritize environmentally friendly practices across the whole production cycle, from raw materials procurement to distribution and even the return of finished goods. The three R's of this technique are "reduce," "reuse," and "recycle," and they are meant to get to use fewer fossil fuels, use fewer harmful materials in manufacturing and distribution, and use less of everything else. (diminishing waste, recycling, and reusing) Scientific methods, including life cycle analysis, "design for environment," and "closed-loop manufacturing," are included in this approach. The Lean and Green Strategy is predicated on a new paradigm that holds that it is possible to concurrently prioritize and attain the conservation of resources, the reduction of costs, the creation of value for the environment and society, and the delight of customers[14,15].

For instance, country- and industry-specific studies have demonstrated how China's transition to labor-intensive mass manufacturing led to its emergence as a manufacturing powerhouse, creating millions of jobs and alleviating poverty for a sizable proportion of the Chinese population. These findings have implications for other countries, such as India. SMEs deserve special recognition for the significant number of jobs they generate. They are more nimble and can speed up the process of social and economic change and regional economic integration throughout the nation [16]. States and areas with a rich history of industrial prosperity tend to have thriving communities of MSMEs. State names like

Maharashtra and Gujarat in the west, Tamil Nadu, Kerala, Andhra Pradesh in the south, West Bengal in the east, and Uttar Pradesh in the north tend to come up when discussing India's most industrially developed regions. The MSME manufacturing data shows how the sector's performance varies from state to state and how the performance of the MSME sector in historically well-off industrially developed states varies among them and vis-a-vis less well-off states.

An Overview of India's SMEs It is widely acknowledged that India's MSMEs are a driving force behind the country's rising prosperity. According to experts, it sustains the Indian economy as no other sector does. In addition, it has helped make the economy more resistant to outside forces. Almost 40 percent of India's workforce is employed by MSMEs, most of which are located in rural regions. Reserve Bank of India (2017) reports that in 2015-16, the MSME sector employed over 117 million people across more than 51 million businesses. The MSMEs make more than 8,000 goods. Everything from time-honored staples to cutting-edge innovations falls under this broad category.

The AHP is a well-known scientific approach based on the sequential study of a problem in a given industrial sector as a hierarchy of parts. The AHP technique guarantees that the issue is broken down into subproblems and solved hierarchically. The subsolutions are integrated to form a whole that solves the original problem. Elements of an issue under investigation are cycled hierarchically inside the AHP framework, from the aim at the top of a hierarchy down to the criteria and sub-criteria at their appropriate levels[17]. Strategic planners in business and industry often use SWOT analysis, or "strengths, weaknesses, opportunities, and threats," to ensure that all project-related elements are recognized and handled. The first two (strengths and weaknesses) are internal to any organisation. In contrast, the second pair (opportunities and threats) are external to the firm and covers the larger context in which it functions, such as competition, politics, and the business climate at large [18,19]. Therefore, SWOT analysis summarizes the most critical internal and external (strategic) aspects that may impact the organization's future. The SWOT assessments are structured generally with lists of strengths and opportunities and lists of weaknesses and threats. The lists are separated here by whether they are internal or external elements that may impact the company's internal policies. Strategic elements are those within and outside the firm that must be considered while planning for the future [20]. Using economic, ecological, and social sustainability criteria, the SWOT analysis examines

existing resources and how they could be used. However, its primary function in planning is to collect evidence that may be used to choose an actionable course of action. A decision is a preference between at least two possible actions in a decision-theoretic analysis. Whenever possible, rational decision makers will choose the option that maximises utility, as calculated from all relevant data on the alternatives under consideration. Decision support involves generating data on the decision context, potential courses of action, and their potential outcomes [21].

Companies have developed plans to better capitalise on possibilities and protect themselves from dangers. As a popular decision-making tool, AHP considers several factors at once. A problematic issue is broken down into a series of easier-to-evaluate sub-problems using the analytical hierarchy technique. The analytical hierarchy process approach that Saaty developed allows for subjective and objective evaluations to be considered throughout the decision-making process.

Conducting a SWOT analysis is the first stage in the approach. Analysis of the manufacturing company's SWOT (strengths, weaknesses, opportunities, and threats) is performed in this research. The knowledge and experience of the company's professionals and management team proved invaluable throughout the SWOT analysis. The second step is to conduct pairwise comparisons between the SWOT categories using Saaty's comparison scale. There is a favourable correlation between sustainable development strategies and business performance, but manufacturers, especially SMEs, have been sluggish in implementing sustainable practices. [22,23]. To determine which aspects of sustainable manufacturing and supply chain management are most important, one manufacturer used SWOT analysis and an analytic hierarchy method to do so.

SWOT AHP METHODS

The link between criteria and alternatives may be readily determined using the AHP approach, making it a very versatile technique. In the case of complicated situations, including several criteria and a reasonably significant number of options, this technique may be used to evaluate the practical importance of the criteria and to ascertain how the criteria interact with one another. The implementation of this technique allows for the decomposition of complicated issues into granular hierarchies, allowing for the incorporation of both quantitative and qualitative considerations into the

study. Furthermore, the AHP bridges the gap between any hierarchy's many levels. This makes it possible to see how modifying one criterion influences the behaviour of the other criteria and the available solutions.

The first step in using AHP is breaking down the issue into a set of criteria that can be evaluated separately from one another. Once this conceptual framework is in place, decision-makers may compare one option to the others using the established criteria. Concrete facts from the alternatives or human assessments may be used in this comparison to enter underlying information. In the 1970s, Thomas L. Saaty [11]introduced an approach to decision making known as the analytical hierarchy process (AHP), which has since been the subject of extensive research and is now widely used in decision making for complex scenarios involving group decision making where individual and group members must consider and weigh multiple competing values and goals.

In this study, we examine the situation of a modest interlock and tile manufacturer and retailer. The SWOT analysis assesses the advantages, disadvantages, prospects, and threats facing a business. AHP approaches allow the organisation to prioritize the many SWOT aspects and choose the most effective plan. Both are developing and choosing strategies that might benefit from a SWOT analysis. It is a great way to evaluate personal potential against objective parameters since everything is quantifiable [3]. The SWOT gives a framework for analyzing the choice context, while the AHP provides insight into the analysis. Advantages of employing AHP in SWOT analysis may include the capacity to assess SWOT elements and include decision-maker preferences in planning objectively. When doing a SWOT analysis, the AHP technique's strengths as a methodical way of tackling decision making challenges may be put to good use[22]. Having completed these comparisons, the decision maker will be armed with fresh qualitative insights into the issue. The results of the comparison between the strengths, weaknesses, opportunities, and threats (SWOT) may then be used to influence the development of new strategies. The SWOT analysis may also be used to evaluate and contrast many strategic choices and choose the one that's the best fit. Decision-makers are pushed to weigh the relative value of different aspects by making comparisons in pairs. In addition, it helps the strategic planning process by providing a helpful learning framework.

Furthermore, it may be utilized as a means of communication and instruction in the decision-making

process. It provides a valuable framework for learning in support of decision making in various contexts. To do an AHP analysis, a questionnaire was developed that asked for a series of pairwise comparisons of components. All survey takers were presented with a pair of options and asked to choose the one that better suited their tastes. The hierarchical structures were compared head-to-head. If two elements are at the same level in the hierarchy, more comparisons will be made between the two.

4. METHODOLOGY

Strategic planners in business and industry often use analysis as one of the most critical tools to identify and solve all the aspects associated with projects. The first two (strengths and weaknesses) are internal aspects of an organisation. In contrast, the second pair (opportunities and dangers) is related to the broader context in which the entity works (competition, political climate, and so on). These four elements, known as strategic considerations, make or break businesses. Therefore, SWOT analysis summarizes the most significant internal and external (strategic) issues that might affect the organization's future. Strategic factors are the internal and external elements that should get the most consideration for the company's development.

When applied to the SWOT framework[24], AHP's primary purpose is to methodically evaluate each of the four perspectives and make them comparable in terms of importance. In this analysis, the SWOT matrix provides the basis for the AHP structure, which is broken down into three distinct sections: (a) the desired outcome of the choice; (b) the SWOT categories; and (c) the components that make up each SWOT category. The assessments, which are often subjective, are carried out by specialists using a comparison scale and are then translated into numerical values and rated. The first step in solving any problem is to break it down into a hierarchy in which the root cause of the problem is located at the top. The alternatives follow this, the criteria, and the sub-criteria. Below the main options are the alternatives. The hierarchy describes the connection between two levels of a structure. As a result, there is an indirect relationship between the structure's components, as each component of the hierarchy is linked to all others. Working backward from the result and forward from the alternatives might help to organize the hierarchy to make comparisons between them easier to

draw. Many criteria, sub-criteria, and sub-sub criteria fall somewhere in the middle. Pairwise options comparisons using a comparison scale are required to obtain expert feedback on the hierarchy structure. Comparison matrices of various variables allow for ranking of significance.

On a scale from 1-9, experts may grade the strength of the comparison as equal, moderate, strong, or very strong. The results are quantified using a pairwise comparison scale when comparing two criteria. Consequently, a square matrix is constructed from the pairwise comparisons, with the diagonal components set to 1. The major eigenvalue and the related normalized right eigenvector in a comparison matrix are used to evaluate the weights assigned to the different criteria and sub-criteria [25]. Weights concerning the criteria/sub-criteria and ratings concerning alternatives are the constituents of normalized eigenvectors. After that, a Consistency Index to rank matrices of order n. is used.

5. CASE STUDY

The interlocking tiles and bricks manufacturing industry was the focus of this study, which was conducted in a small-scale process industry. They make a variety of tile and interlocking items. Customers care more about the quality of the product or service than any other factor. Finished goods are supplied to clients on schedule, and transportation is also provided. Twenty-five managers and employees assessed the manufacturing sector as a whole. To facilitate such comparisons, a questionnaire was developed. The reliability of the questionnaire was calculated using Cronbach's alpha, one of the most used techniques for calculating internal consistency. It is generally accepted that an alpha of Crombach's 0.7 or above indicates reliability. So, it is safe to say that the questionnaire has good internal consistency. A Saaty scale ranging from 1 to 9 was utilized to express the preferences for comparison. Consistency in the pairwise comparison was checked using the Consistency Index. When the Consistency Index is less than 0.1, it is consistent. The comparison has to be redone if there is any inconsistency [26]. After collecting responses to each survey question, a geometric mean was computed. Afterward, a pairwise comparison matrix was

generated.

To do an AHP analysis, a questionnaire was designed containing a series of pairwise comparisons of components. Due to the current coronavirus epidemic, a survey questionnaire was administered online. To get a response that considers respondents' preferences, it was asked to compare and contrast two options. The issue was figuring out which of the two was more important and to what degree. After that, AHP assigns a numerical value to each individual's choice so that they may be compared and assessed objectively. The weight of each factor is measured on a scale from 1 to 9. Separate pairwise comparisons were performed on each tier of the hierarchy. It is reasonable to assume that the number of comparisons would increase linearly with the depth of a hierarchy. With n factors, the required number of comparisons at each level as n(n 1)/2 can be calculated.

Table 1.

Criteria selected by experts from SWOT Analysis

Strength

Weakness

Quality of the product

Poor Location of Site

Experienced Workers

Less storage area

Delivery Time

Lack of Resources

Customer Relationship

Lack of Managerial Skill

Production Time

Opportunities

Threats

Foreign Market

13 Availability of Raw material

Government Grands

Increased Tax

Sales Growth

Area Development

Demand of Product

Environmental Impacts

Table 2.

Pairwise Comparison 3 Scale

Intensity of importance	Definition	Explanation
1	Equal Importance	Two activities contribute equally to the objective
3	Moderate Importance	Experience and Judgement slightly favour one activity over another
5	Strong Importance	Experience and Judgement strongly favour one activity over another
7	Very Strong Importance	An Activity is favoured very strongly over another
9	Extreme Importance	

The importance of one Activity over another affirmed in the highest possible order

2,4,6,8

Intermediate Values

Intermediate values between two adjacent judgments.

Table 3 .

Pairwise Comparison Matrix (SWOT)

Strengths

Strengths

Weaknesses

Opportunities

Threats

Criteria Weight

Strengths

1

5

1

3

0.41

Weaknesses

0.2

1

0.33

2

0.13

Opportunities

1

3

1

3

0.36

Threats

0.33

0.5

0.33

1

0.10

Table 4.

1 Pairwise Comparison Matrix (Strengths)

Strengths

Product Quality

(S1)

Experienced workers

(S2)

Product delivery

(S3)

Good customer Relationship

(S4))

Time of production(S5)

Criteria Weight

Product Quality(S1)

1

5

7

4

7

0.52

Experienced workers(S2)

0.2

1

3

4

5

0.23

Product delivery(S3)

0.14

0.33

1

0.33

2

0.07

Good customer Relationship(S4)

0.25

0.25

3

1

2

0.12

Time of production(S5)

0.14

0.2

0.5

0.5

1

0.05

Table 5.

1 Pairwise Comparison Matrix (Weaknesses)

Weaknesses

Poor location

(W1)

Less storage area

(W2)

Lack of Resources

(W3)

Lack of managerial skill

(W4)

Criteria Weight

Poor location(W1)

1

5

0.25

0.5

0.19

Less storage area(W2)

0.2

1

0.2

0.33

0.07

Lack of Resources(W3))

4

5

1

3

0.52

Lack of managerial skills(W4)

2

3

0.33

1

0.22

Table 6.

Pairwise Comparison Matrix (Opportunities)

Opportunities

New foreign markets(O1)

Govt. grant to improve facilities(O2)

Increased sales(O3)

Emerging need for product(O4)

Criteria Weight

New foreign markets(O1)

1

5

0.25

0.5

0.16

Govt. grant to improve facilities(O2)

0.2

1

0.2

0.33

0.14

Increased sales(O3)

4

5

1

3

0.39

Emerging need for product(O4)

2

3

0.33

1

0.27

Table 7.

Pairwise Comparison Matrix (Threats)

Threats

Availability of raw materials (T1)

Tax increase(T2)

Area development(T3)

Environmental Impacts(T4)

Criteria Weight

Availability of raw materials (T1)

1

3

3

0.33

0.30

Tax increase(T2)

0.33

1

0.5

0.5

0.13

Area development(T3)

0.33

2

1

0.33

0.16

Environmental Impacts(T4)

3

2

2

1

0.42

Table 8.

Random Index Table

Number of attributes,n

1 1

2

3

4

5

6

7

8

9

10

Random Index RI

-

-

0.58

0.90

1.12

1.24

1.32

1.41

1.45

1.49

Table 9.

Overall And Factor Priority Score 26 of Swot Factors

SWOT GROUP

GROUP PRIORITY

SWOT FACTORS

FACTOR PRIORITY

OVERALL PRIORITY

STRENGTHS

0.41

Product Quality(S1)

0.52

0.213

Experienced workers(S2)

0.23

0.094

Product delivery(S3)

0.07

0.029

Good customer Relationship(S4)

0.12

0.049

Time of production(S5)

0.05

0.021

WEAKNESSES

0.13

Poor location(W1)

0.19

0.025

Less storage area(W2)

0.07

0.009

Lack of Resources(W3))

0.52

0.068

Lack of managerial skills(W4)

0.22

0.029

OPPORTUNITIES

0.36

New foreign markets(O1)

0.16

0.058

Govt. grant to improve facilities(O2)

0.14

0.050

Increased sales(O3)

0.39

0.140

Emerging need for product(O4)

0.27

0.097

THREATS

0.10

Availability of raw materials (T1)

0.44

0.044

Tax increase(T2)

0.12

0.012

Area development(T3)

0.16

0.016

Competitive companies(T4)

0.29

0.029

Figure 1

Radar Diagram of Priority Score Factors

6. RESULT

SWOT and AHP may make up for each other's shortcomings when used together. The combined SWOT-AHP analysis is adaptable and may be used for various purposes. Specific successes have come from using the combined SWOT-AHP in SMEs, such as that analysis using the combined SWOT-AHP may aid businesses in both a subjective and objective search for the company's competitive edge. SMEs may benefit significantly from using this study to assist their decision-making

and strategy formulation. As a consequence of considering external elements, the final approach is adaptive and in step with the times. So, the analysis may aid in the accomplishment of corporate objectives. Using this data to design plans to fulfill client requests may help increase business continuity and corporate success.

The results reveal the following rankings of importance for each SWOT category. The Strength category is given a 41% weighting, the Weakness category 13%, the Opportunities category 36%, and the Threat category 10%. Rising sales and improved product quality have emerged as two of the most crucial variables (14% and 21 %, respectively). Unavailability of resources (6%) and raw materials (4%), although still essential, come in lower on the list. According to the research results, it is essential to ensure that supplies of essential components are not depleted while the current coronavirus pandemic is continuing strong.

Traditional (and sometimes low-quality) goods are what SMEs in developing nations tend to crank out. Moreover, they focus primarily on serving niche communities within their immediate vicinity. As a result, it is challenging for SMEs to get a foothold in the global market due to the rapid pace at which technology is evolving.

The global technology market is not flawless, making it challenging to locate the appropriate technology promptly. Learning a new technology also requires investing time and money into acquiring unfamiliar knowledge, resources, and tools. Therefore, the ability of SMEs to successfully adopt and innovate technological solutions is critical to their overall success when expanding internationally. To compete on a global scale, SMEs must adopt cutting-edge technological solutions. To benefit from cutting-edge technologies, even the smallest businesses need access to novel ideas like cloud computing, which facilitates multiple users' shared use of infrastructure. This way, MSMEs can free up vital resources and focus on their core operations.

7. CONCLUSION

SMEs rely heavily on technological advantages to maintain global competitiveness. Indian MSMEs

have unique difficulties in adapting to the current global trend in terms of both technology adoption and business expansion. Considering that MSMEs in India are the lifeblood of the country's economy, we must learn what makes them tick. Competition in international markets is made more difficult for MSMEs by a lack of access to and investment in technology.

Other important drivers of technological change are the effluent discharge standards and product quality certifications (domestic/export), which mandate the use of more current methods and practices. The need for technology upgradation and the withdrawal of maintenance support for existing technology may compel MSMEs to adopt new technology; the lack of availability of the requisite level of skills among the labour force, even for regular jobs, is another prominent reason why technology upgradation may be necessary for MSMEs to continue supplying to global markets.
However, if additional barriers exist, such as a lack of digital access, a lack of resources or knowledge to innovate the product quality, an inability to lower the export prices, a higher unit cost of production, informational bottlenecks, and an inadequate strategy for marketing and advertising, MSMEs may fail to take the full advantages of globalization.
The study may be used as a resource to help businesses improve their sustainable manufacturing practices. Through this method, businesses may boost their efficiency and competitiveness. By keeping close tabs on personnel, equipment, and supplies, as well as by churning out actual work with fewer mistakes, the lean implementation strategy aims to remove t every stage of the process.

The government should set aside a section of the market just for SMEs and shield them from more giant corporations. Instead, organizations need to concentrate on improving their strengths while minimizing their flaws to stay competitive and fulfill the needs of their stakeholders. On the other hand, when coupled with AHP, SWOT analysis becomes a potent instrument for guiding managerial strategy. The results demonstrate that decision-makers may use calculated priorities from the SWOT-AHP framework to examine their choices objectively.

The Analytic Hierarchy Process (AHP) is a method of MCDM that may be used to prioritize and

weigh different criteria. With an AHP, one may create a tree-like hierarchy of options from which to choose the course of action that best suits their requirements. Numerous authors have utilized MCDM to analyze the interrelationships between the variables, quantify the effects of those interactions, and evaluate the viability of the manufacturing process from a sustainability perspective

Using the findings, 4 the most effective strategic options for the company may be selected. Future research might compare the outcomes of any multicriteria decision-making strategy (fuzzy logic, ANP, 1 and Data Envelopment Analysis [DEA]) with SWOT, even though the AHP method was utilized in this study to analyze SWOP group variables. Calculating 26 the importance of the SWOT variables, a management strategy for making a pivotal choice may be created or bolstered.

The government should set aside a section of the market just for SMEs and shield them from more giant corporations. 2 In order to stay competitive and satisfy their stakeholders, businesses should work to improve both their strengths and their flaws. On the contrary, when SWOT analysis is coupled with AHP, it becomes a potent instrument for guiding management's long-term strategic planning. The study's results demonstrate that decision-makers may discover a technique for objectively examining their choices by employing computed priorities from the SWOT-AHP framework. The findings may be utilized to narrow down potential courses of action and settle on the optimal 6 one for the business. Although the AHP was utilized in this study, any other multicriteria decision-making tool might 5 be used in conjunction with SWOT in future studies for a more in-depth analysis of the group's components.

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