# Examining Quality Challenges in Small and Medium-Sized Enterprises (Smes) in Ankara: Applying The 5s Methodology

Melike Nur Tek[1], İrem Özkan[2], Melek İlarslan[3], Deniz Efendioğlu[4]

[1, 2, 3] Industrial Engineering, Faculty of Engineering & Natural Science, Ankara Yıldırım Beyazıt University, Ankara, Turkey
[4] Industrial Engineering, Faculty of Engineering & Natural Science, Ankara Yıldırım Beyazıt University, Ankara, Turkey

ORCID No: https://orcid.org/0000-0002-3710-9187

**Keywords**

*SMEs in Turkey; 5S; Lean Production; Non-Parametric Tests*

**Abstract**

*The primary focus of this research revolves around addressing quality-related challenges and management issues within small and medium-sized enterprises (SMEs) in Turkey. SMEs constitute a significant portion of the country's total business landscape and therefore exert a substantial influence on its economy. However, the relatively low level of quality consciousness among SMEs has resulted in a variety of problems. Thankfully, the simple and straightforward 5S quality methodology can serve as an effective solution to these issues. The 5S method proves invaluable for enhancing overall quality and optimizing operational processes. To gain deeper insights into the current state of SMEs regarding quality problems and awareness, conducted a survey specifically targeting manufacturing SMEs in Ankara. We carefully analyzed the responses from fifty SMEs based in Ankara using non-parametric hypothesis tests. The primary factors contributing to these quality problems include inadequately trained employees, insufficient quality education or training, and a general disregard for overall quality. In this context, quality managers assume a critical role in adequately training their workforce and fostering a heightened sense of quality awareness. By increasing awareness and implementing the future research plans outlined in this study, the 5S methodology can potentially pave the way for Turkish SMEs to transition into high-quality production processes.*

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## 1. INTRODUCTION

The number of SMEs increased drastically in 2020, SMEs accounted for 99.8% of the total number of companies in Turkey “Against that; 72% of employment and 49.4% of turnover” (TÜİK, 2020). The numbers of SMEs are shown in Figure 1, with details distinguishing between micro, small, and medium enterprises.

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[1] Resp author; e-mail: defendioglu@aybu.edu.tr

It is obvious that the SMEs in Turkey are playing a dominant role for the economic development of the country. The export values for different types of SMEs can be observed in Figure 2. In that case, Quality Management is very important, not only for meeting the customers' requirements but also for meeting the organization's requirements. In general, Quality Management has many advantages like, reducing waste, reducing the costs, and increasing the profits, preventing mistakes and failures, reducing risks, and increasing overall efficiency and productivity. But the small to medium enterprises in Turkey have many gaps and weaknesses in Quality Management. It is found that SMEs in Turkey have a knowledge gap in implementing any Quality management tool and philosophy. According to the research made, there is a lack of existing literature about 5S implementation on SMEs in Turkey. Another issue to consider is the low-Quality importance awareness of Small and medium-sized enterprises in Turkey.

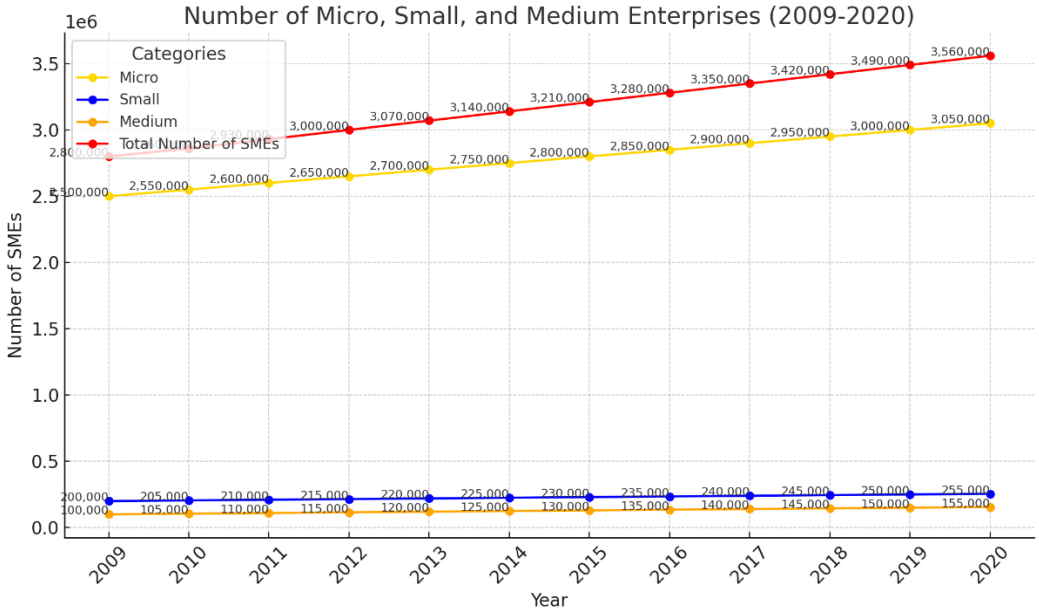
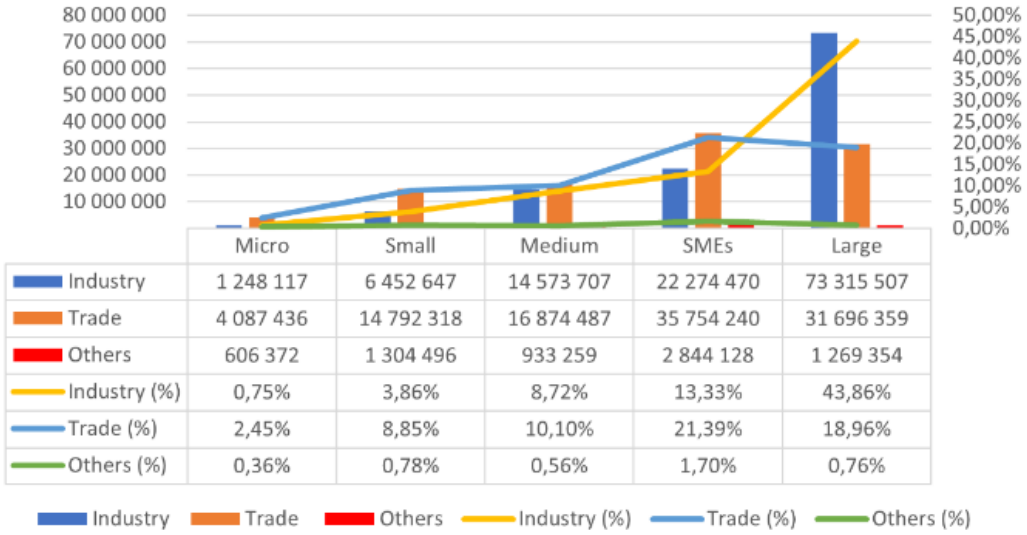



**Figure 1.** Change in number of smes in turkey over years (tuik, 2020)

The purpose of this research is, to show the importance of Quality Management and what can be achieved by implementing a Quality philosophy like 5S on SMEs. Given the lack of quality knowledge of SMEs, the goal of this paper is to show that 5S is the easiest and most effective method to increase the overall quality.




| | Micro | Small | Medium | SMEs | Large |
|---|---|---|---|---|---|
| Industry | 1 248 117 | 6 452 647 | 14 573 707 | 22 274 470 | 73 315 507 |
| Trade | 4 087 436 | 14 792 318 | 16 874 487 | 35 754 240 | 31 696 359 |
| Others | 606 372 | 1 304 496 | 933 259 | 2 844 128 | 1 269 354 |
| Industry (%) | 0,75% | 3,86% | 8,72% | 13,33% | 43,86% |
| Trade (%) | 2,45% | 8,85% | 10,10% | 21,39% | 18,96% |
| Others (%) | 0,36% | 0,78% | 0,56% | 1,70% | 0,76% |

**Figure 2.** Export values of enterprises by sector and size ($ million)

Furthermore, the motivation for this research arises from the current situation of the SMEs in Turkey, where many SMEs have prejudices that the implementation is a big, expensive, time-consuming, and laborious change and don't know the actual advantages of Quality improvement tools.

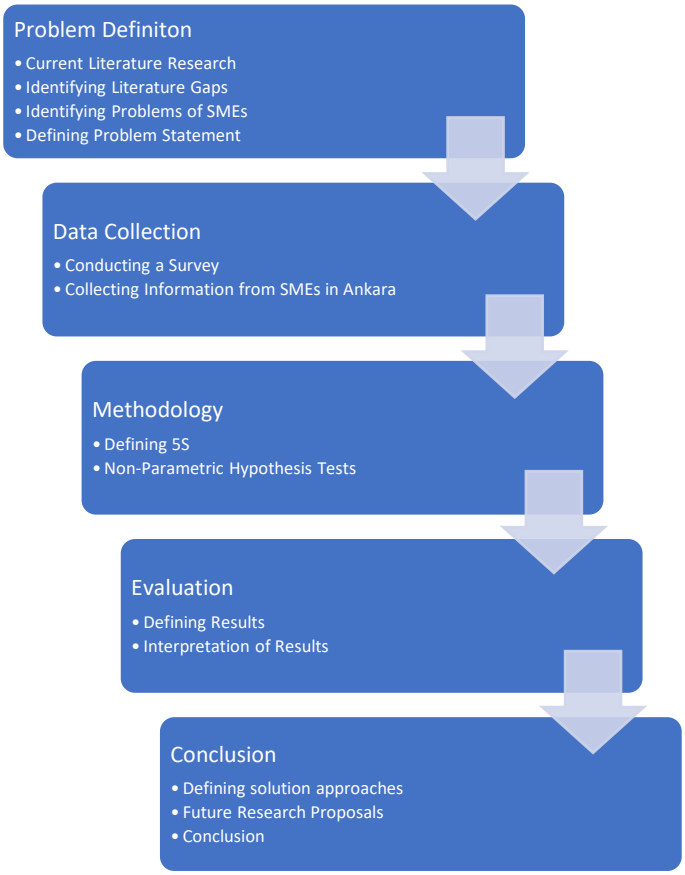



**Figure 3.** General framework

The aim of this paper is, to clarify all the prejudices of SMEs, to increase the quality importance awareness and to prove that 5S is a very suitable and simple philosophy for all SMEs. In order to realize all of this, a survey is used to critically analyze and evaluate quality awareness and quality problems in SMEs based in Ankara. Also, the 5S methodology is analyzed in detail and illustrated applicable to all SMEs. This research is intended to help Turkish SMEs having a simple but effective solution to their quality problems. The general framework of the study can be seen from Figure-3.

## 2. LITERATURE REVIEW

### 2.1. Implementations of 5S in SME's

Systematically introducing and implementing the 5S method means for SMEs that they choose the path to more customer satisfaction, higher work efficiency and more effective collaboration in orders and projects. The graph of quality knowledge of SME's from literature and this study ca be observed by Figure-4. Soumya R. Purohit and V. Shantha agreed that 5S provides one of the most important foundations for realizing lean manufacturing (Purohit & Shantha, 2015). Furthermore, there is an assumption that 5S is just good housekeeping and only clean and tidy, but James Van Patten makes it clear that 5S is a way of changing the way people do their work, their workplace and addressing each other and, provides the basis for significant improvements (Van Patten, 2006). In their study, H. R. Zadry and R. Darwin demonstrated an increase in productivity after the application of 5S and PDCA to a handmade shoe producing SME in West-Sumatra (Zadry & Darwin, 2020). Another research is from India, Prof. Saad Shaikh and his colleagues implemented the 5S method on a small-scale filter production company (Shaikh et. al., 2015). Furthermore, Paloma Martínez Sánchez and Carolina Montoya Rodriguez studied in 2015 about the impacts of 5S on quality, productivity, and organizational climate and also Avishkar A. Ahire and his colleagues make a study of the 5S method at a manufacturing company also in India (Sanchez et. al.,2015), (Ahire & Ahirrao, 2021). Lately, In 2020, Mohd Adzrie and T. Vincent, implemented the 5S on a SME in Malaysia, where they planned the implementation with the PDCA Cycle (Radzali & Thomas, 2020).

When the successful studies are examined, Agrahari et. al. (2015) states the implementation of the 5S methodology in a small-scale industry, demonstrating significant improvements in safety, productivity, efficiency, and housekeeping by visual evidence. Another study is Ezzeddine & Aoun's (2019) study revealed a notable and favorable impact of 5S on employee performance across all aspects except for the "Sort" stage. Sangode (2018) stated in her research findings indicating that organizations experience a beneficial outcome from implementing the 5S methodology. Also critiqued studies can be observed from literature. Mishra & Chakraborty (2014) introduces a lean implementation model that is notably generic and has effectively addressed numerous challenges associated with implementation, distinguishing it from other frameworks. Unlike industry-specific approaches, the identified lean implementation frameworks discussed in the paper exhibit a broader applicability, making them adaptable across various sectors. Gala & Wolniak (2013) furnishes theoretical explanations of Lean Management and 5S, accompanied by a case study derived from practical insights. Furthermore, the author details the issues encountered during the implementation of 5S.

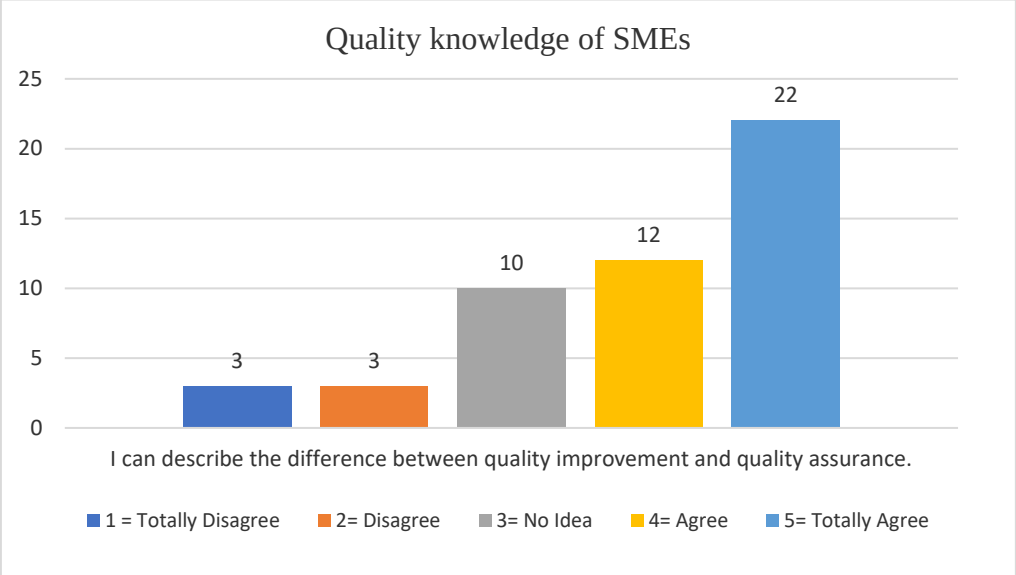



**Figure 4.** Quality knowledge of SMEs

### 2.2. Barriers in Implementation of 5S

While some enterprises lack knowledge about the 5S method, some enterprises have a bias towards the 5S methodology due to the unsuccessful results they had achieved with wrong or incomplete implementation on their previous initiatives, and this has led to the opinion that the 5S method is an ineffective tool. Gala and Wolniak applied the 5S methods in an enterprise both in production and in the office and examined the obstacles they encountered during the application (Gala & Wolniak, 2013). Furthermore, Rahman, Khamis, Zain, Deros, and Mahmood developed a questionnaire to measure the level of implementation of the 5S. As a result of the survey, it was tried to measure the performance of using 5S tools in different divisions of two different businesses by using a Likert scale, and the problems faced while performing 5S practices are examined (Rahman et. al., 2010). Another study for the determination of the barriers for 5S is Nilipour and Jamshidian's study that 5S applications are an important and powerful tool for environmental organization management and discussed the obstacles to the effective implementation of 5S (Akbar & Mehdi, 2005). From the perspective of employees Titu, Oprean, Grecu implemented Kaizen-5S in the after-sales department of a business and analyzed the results (Titu et. al., 2010). Ramdass have conducted a study on the implementation of 5S in clothing and textile industry using case study methodology. It is pointed out that the main problem in the implementation of the 5S method is the resistance of the employees to change (Ramdass, 2015).

## 3. METHODOLOGY

A survey was conducted to measure how much SMEs know about the concept of quality, their attitudes about quality activities and their level of application of these activities, and to evaluate their knowledge and inclinations about the 5S method. In this survey study, manufacturing SMEs located in Ankara were selected as the target population. According to the industry registry records of the Ministry of Science, Industry and Technology, Ankara ranks 3rd in terms

of industry share in Turkey. In this respect, Ankara province is considered as a suitable population in terms of representing all SMEs in Turkey. According to 2019 data, the number of industrial enterprises in Ankara is 11700 and the number of SMEs is 11587. Under the condition of the difference (0.2), estimated standard deviation (0.5), and the target power (0.80), it is found that a sample size of approximately 50 is sufficient for Ankara province. In order to implement the survey, at the stage of reaching SMEs, data such as the names and contact information of SMEs operating in the province of Ankara were requested from KOSGEB through an official letter. However, upon the negative response, the businesses were searched one by one through the company lists on the websites of the organized industrial zones in Ankara, and the contact addresses of the businesses that were determined to be SMEs were reached. The survey had been sent to between 300-400 companies. First of all, businesses were contacted via e-mail and data was started to be collected via Google Forms, then the survey study was continued by reaching business officials via social media. Since the desired number could not be reached by these means, the survey continued with face-to-face interviews held in OSTİM industrial area and the survey was completed by reaching 50 enterprises. The sample size would like to be enhanced; however, the answers of survey are not taken from the SMEs in the period of 6 months except for fifty-one.

The survey consists of 2 parts and 35 questions in total. In the first part of the survey, general questions about the business such as the duration of the business, the number of employees, the existence of the quality department or personnel were included. The second part consists of 21 questions using a 5-point Likert Scale. In this section, it has been tried to understand the quality awareness of the enterprises and their attitudes in applying and maintaining quality activities, and in the last 5 questions, it is aimed to determine their predisposition to 5S by questioning the factors such as order and cleanliness in the enterprises. The data obtained from the questionnaire were interpreted statistically by hypothesis tests. Statistical tests are often subdivided into parametric tests on the one hand and non-parametric tests on the other. Parametric tests have higher test power than non-parametric tests, but there are some assumptions that must be met in order to be applied. These assumptions are data conforming to normal distribution, data being interval or ratio scaled, homogeneous variances, knowing the main population parameters, and sufficient number of subjects in the groups. Non-parametric tests are used when the metric scale level is not available, the true distribution of random variables is unknown, the variables are nominal or ordinal scaled, and the sample is not large enough. Since the data obtained from the questionnaire have nominal and ordinal scales, non-parametric hypothesis tests were used in this study. According to the number of group variables in the sample, the appropriate one from the Mann-Whitney U and Kruskal Wallis tests was selected, and the hypotheses were tested at the 95% confidence interval. The hypothesis has been given at Table-1 in detail.

**Table 1.** Hypothesis Tests

| | |
|---|---|
| **1** | $H_0$= There is no significant difference between the business scale and the tendency to 5S.<br>$H_1$= There is a significant difference between the scale of the enterprise and the tendency to 5S. |
| **2** | $H_0$= There is no significant difference between the age of the business and the tendency to 5S.<br>$H_1$= There is a significant difference between the age of the business and the tendency to 5S. |
| **3** | $H_0$= There is no significant difference between the existence of the quality department and the quality training which is given or not.<br>$H_1$= There is a significant difference between the existence of the quality department and the quality training which is given or not. |
| **4** | $H_0$= There is no significant difference between the scale of the enterprise and the application of the quality method.<br>$H_1$= There is a significant difference between the scale of the enterprise and the application of the quality method. |
| **5** | $H_0$= There is no significant difference between the age of the enterprise and the application of the quality method.<br>$H_1$= There is a significant difference between the age of the enterprise and the application of the quality method. |
| **6** | $H_0$= There is no significant difference between the age of the enterprise and the knowing of the 5S method.<br>$H_1$= There is a significant difference between the age of the enterprise and the knowing of the 5S method. |
| **7** | $H_0$= There is no significant difference between the scale of the enterprise and the knowing of the 5S method.<br>$H_1$= There is a significant difference between the scale of the enterprise and the knowing of the 5S method. |
| **8** | $H_0$= There is no significant difference between the fact that mistakes are caused by lack of information and employees are informed about products, processes, workflow, quality requirements, etc.<br>$H_1$= There is a significant difference between the fact that mistakes are caused by lack of information and employees are informed about products, processes, workflow, quality requirements, etc. |
| **9** | $H_0$= There is no significant difference between the errors caused by the lack of knowledge and who has the responsibility for quality.<br>$H_1$= There is a significant difference between errors caused by lack of knowledge and who has the responsibility for quality. |
| **10** | $H_0$= There is no significant difference between the fact that the errors are caused by the supplier and that the selection of suppliers is the number one criterion for SMEs.<br>$H_1$= There is a significant difference between the fact that the faults originate from the supplier and that the supplier selection is the number one criterion for SMEs. |
| **11** | $H_0$= There is no significant difference between the fact that the errors are caused by the employee, and the quality training is given to the employees. |

| | |
|---|---|
| | $H_1$= There is a significant difference between the fact that the errors are caused by the employee, and the quality training is given to the employees. |
| **12** | $H_0$= There is no significant difference between the infrastructure-related faults and the age of the enterprise.<br>$H_1$= There is a significant difference between the infrastructure-related errors and the age of the enterprise. |
| **13** | $H_0$= There is no significant difference between the knowing of the 5S method and the tendency to the 5S method.<br>$H_1$= There is a significant difference between knowing of the 5S method and the tendency to the 5S method. |
| **14** | $H_0$= There is no significant difference between whether there is a quality method applied or not, and the view that time and resource expenditures for quality improvement will reduce costs in the long run.<br>$H_1$= There is a significant difference between whether there is a quality method applied or not, and the view that time and resource expenditures for quality improvement will reduce costs in the long run. |
| **15** | $H_0$= There is no significant difference between the existence of the quality department and quality awareness.<br>$H_1$= There is a significant difference between the existence of the quality department and quality awareness. |
| **16** | $H_0$= There is no significant difference between the scale of the enterprise and quality awareness.<br>$H_1$= There is a significant difference between the scale of the enterprise and the awareness of quality. |
| **17** | $H_0$= There is no significant difference between the age of the enterprise and the quality awareness.<br>$H_1$= There is a significant difference between the age of the enterprise and quality awareness. |
| **18** | $H_0$= There is no significant difference between the existence of a quality department in the enterprise and the continuity of quality assurance.<br>$H_1$= There is a significant difference between the existence of a quality department in the enterprise and the continuity of quality assurance. |
| **19** | $H_0$= There is no significant difference between quality awareness and manager-employee cooperation.<br>$H_1$= There is a significant difference between quality awareness and manager-employee cooperation. |

## 4. FINDINGS

A total of 19 non-parametric tests were performed on the answers to the different questions from the survey. With these tests, the following findings were obtained. It was important to make it clear that the tendency towards 5S is not related to either the age of the SME or its size. The results of hypothesis tests can be seen from Table-2. Another result has shown that the existence of a quality manager or quality department plays an essential role in ensuring that workers also receive the necessary quality training and education. It has been observed that as the size of the company increases, the applications of quality methods increase. It can be said

that in companies with a high number of employees, the notion of quality has gained importance and quality practices have become the standard. In addition, no significant relationship was found between the errors caused by lack of information and informing the employees about the products, process, workflow, quality requirements, etc. This may be due to the inadequacy of the training provided or the lack of continuous control. As a result of the analysis, it was found that while employees received quality training, errors made by employees persisted. SMEs, most of which do not have qualified staff, should reconsider the quality and adequacy of the training provided.

Larger enterprises typically have more complex organizational structures, multiple departments, and diverse operations compared to smaller ones. Implementing 5S across a large organization requires significant coordination, resources, and time. There may be more resistance to change, bureaucratic hurdles, and challenges in standardizing processes across different locations or departments. In contrast, smaller enterprises may have fewer layers of management, making it easier to implement 5S practices with less bureaucracy and resistance (Greenwood et. al., 2011).

The variance in the adoption and effectiveness of 5S practices across different ages of enterprises and levels of quality awareness is influenced by several factors like: organizational culture and tradition, leadership and management style, investment in continuous improvement, resource availability (Akram et. al., 2023).

The lack of a staff structure to manage the training, the inability to identify managers' training needs, the workload of employees, the lack of time or the cost of the training can drastically affect the functionality of the training. Another result showed that infrastructure-related errors are observed regardless of the age of the respective SME. Lack of information about the field of activity, lack of qualified personnel in this field or problems with capital can lead to infrastructure-related errors. Another result is that the SMEs which have applied a quality method are highly based on the opinion that time and resource expenditures for quality improvement will reduce costs in the long run. Thus, there is an impression that the SMEs who also implemented a quality method use it consciously and also believe that it is helpful and leads to positive long-term effects.

**Table 2.** Non-parametric hypothesis test results

| **Hypothesis Test number** | **P Value (α= 0,05)** | **Result** |
|---|---|---|
| 1. | P=0,133 | $H_0$ = accepted |
| 2. | P=0,544 | $H_0$ = accepted |
| 3. | P=0,020 | $H_0$ = rejected |
| 4. | P=0,003 | $H_0$ = rejected |

| | | |
|---|---|---|
| 5. | P=0,661 | $H_0$ =accepted |
| 6. | P=0,588 | $H_0$ =accepted |
| 7. | P=0,010 | $H_0$ =rejected |
| 8. | P=0,483 | $H_0$ =accepted |
| 9. | P=0,669 | $H_0$ =accepted |
| 10 | P=0,362 | $H_0$ =accepted |
| 11. | P=0,463 | $H_0$ =accepted |
| 12. | P=0,279 | $H_0$ =accepted |
| 13. | P=0,029 | $H_0$ =rejected |
| 14. | P=0,050 | $H_0$ =rejected |
| 15. | P=0,009 | $H_0$ = rejected |
| 16. | P=0,004 | $H_0$ =rejected |
| 17. | P=0,905 | $H_0$ =accepted |
| 18. | P=0,001 | $H_0$ =rejected |
| 19. | P=0,001 | $H_0$ =rejected |

Moreover, the presence of a quality department or supervisor in SMEs shows that the SME has more information about quality. In terms of both quality awareness and continuity of quality assurance, they have gained an advantage over SMEs that do not have a quality department or supervisor. In addition, micro and small SMEs are more quality conscious than medium-sized SMEs. This shows that it is easier to spread quality awareness in businesses with few employees. However, the age of SME did not affect quality awareness. This shows that newly formed SMEs do not have a relationship in terms of quality awareness compared to SMEs that have been operating for many years.

The challenges can be faced in this process stated below.

- **Resistance to Change**: Employees may resist adopting new processes and procedures associated with 5S due to fear of the unknown, concerns about job security, or reluctance to change established routines (Furxhi, 2021).
- **Lack of Management Support:** Without strong support and leadership from management, 5S initiatives may struggle to gain traction or sustain momentum. Management buy-in is crucial for allocating resources, providing guidance, and setting priorities (Albashar, 2024).

- **Insufficient Training and Education:** Inadequate training on 5S principles and techniques can hinder successful implementation. Employees need to understand the purpose and benefits of 5S, as well as how to effectively apply its principles in their work areas (Attri et. al. 2017).
- **Resource Constraints:** Limited financial resources, time, or personnel can impede 5S implementation efforts. Without sufficient resources, organizations may struggle to invest in necessary equipment, materials, or training programs (Lan Chi, 2024).
- **Sustainability Challenges:** Maintaining the gains achieved through 5S over the long term can be challenging. Without ongoing commitment and reinforcement, there is a risk of backsliding or regression to previous work habits and standards (Mihelcic et. al. 2017).
- **Cultural Barriers**: Organizational culture plays a significant role in the success of 5S initiatives. Cultural barriers such as lack of trust, resistance to collaboration, or a focus on short-term results over long-term improvement (Al Alawi et. al. 2007).
- **Measurement and Feedback:** Without clear metrics and feedback mechanisms in place, it can be difficult to assess the effectiveness of 5S implementation efforts and identify areas for improvement (Sati & Adam, 2019).

It is seen that SMEs with quality awareness are ahead in terms of manager-employee cooperation. Quality awareness emphasizes the cooperation between the manager and the employee. The evaluation of the hypothesis tests were made with the SPSS software. Two types of tests were used. One of the Mann Whitney U test and the Kruskal Wallis H test.

## 5. CONCLUSION

We live in a world where globalization determines our everyday life. As a result, however, the competition in the market is increasing every day, so companies need a significant difference in order to be able to stay on the market at all. Turkey, where 99.8% of all companies are SMEs, needs to take advantage of this fact as soon as possible in order to stand out and become more present in the international market. Quality is also an important factor that makes companies more efficient in the long term and gives them a competitive advantage. However, the research, especially in the literature, showed that Turkey is very passive when it comes to quality. There were large gaps in literature, especially when it came to quality awareness. Many manufacturing SMEs in Turkey have a lot of underqualified staff, which also drastically disadvantages production in terms of quality. Likewise, it has also been discovered that complicated quality methods such as Total Quality Management or Six Sigma would be too challenging for these types of SMEs and would not lead to long-term effectiveness. Thus, the main topic of this thesis is to make the 5S method better known and applicable to any SME. The 5S method is the easiest quality method to implement, which is uncomplicated, cost-effective and timesaving, while offering advantages such as reducing search and waiting times, short distances between individual stations and storage locations and sensible utilization of capacities, but also order and clarity helps to prevent accidents at work and increases the overall safety. Thus, the simple 5 steps of the 5S method, Sort, Set in Order, Shine, Standardize and Sustain, can change many

things for the better and contribute a very high positive impact on the economy overall. However, the problems of the SMEs in terms of quality are very high at the moment.

The precautions that can be taken has been stated below:

- **Continuous Improvement:** Emphasize the significance of ongoing enhancement throughout the journey of 5S. Promote regular assessments, feedback mechanisms, and adjustments to address emerging obstacles and enhance outcomes continually(Furxhi, 2021).
- **Identify Specific Challenges:** Recognize the exact hurdles encountered during the implementation of 5S, such as employee resistance, lack of support from management, inadequate resources, or challenges in maintaining changes over time (Albashar, 2024).
- **Employee Training and Involvement:** Offer thorough training to employees regarding the principles and advantages of 5S. Encourage their active engagement in the process, as their participation is pivotal for successful execution (Attri et. al. 2017).
- **Management Support:** Ensure robust backing from senior management by showcasing the potential benefits of 5S, allocating required resources, and actively engaging in the implementation process (Al Alawi et. al. 2007).
- **Establish Clear Goals and Standards:** Define precise objectives and benchmarks for each phase of the 5S process. This offers clarity and guidance, steering efforts towards achieving tangible results (Mihelcic et. al. 2017).
- **Address Resistance and Cultural Change:** Tackle resistance to change by fostering a culture of transparency, communication, and collaboration. Encourage feedback and handle concerns constructively to garner support from all stakeholders (Al Alawi et. al. 2007).
- **Celebrate Successes and Learn from Failures:** Acknowledge and commemorate accomplishments and milestones attained during implementation of 5S. Similarly, perceive setbacks and failures as opportunities for learning, refining strategies, and enhancing future endeavors (Sati & Adam, 2019).
- **Ensure Sustainability:** Implement strategies to uphold the benefits achieved through 5S by integrating its principles into daily practices, establishing routines for upkeep and enhancement, and nurturing a culture of ownership and responsibility (Mihelcic et. al. 2017).

In order to go into these quality problems in more detail, a survey was conducted with the manufacturing SMEs in Ankara. The aim was to better understand the SMEs, to measure their quality awareness and also to see the status of the quality. During the survey alone, it was quite difficult to get the answers, many SMEs were unwilling to fill out the survey or didn't even want to talk and distanced themselves. Finally, 50 SMEs took part in the survey and this number was enough to conduct non-parametric hypothesis tests. The test results were very different. With these results, one can make it clear that the tendency towards 5S does not play a role either with the age or with the size of the SME and that the 5S method can actually be implemented

for all SMEs. It has been observed that as the size of the company increases, the applications of quality methods increase. One can say that in companies with a large number of employees, the idea of quality has gained importance. So, it can also be said that the basis for quality is already there for most of them, and only the performance needs to be increased. It is important to clarify that in the survey, 80% of the SMEs stated that the shortcomings and defects are caused by the employees. This is a very important clue. In general, one can also say that the quality of the quality training is not sufficient. This is where quality managers come into play. The quality managers bear a great deal of responsibility in training their employees sufficiently and increasing their quality awareness. This is exactly where the 5S method explained in this paper comes in. The 5S method in the full program could bring structure, order, certainty, awareness and also control, which is sorely lacking in the SMEs in Ankara. With 5S training, audits, checklists, and all other methods explained in this paper, the SMEs could make great progress in a short time to lead Turkey with all its SMEs to a high-quality manufacturing environment.

For future research directions, a larger-scale study may be conducted to confirm the current findings. Different type of studies impletementing 5S also explore the effectiveness of various strategies in Turkish SMEs and support the idea of this article. Not only with 5S, but also various types of lean production methodologies such SOCT, Lean balancing, Kaizen can be investigated that what is the situation for specific areas or in Turkey.

## 6. CONFLİCT OF INTEREST

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this paper.

## REFERENCES

Ab Rahman, M. N., Khamis, N. K., Zain, R. M., Deros, B. M., & Mahmood, W. H. W. (2010). Implementation of 5S practices in the manufacturing companies: A case study. *American Journal of Applied Sciences*, *7*(8), 1182-1189.

Al-Alawi, A. I., Al-Marzooqi, N. Y., & Mohammed, Y. F. (2007). Organizational culture and knowledge sharing: critical success factors. *Journal of knowledge management*, *11*(2), 22-42.

Al Bashar, M., Taher, M. A., & Ashrafi, D. (2024). OVERCOMING LEAN TRANSFORMATION HURDLES IMPLEMENTING EFFICIENCY IN THE US MANUFACTURING INDUSTRY.

Ahire, A. A., Chaudhari, A. B., Ahirrao, O. S., & Sarode, V. B. (2021). Increasing Productivity Through Implementation of 5S Methodology In A Manufacturing Industry: A Case Study. *Int. J. Sci. Res. in Multidisciplinary Studies Vol*, *7*(7).

Agrahari, R. S., Dangle, P. A., & Chandratre, K. V. (2015). Implementation of 5S methodology in the small scale industry: a case study. *International Journal of Scientific & Technology Research*, *4*(4), 180-187.

Akram, M. W., Abbas, A., Khan, I. A., & Ahmad, M. F. (2023). The impact of effective implementation of the 5S concept on company performance: A Case Study of a Manufacturing Company. *NICE Research Journal*, *16*(2), 119-140.

Attri, R., Singh, B., & Mehra, S. (2017). Analysis of interaction among the barriers to 5S implementation using interpretive structural modeling approach. *Benchmarking: An International Journal*, *24*(7), 1834-1853.

Chi, Do. (2024). Improving Economic Efficiency and Occupational Safety in Production Facilities Using the 5S-Kaizen Method. Sustainability in Environment. 9. p44. 10.22158/se.v9n1p44.

Ezzeddine R, Aoun M. (2020). The effect of 5S on Employee Performance: An Empirical Study among Lebanese Hospitals. *Int Bus Account Res J*; 4:44.

Furxhi, G. (2021). Employee's resistance and organizational change factors. *European Journal of Business and Management Research*, *6*(2), 30-32.

Gala, B., & Wolniak, R. (2013). Problems of implementation 5S practices in an industrial company. *Management Systems in Production Engineering*.

Greenwood, R., Raynard, M., Kodeih, F., Micelotta, E. R., & Lounsbury, M. (2011). Institutional complexity and organizational responses. *Academy of Management annals*, *5*(1), 317-371

Mihelcic, J. R., Naughton, C. C., Verbyla, M. E., Zhang, Q., Schweitzer, R. W., Oakley, S. M., ... & Whiteford, L. M. (2017). The grandest challenge of all: The role of environmental engineering to achieve sustainability in the world's developing regions. *Environmental Engineering Science*, *34*(1), 16-41.

Mishra, R. P., & Chakraborty, A. (2014). Strengths, weaknesses, opportunities and threats analysis of lean implementation frameworks. *International Journal of Lean Enterprise Research*, *1*(2), 162-182.

Nilipour, A., & Jamshidian, M. (2005). 5S as an environmental organization management tool: benefits and barriers. In *Proceedings of the 3rd international management conference*.

Purohit, S. R., & Shantha, V. (2015). Implementation of 5S methodology in a manufacturing industry. *International Journal of Scientific & Engineering Research*, *6*(8), 225-231.

Radzali, M. A., & Thomas, V. (2020). Assessment on 5S approach strategy for small medium enterprise (SME): a case study in Sabah. *Journal of advanced mechanical engineering applications*, *1*(2), 7-19.

Ramdass, K. (2015, August). Integrating 5S principles with process improvement: A case study. In *2015 Portland International Conference on Management of Engineering and Technology (PICMET)* (pp. 1908-1917). IEEE.

Sánchez, P. M., Rodriguez, C. M., Maruyama, U., & Salazar, F. (2015, September). Impact of 5S on quality, productivity and organizational climate-Two Analysis Cases. In *Proceedings of the International Conference on Operations Excellence and Service Engineering* (pp. 748-755).

Sati, S. A., & Adam, A. I. (2019). Evaluating the effectiveness of 5S implementation in the industrial sector. *International journal of innovative science and research technology*, *4*(10), 804-808.

Sangode, P. B. (2018). Impact of 5s methodology on the efficiency of the workplace: study of manufacturing firms. *International Journal of Research in Commerce & Management*, *9*(12).

Shaikh, S., Alam, A. N., Ahmed, K. N., Sawant, I., & Hasan, S. Z. (2015). Implementation of 5S practices in a small-scale organization: a case study. *International Journal of Engineering and Management Research (IJEMR)*, *5*(2), 130-135.

Titu, M. A., Oprean, C., & Grecu, D. (2010, March). Applying the Kaizen method and the 5S technique in the activity of post-sale services in the knowledge-based organization. In *Proceedings of the International Multiconference of engineers and computer scientists* (Vol. 3, No. 1, pp. 1-5).

Türkiye İstatistik Kurumu (TÜİK), "KOBİ İstatistikleri Raporu (2009-2019)", 2020.

Van Patten, J. (2006). A second look at 5S. *Quality progress*, *39*(10), 55.

Zadry, H. R., & Darwin, R. (2020, December). The Success of 5S and PDCA Implementation in Increasing the Productivity of an SME in West Sumatra. In *IOP Conference Series: Materials Science and Engineering* (Vol. 1003, No. 1, p. 012075). IOP Publishing.