

An empirical study on total quality management in aquaculture processing plants

Su ürünleri işleme tesislerinde toplam kalite yönetimi üzerine ampirik bir çalışma

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Abstract: This research is the first empirical study in the aquaculture sector that aims to examine the total quality management (TQM) practices of managers and employees in aquaculture processing plants. Although the concept of quality has existed since ancient times in human history, it has gained its modern meaning as TQM in the last fifty years. In this context, the aim of the study is to evaluate the implementation of TQM in the aquaculture sector and to reveal its effects on the competitiveness and sustainability of enterprises. The population of the research consists of managers and employees working in Aquaculture Processing Plants. In the research, demographic and socio-economic status of the participants were determined. In addition, in the analysis of the data, it was aimed to obtain more meaningful and summarised factors by using the dimension reduction method. The 26 variables applied in the field were reduced to 6 (six) factors by factor analysis. These factors explained 70.724% of the total variance. The findings of the study are expected to provide a significant contribution to the scientific literature in this field as well as preparing the ground for further and comprehensive research.

Keywords: Total quality, affiliation, customer satisfaction, employee satisfaction

Öz: Bu araştırma, su ürünleri işleme tesislerinde yöneticilerin ve çalışanların toplam kalite yönetimi (TKY) uygulamalarını incelemek amacıyla su ürünleri sektöründe yapılan ilk ampirik çalışmadır. Kalite kavramı insanlık tarihinde eski çağlardan beri var olmakla birlikte, son elli yılda TKY olarak modern anlamını kazanmıştır. Bu bağlamda, çalışmanın amacı su ürünleri sektöründe TKY'nin uygulanmasını değerlendirmek ve bunun işletmelerin rekabet gücü ve sürdürülebilirliği üzerindeki etkilerini ortaya koymaktır. Araştırmanın popülasyonu, Su Ürünleri İşleme Tesislerinde çalışan yöneticiler ve çalışanlardan oluşmaktadır. Araştırmada, katılımcıların demografik ve sosyo-ekonomik durumları belirlenmiştir. Ayrıca, verilerin analizinde boyut indirgeme yöntemi kullanılarak daha anlamlı ve özetlenmiş faktörler elde edilmesi amaçlanmıştır. Alanda uygulanan 26 değişken, faktör analizi ile 6 (altı) faktöre indirgenmiştir. Bu faktörler, toplam varyansın %70.724'ünü açıklamaktadır. Çalışmanın bulgularının, bu alandaki bilimsel literatüre önemli bir katkı sağlamasının yanı sıra, daha kapsamlı araştırmalar için zemin hazırlaması beklenmektedir.

Anahtar kelimeler: Toplam kalite, bağlılık, müşteri memnuniyeti, çalışan memnuniyeti

INTRODUCTION

The aquaculture industry, which is an important sector within animal products, constitutes a critical link in the food chain, especially with aquaculture processing facilities. The rapidly growing world population and the necessities of modern life increase the demand for ready-to-eat food day by day. In this context, aquaculture processing plants not only provide ready-to-eat food, but also play an important economic role.

Demand for seafood products is increasing in our country and around the world due to their health benefits. Fish meat is rich in nutritional value and is preferred by consumers. Many seafood products have high nutritional value due to their protein, fat, vitamin, and mineral content. For this reason, they are highly preferred. However, due to post-harvest biochemical reactions in fish, microbial spoilage may occur, making product freshness crucial for safe food consumption. The pH and moisture levels are some of the key parameters affecting the

shelf life of these products. The preservation of seafood and ensuring its microbial safety is one of the biggest challenges on a global scale. Various methods have been developed to overcome these challenges and achieve this goal. Cold plasma (CP) technology is increasingly being used as a powerful tool for lightly processed foods, especially seafood, to meet consumer expectations (Olatunde et al., 2021; Altın Yiğit, 2024).

However, although these processing methods are effective in extending the shelf life of foods, they have certain limitations, such as nutrient loss, due to factors such as excessive heating, texture, aroma, and color changes (Olatunde and Benjakul, 2018; Pankaj et al., 2018).

Approximately 88% of the world's aquaculture production is consumed directly as food, while the remaining 12% is used in the production of non-food products such as fish meal and fish oil (FAO, 2023). Fish constitutes an important part of

animal protein consumption in many parts of the world. Various seafood products are highly nutritious and popular due to their high amounts of protein, fat, vitamins and minerals. However, post-harvest biochemical reactions and microbiological deterioration in fish make the freshness of the product critical (Vasconcelos et al., 2021). Freshness is the most important criterion for determining fish quality, and the development of reliable methods and practical applications for determining this characteristic has been the main priority of research dating back to ancient times (Ladtrat et al., 2003).

In the globalizing world, an intense competitive environment has emerged between production, quality and market dynamics. In this competitive environment, it has become a necessity to prioritize quality in production processes. Food and beverage safety, especially food hygiene and quality, is emerging as a global common health problem (Tan et al., 2023). Therefore, new strategies need to be developed in line with the data obtained. The concept of quality, which entered our lives in 2000 BC (Gitlow, 1989), has gained meaning with the naming of Total Quality Management (TQM) since the last quarter of the twentieth century and has reached today. In today's business world where competition is intense, it is of great importance for businesses to adopt TQM practices to ensure their sustainability. These practices not only increase business performance but also strengthen employees sense of belonging and satisfaction (Lüleci, 2018).

According to data published by the Food and Agriculture Organization of the United Nations (FAO, 2023), approximately 15 million people are employed in fisheries.

This figure exhibits a marked increase among those engaged in the seafood processing industry, enterprises specialising in freezing and storage, and other business segments involving seafood transportation. As is evident from the data presented, it is understood that a considerable number of individuals are involved in the process of accessing seafood, which is considered to be a safe animal food. It is imperative to acknowledge that the quality of the product is contingent on the efficacy of the education of the masses. The fishing industry, cognisant of the critical issues it faces, is engaged in substantial research and implementation.

This research is the first study to examine the effects of TQM practices on human factor satisfaction in seafood processing plants. The research aims to examine how human satisfaction reflects on quality management and emphasizes the importance of human factor for increasing the effectiveness of TQM practices. As a result, the successful implementation of total quality management in aquaculture processing plants increases both employee satisfaction and the overall quality level of the enterprise.

MATERIALS AND METHODS

Research area and method

The primary data of this research were obtained from the questionnaire study conducted on a voluntary basis between

17 July 2021 and 15 June 2023 from the managers and employees of the enterprises operating as aquaculture processing plants. In addition, data were collected by face-to-face interviews with purposefully determined sector stakeholders. Processing facilities (Mersin, Muğla, Sinop / Türkiye) were determined by gradual sampling method (Mersin, Muğla, Sinop / Türkiye) in order to carry out the research through the sample that will reflect the characteristics of the main mass without the need to investigate the universe one by one. The formula in Equation 1 below was used to determine the sample volume to be applied in the field.

$$n = \frac{Npq t_{\alpha}^2}{(N-1)d^2 + pq t_{\alpha}^2} \quad (1)$$

[N=Total number of units; n=Sample diameter; p=Favourable probability; p=Unfavourable probability; d=margin of error (e.g. 5%); t_α=table value (e.g. 1.96)] (Çiçek and Erkan, 1996; Baş, 2013). Due to the nature of the research, it was decided to carry out a non-refundable selection since each subject would be interviewed only once.

A preliminary field study was conducted to finalise the questionnaires to be applied in the field. In addition, it was also stated in writing that the questionnaires would not be used for other than scientific purposes, and care was taken to ensure that the questionnaires received as accurate answers as possible.

In the questionnaires, 11 multiple-choice, one open-ended and 26 Likert scale questions were applied to the employees to determine the socio-economic and demographic structure, and 12 multiple-choice and 14 Likert scale questions were applied to the managers to determine the socio-economic and demographic structure. Likert scale was prepared as (Disagree, Strongly Disagree, Undecided, Agree, Strongly Agree).

Since there were five different evaluations in the questionnaires, the score range of the evaluation scale was calculated as 'Width/rating = (5-1)/5 = 0.80'. The lower limit of the 'agree' option, 3.41 points and above, was accepted as the threshold value of 'positive evaluation' (Karademir and Arat, 2014).

Reliability tests applied

Reliability test was applied in order to reveal whether the data to be collected reflects the phenomenon to be measured. Alpha coefficient (Cronbach Alpha) was used to test the reliability of the scales used in the research (Özdamar, 2013) (Table 1).

As seen in Table 1, the calculated Cronbach's alpha coefficient is accepted as an indicator of reliability (Saruhan and Özdemirci, 2011). It was decided to conduct the field study with the questionnaires whose reliability was tested. Permission was obtained from the 'Sinop University Human Research Ethics Committee' to conduct the field study.

Table 1. Reliability Coefficient/Kaiser-Meyer-Olkin (KMO) and Bartlett's Test Results

Reliability Coefficient		KMO and Bartlett's Test Results	
Cronbach Alpha	Number of Questions	KMO Value	0.846
0.9412	38	Bartlett's Test	Approximate Khi-Square
			Degrees of Freedom Significance
			2725.699
			630.000

After the reliability test of the questionnaires originally prepared for the research, the applicability of factor analysis in the analysis of the data was also tested (Table 1).

In Table 1, Kaiser-Meyer-Olkin (KMO) value was 0.846 and Bartlett's test result was $p < 0.05$. According to Kaiser and Rice (Kaiser and Rice, 1974), it was decided that it would be correct to continue factor analysis with these data.

Statistical methods

Since the number of subjects belonging to the managers of the aquaculture processing plants did not reach the sample size, which is considered to be a prerequisite for the application of factor analysis, Likert type questions were digitised and averages were calculated. These calculated averages were compared with the threshold value and problematic areas were identified and solution suggestions were made. Since the sample size obtained from the questionnaire study applied to the employees met the prerequisites for factor analysis, the data were evaluated by factor analysis.

Subsequent to the field application, the data procured from the questionnaires was transferred to the computer environment. The Office 2010 programmes were used for writing and descriptive statistics. The statistical package programmes SPSS (version 21) and Minitab (version 17) were used for data analysis.

RESULTS

In this section of the study, the opinions of the managers and employees of aquaculture processing plants on total quality management practices and the findings obtained from the analysis of the data are presented.

In the research, demographic and socio-economic status of managers and employees were analysed separately. It was determined that 30% of the managers and 37% of the employees were women, 30% of the managers and 58% of the employees were married. It was determined that 38% of the employees were between the ages of 18-25, 43% between the ages of 26-40, 17% between the ages of 41-50, and only 2% between the ages of 51-30; 90% of the managers were between the ages of 26-40 and only 10% were over 40.

When the educational status is analysed, it is understood that 80% of the managers of aquaculture processing plants are undergraduate and 20% are postgraduate graduates. On the other hand, 18% of the employees are primary school graduates, 55% are secondary school graduates, 25% are associate degree + bachelor's degree graduates, and the rate of postgraduate graduates among the employees is only 2%. When the educational status of managers and employees are

evaluated together, it is seen that there is an agglomeration of secondary education among employees and an agglomeration of associate's degree + bachelor's degree among managers.

It is understood that 29% of the employees have been working in the company since the establishment of the company, 51% of them have been working in the sector for 1-5 years, 20% for 6 years and more, 10% of the managers have been working in the sector since the establishment of the company, 70% for 1-5 years, 20% for 6 years and more.

When asked 'Do you have a social media account?', 8% of the employees did not answer this question; 28% of the respondents used only one account, a significant majority (64%) used two or more accounts; 40% of the managers used only one account, while 60% used two or more accounts.

It is stated that 18% of the employees and 30% of the managers have sources of income other than the wages received from the enterprise. In addition, an overwhelming majority of the employees (65%) define themselves as 'low-income'. Only 1% of the respondents used the right not to answer about their economic situation.

When those who use the Internet were asked 'for which purpose they use the Internet the most', 43% of the employees and 60% of the managers stated that they use the Internet to communicate with their friends.

When the managers were asked 'What are your reasons for starting total quality management practices?' (it was stated that they could give more than one answer); it was understood that 90% of the managers aimed to increase product quality, 70% to increase customer satisfaction, 60% to increase the image of the enterprise, 50% to increase employee satisfaction and 20% to open up to foreign markets.

Factor analysis

In estimating the parameters of the model, the method searches for the best fitting values in the data set and realises a new factor formation independent of each other. This method, which is created by utilising correlation and covariance matrices, is defined as factor analysis.

There are certain stages in performing factor analysis and these stages should be carried out by following the scientific order. A high KMO value means that each variable can be perfectly predicted by other variables. As the KMO value approaches one, it can be said that the relationship between the variables is clear and factor analysis will give reliable results. As seen in Table 1, KMO test result is 0.846 and Bartlett's test of sphericity df value ($p < 0.001$). The results of KMO and Bartlett's test show the suitability of factor analysis.

According to the results of the factor analysis, the number of factors was determined by the eigenvalue statistic (Table 2). In the eigenvalue statistic analysis, factors with values greater than one are determined as factors (Kaiser and Rice, 1974)

and factors with values greater than one are accepted as significant factors (Büyükoztürk, 2025). The contribution of each factor to the total variance is an important issue to be evaluated when deciding on the number of factors.

Table 2. Total variance explained by factor analysis

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %
1	10.959	42.151	42.151	4.793	18.433	18.433
2	2.222	8.548	50.699	4.608	17.724	36.157
3	1.540	5.923	56.622	2.569	9.880	46.037
4	1.486	5.715	62.337	2.453	9.434	55.471
5	1.173	4.513	66.850	2.376	9.138	64.609
6	1.007	3.874	70.724	1.590	6.116	70.724
7	0.875	3.364	74.088			
8	0.767	2.949	77.037			
...	...	...	...			
...	...	...	...			

In the factor analysis, the number of factors was examined by using the non-cyclic method and it was determined that a 6-factor structure explaining 70.724% of the total variance was obtained.

As can be seen when the Slope Slope Graph is analyzed, the place where the slope decreases is after the sixth factor (Figure 1).

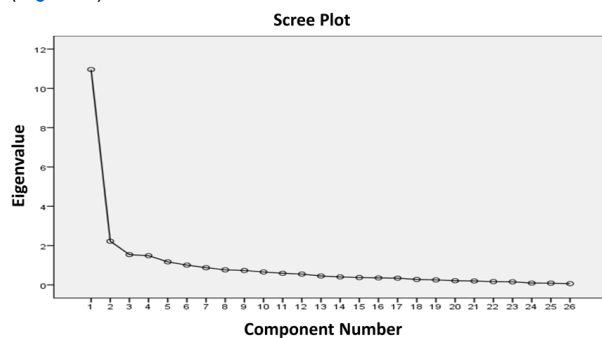


Figure 1. Slope graph

As can be seen from Table 2 and Figure 1, there are 6 (six) factors with eigenvalues greater than one. In both cases, it shows that six factors should be identified in the system.

The first factor explains 18.433% of the total variance with 10.959 eigenvalues. The second factor explains 17.724% of the variance with 2.222 eigenvalues, the third factor explains 9.880% of the total variance with 1.540 eigenvalues. The fourth factor explains 9.434% of the total variance with 1.486 eigenvalues, the fifth factor explains 9.118% of the total variance with 1.173 eigenvalues, and the sixth factor explains 6.116% of the total variance with 1.007 eigenvalues. The six factors explain approximately $\frac{3}{4}$ of the total variance (70.724%).

Since there is no restriction on factor loadings, all factor loadings are included in the matrix. Six factors were formed with the variables. There are 7 (seven) components in the first

factor. The second factor has 6 (six) components, while the third and fourth factors have 4 (four) components, the fifth factor has 3 (three) components and the sixth factor has two components (Table 3).

The first factor includes 7 (seven) variables and accounts for 18.433% of the total variance. When we look at the variables that make up this factor, which can be named as the 'organisational belonging' of the company where the employees work (Table 3); it is seen that the belief that the company means a lot in their own 'life' takes the first place with a factor load value of 0.808. 'I feel that I belong to the company I work for' with a factor loading value of 0.787, "I would be very pleased to spend the rest of my working life in the company" with a factor loading value of 0.777, "I cannot think of leaving the company to which I have given so much of myself", "I think it is like a part of my family", "I would feel guilty if I left the company" with a factor loading value of 0.777, followed by "If I were to leave my job in the company, my life would be turned upside down" with a factor loading value of 0.604.

This factor has a total eigenvalue of 5.083.

The second factor contains 6 (six) variables and accounts for 17.724% of the total variance. In the ranking of the variables in this factor, which we can call the 'duties and responsibilities' of the employees in the company where they work, according to the factor loads, the statement 'I think that the duties and responsibilities of the employees are clearly defined' with a factor load of 0.775 in the first place, the belief that 'measurement and evaluation are made according to performance', 'problem solving training is given to the staff', 'activities related to quality are regularly updated', 'total quality trainings are given to employees' is followed by the statement 'there is no communication problem between employees' with a factor load of 0.647 in the last place of the second factor.

This factor has a total eigenvalue of 4.351.

Table 3. Transformed factor distribution

Variables	Factors					
	1	2	3	4	5	6
19. I believe that the company I work for means a lot in my life.	.808					
21. I feel that I belong to the company I work for.	.787					
22. I would be very happy to spend the rest of my working life in the company.	.777					
23. I can't think of leaving. as I have given so much of myself to the company.	.745					
20. I think that the company I work for is like 'a part of my family'.	.690					
25. I feel guilty if I leave the company.	.672					
24. If I quit my job at the company. my life would be turned upside down.	.604					
1. I think that the duties and responsibilities of employees are clearly defined.		.775				
4. I believe that measurement and evaluation is based on performance.		.772				
2. I believe that problem solving training is given to the personnel in the organisation.		.757				
7. I believe that quality-related activities are regularly updated.		.732				
6. I believe that total quality trainings are given to all employees in the organisation.		.668				
15. I think that there is no communication problem between employees.		.647				
5. I believe that employees are authorised and paid according to their position and			.623			
3. I think that the knowledge. skills and experience of the employees are sufficient.			.593			
14. I think that employees are included in strategic decision-making processes in the			.548			
18. I believe that each employee makes decisions about his/her work on his/her own.			.534			
16. I believe that there are no problems in communication between employees and their				.802		
26. I have job security in the company I work for.				.633		
8. The organisation has a transparent personnel selection and placement policy.				.536		
17. I am convinced that thanks to that self-control. the work is carried out without a hitch.				.525		
9. I believe that internal resources are utilised first in recruitment.					.674	
10. I think that the selection of people to be recruited in the organisation is fair.					.621	
11. I believe that the reward and punishment system is communicated to employees in					.509	
13. I think that employees do not have to take leave while performing their duties.						.858
12. I think that managers delegate authority to their employees when necessary.						.624

The third factor includes 4 (four) variables and accounts for 9.980% of the total variance. In this factor, which can be named as the company's 'wage policy and decision making', the belief that 'employees are authorised and paid according to their performance' ranks first with a factor load of 0.623. In the second place with a factor load of 0.593 is the statement that 'the knowledge, skills and experience of the employees are sufficient', followed by the statement that 'employees are included in the decision-making processes', and in the last place with a factor load of 0.534 is the statement that 'each employee made decisions about his/her work'.

This factor has a total eigenvalue of 2.298.

Fourth Factor; There are 4 (four) variables and it accounts for 9.434% of the total variance. In this factor, which can be named as 'communication with managers' in the company where employees work, the belief that 'employees do not have problems in communicating with managers' takes the first place with a factor load value of 0.802. In the second and third ranks, respectively, 'I have job security in the company I work for', 'there is a personnel selection and placement policy in the organisation', and in the last rank, with a factor load value of 0.525, 'I believe that the work is carried out without interruption thanks to autocontrol in the organisation'.

This factor has a total eigenvalue of 2.496.

Fifth Factor; There are 3 (three) variables in this factor. The fifth factor accounts for 9.138% of the total variance. The first of the variables belonging to the fifth factor, which can be named as 'recruitments' of the company where the employees work, is the idea that 'internal resources are used first in recruitments in the enterprise' with a factor load value of 0.674, followed by the idea that 'fair treatment is used in the selection of people to be recruited in the enterprise'. The last variable belonging to the factor is the belief that 'the reward and punishment system is notified to the employees in writing' with a factor load value of 0.509.

This factor has a total eigenvalue of 1.804.

Sixth Factor; There are only two variables in this factor. The second factor accounts for 6.116% of the total variance. The first variable of the sixth factor, which can be named as 'delegation of authority' of the company where the employees work, expresses the statement that 'employees do not have to get permission from managers while performing their duties' with a factor load value of 0.858 and the idea that 'managers delegate authority to employees when they deem necessary' with a factor load value of 0.624.

This factor has an eigenvalue of 1.482.

The answers given by the managers were quantified with a rating scale and calculations were made on averages. For

this purpose, the Likert-type questions in the questionnaires applied to the managers under five headings and the averages calculated in line with the answers given by the managers to

the sub-items under each heading, those below the threshold value (3.41) were accepted as problematic areas in terms of quality management in aquaculture processing plants.

Table 4. Managers opinions on quality management practices

Category	Managers	$\bar{X}$	St. Error
Education	4. I think that special training is given to the employees working in the Total Quality Department.	4.90	0.32
	5. I believe that quality related activities are regularly reviewed.	4.80	0.33
	6. I know that the principles and rules to be followed by the personnel in the enterprise are notified in writing.	4.50	0.97
Data Analyses	14. I think that hanging the Organisation Chart will contribute to TQM.	4.20	1.23
	3. I believe that the Total Quality Department is independent in our organisation.	4.40	0.70
	8. I think that employees are paid according to their position and performance.	3.70	1.49
	12. I think that the data collected is used to improve quality.	4.80	0.42
Measurement	7. I believe that measurement and evaluation is based on performance.	4.50	0.97
	1. I believe that we have a quality policy in our organisation.	4.00	1.63
Inspection	11. I believe that adequate inspections and controls are applied during production.	4.70	0.48
	10. I think that training programmes are implemented according to the needs of the enterprise.	4.40	0.70
Fee	2. I think that all kinds of financial support is provided for quality management.	4.70	0.48
	9. I believe that the wage is increased according to the responsibility of the employee (*).	2.20	1.39
	13. I believe that analysing the data obtained from production positively affects TQM.	4.45	0.71

The managers stated that in-service training is given in aquaculture processing plants, total quality management organisation table in processing plants contributes to quality management, measurement and evaluations are made according to performance, adequate audits and controls are carried out, analyses of data obtained from production affect total quality management positively and all kinds of financial support is given for quality management as problematic areas with a mean value above the threshold value, and the issue that employees cannot be paid according to their performance is a problematic area with a value of 2.20 below the threshold value of 3.41 (Table 4).

DISCUSSION

Although the jobs in the sector are generally based on physical labour, the fact that middle-aged and older people work in the sector should be considered as a social phenomenon as well as an economic necessity. The fact that middle-aged employees adopt innovations more (Çiçek et al., 1998) should not be overlooked that they can be turned into an advantage in the sector by combining their experience with the experience they have gained in solving the problems they face in the sector together and implementing innovations.

There are two features emphasised by the classical management theories that started with the industrial revolution. The first one is to increase efficiency and productivity in enterprises (organisational structures). The second is the regulation of formal organisation and management activities (Koçel, 2018). Motivating employees to improve product and service quality and creating an organisational culture in which the products and services produced are well marketed (Uzan, 2012) and ensuring maximum customer satisfaction by involving people at all levels in all functions (Sahney et al., 2004). In other words; increasing productivity, accumulating knowledge, learning what works and how to work, having all the

necessary tools to do the job, measuring production and getting information from all departments can be defined as total quality management (Verma, 2014). As can be seen, TQM is expressed as a strategy based on teamwork and employee empowerment rather than a management approach (Kaya and Şahin, 2022).

Sağlam (2017) examined and evaluated the current structural and economic characteristics of aquaculture processing plants, identified their problems, determined their faulty, deficient or defective aspects, if any, and according to the results to be obtained, put forward what needs to be done in order to make these enterprises more efficient, and discussed their structural and economic advantages and disadvantages.

In this part of the research, which aims to evaluate the impact of quality management practices on working life, the findings obtained from the analysis of the data are presented.

Factor analysis is a statistical method that explains the relationships in a data set with fewer factors. Factor analysis, in general, establishes a relationship by presenting a model that links the set of variables that cannot be measured directly to the observation variable (Hair et al., 2009).

Factor analysis has two main purposes.

1. To reduce the number of variables

2. By utilising the variables between the original variables, it is to reveal some structures that are not related to each other but are assumed to be explained by the variables forming the group (Özdamar, 2013).

In factor analysis, total variance above 40% is considered ideal (Scherer et al., 1988). Since the total variance explained as a result of the factor analysis met a significant load, it was decided that the structure obtained was appropriate.

Another alternative method for determining the number of

factors is the slope graph. In the graph, the factor where there is a decline due to acceleration expresses the number of important factors (Thompson, 2004).

By ensuring that all employees are focused on quality management and continuous improvement, organisations can create and sustain cultural values that create long-term success for both customers and the organisation itself. Total quality management's focus on quality helps to identify skill deficiencies in employees, with the necessary education, training or guidance to address these deficiencies. Total quality management is a management philosophy based on the belief that all members of an organisation, from the lowest level employees to the highest level managers, can achieve long-term success by focusing on improving quality and thus satisfying the customer (Alexander, 2024).

The results of the research show that total quality management practices improve organisational performance in aquaculture processing plants. It is similar to the findings of studies examining the effect of total quality management on organisational performance (Kaya and Şahin, 2022).

The exact time when the concept of quality emerged is not known, but it is seen that there have been studies on quality for centuries. In line with the principle of 'reaching the best', human beings' demands for "getting better quality services and products" continue from past to present (Akçay, 2008). Today, the place and importance of quality is increasing day by day. The difference between a business and another business or a product and another product is generally perceived as related to the product or service of the business (Awoku, 2012). Therefore, in order to ensure continuous improvement at every point, it emphasises the quality teams formed in every area of the business and the absolute participation of every employee in this work (Wilkinson, 1998).

Lüleci (2018) stated that it is essential for institutions or organisations to carry out their activities by using all their resources such as information, technology, material, human and financial resources and to satisfy the needs and expectations of both employees and customers, to base business results on excellence and to make positive contributions to society.

As stated by Küçük (2004) for the development and continuity of the effectiveness of the activities applied in the development of TQM processes, researches should be carried out at regular intervals. The results of the study should help scientists to learn more about this subject.

The research results show that total quality management practices improve operational performance in fish processing plants. These findings are similar to those of studies examining the impact of total quality management on organizational performance (Sadıkoğlu and Olcay, 2021; Fidanoğlu and Değirmenci, 2019).

CONCLUSION

In this study, in order to determine the attitudes of

managers and employees towards total quality management practices in aquaculture processing plants, a scale consisting of 26 five-point Likert-type questions for managers and 38 for employees was developed. Factor analysis was applied to the data obtained from the questionnaires applied to the employees, and it was determined that the six-factor structure obtained more meaningfully by reducing the dimension in the analysis of the data constituted 70.724% of the total variance.

The fact that the participants were managers and actual employees in aquaculture processing plants had a strengthening effect on the reliability of the findings.

It is understood that all of the managers (20% postgraduate) and 27% of the employees have higher education. Educated managers and employees are an important facilitator in socio-economic and socio-cultural development as well as following and implementing technological developments. In the research, TQM perception differs according to demographic characteristics, working hours, media usage time and forms, and economic characterisation of themselves. In the development of employees' sense of belonging to the company they work for; beliefs such as using their authority and having equal rights are effective.

Factor analysis applied to the data obtained from the questionnaires applied to the employees reduced the dimension and critical factors such as 'corporate affiliation', 'duties and responsibilities', 'wage policy and decision making', 'communication with managers', 'recruitment', 'delegation of authority' were obtained.

According to the findings obtained from the research; the total quality management component that affects the corporate performance at the highest level is 'corporate belonging', followed by the components of 'sense of duty and responsibility' in the second place and 'delegation of authority' in the last place. In the development of the sense of belonging, the continuity of training activities in the enterprise is a major factor. The findings of this study also show that training has a significant and positive effect on the corporate performance of employees, total quality management implementation and the success of the programme.

By quantifying the answers given by the managers; the managers stated that regular training is given to the employees, organisation charts positively affect TQM, measurement-evaluation is made according to performance, audits and controls are carried out regularly and the implementation of the business auto-control system minimises the problematic areas. In addition, the managers stated that the issue that employees are not paid according to their performance is a problematic area with a value of 2.20, which is below the threshold value of 3.41. On the other hand, it is understood that the employees believe that the wages paid to them are based on their performance. This situation, which seems to be a contradiction, is a case that requires sociological examination in working life.

When the findings are analysed as a whole, it is seen that the managers and employees of the aquaculture processing plants participating in the survey have internalised total quality management. It is possible to benefit from both internal operations of the enterprises and external stakeholders and techniques at the maximum level with the support of the managers. Transferring the knowledge gained by the managers to the employees also contributes to the self-control system. Total quality management practices and the reduction of defective products at the rate of the effectiveness of the auto-control system will contribute to the sustainability of the business as well as profitability.

In a shrinking world, technological developments, insatiable human appetite, and ruthless competition, gaining a place in the environment and maintaining this place is through managing companies with the right strategies. The ability to plan for the future, to turn competition into an advantage and sustainability depend on the belief of succeeding together with all employees.

The research is limited to examining the organisational implementation of total quality management in the sampled processing plants. Considering that this is the first and only empirical study on quality management practices in seafood processing plants, it is thought that this study will provide a basis for further and more comprehensive research.

As in other large and small enterprises, the addressee of aquaculture processing plants and total quality management applications in these plants and all organisations is human. The most important factor in achieving the goals of institutions and

organisations is the human being who should be given the most importance and value.

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All authors contributed to the idea and design of the study. Material preparation and research were carried out by (Şennan Yücel), (Tuçe Altın Yiğit) and (Gülşen Uzun Gören). The writing and editing of the manuscript was done by (Şennan Yücel), (Tuçe Altın Yiğit) and (Gülşen Uzun Gören) and all authors read and approved the manuscript.

CONFLICT OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest or competing interests.

ETHICAL APPROVAL

No specific ethical approval was required for this study.

DECLARATION OF AI USE

We have not used AI-assisted technologies in creating this article.

DATA AVAILABILITY

All data are presented in the article.

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