

RELATIONSHIPS OF SAFETY CLIMATE AND ORGANIZATIONAL  
CITIZENSHIP BEHAVIORS IN AEROSPACE INDUSTRY IN TURKEY

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MAHMURE DİLAYLA KILIÇASLAN

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Approval of the thesis:

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CITIZENSHIP BEHAVIORUS IN AEROSPACE INDUSTRY IN TURKEY**

submitted by **MAHMURE DİLAYLA KILIÇASLAN** in partial fulfillment of the requirements for the degree of **Master of Science in Occupational Health and Safety Department, Middle East Technical University** by,

Prof. Dr. Halil Kalıpçılar  
Dean, Graduate School of **Natural and Applied Sciences**

---

Prof. Dr. Mahmut Parlaktuna  
Head of Department, **Occupational Health and Safety**

---

Prof. Dr. Nuray Demirel  
Supervisor, **Department of Mining Engineering, METU**

---

Dr. Murat Can Ocaktan  
Co-Supervisor, **Occupational Health and Safety, METU**

---

**Examining Committee Members:**

Prof. Dr. Mahmut Parlaktuna  
Department of Petroleum and Natural Gas Engineering, METU

---

Prof. Dr. Nuray Demirel  
Department of Mining Engineering, METU

---

Prof. Dr. Celal Karpuz  
Department of Mining Engineering, METU

---

Prof. Dr. Mustafa Necmi İlhan  
Department of Public Health, Fac. of Medicine, Gazi Uni.

---

Assist. Prof. Dr. Bahar Öz  
Department of Psychology, METU

---

Date: 01.02.2019

**I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.**

Name, Surname: Mahmure Dilayla Kılıçaslan

Signature:

## **ABSTRACT**

### **RELATIONSHIPS OF SAFETY CLIMATE AND ORGANIZATIONAL CITIZENSHIP BEHAVIORS IN AEROSPACE INDUSTRY IN TURKEY**

Kılıçaslan, Mahmure Dilayla  
Master of Science, Occupational Health and Safety  
Supervisor: Prof. Dr. Nuray Demirel  
Co-Supervisor: Dr. Murat Can Ocaktan

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With industrialization the concept of occupational health and safety has gained enormous importance all over the world. Despite legal regulations in the field of occupational health and safety in Turkey, occupational diseases and work accidents continue to increase. One of the main reasons of the increases about occupational diseases and work accidents is the inadequacy of safety climate. The main aim of this research study is to investigate relationships of organizational citizenship behaviors and safety climate in aerospace industry in Turkey. Research methodology followed in this study entails two main stages. In the first stage, comprehensive literature survey was conducted and target workplace was selected. In the second stage, quantitative research was conducted through data gathering, statistical analysis of the data, and interpretation of the obtained results. Number of employees who participated in the survey was determined to be 400 out of 7267 employees in an aerospace company. Stratified sampling method is used to determine the employees. The data are analyzed in IBM SPSS Statistics 22 and IBM SPSS Amos 21 programs. According to the research, it was seen that organizational citizenship behaviors positively affected the safety climate in the researched company which takes part in the aerospace industry.

Although there are many different studies on safety climate and organizational citizenship behavior, comprehensive studies that deal with both concepts as holistic are very few. The main novelty of this thesis study is that it clarifies the relationship between safety climate and organizational citizenship behavior extensively for the first time.

Keywords: Safety Climate, Organizational Citizenship Behavior, Occupational Health and Safety, Aerospace Industry

## ÖZ

### **TÜRKİYE’DE HAVACILIK VE UZAY ENDÜSTRİSİNDE ÖRGÜTSEL VATANDAŞLIK DAVRANIŞLARI VE GÜVENLİK İKLİMİ İLİŞKİSİ**

Kılıçaslan, Mahmure Dilayla  
Yüksek Lisans, İş Sağlığı ve Güvenliği  
Tez Danışmanı: Prof. Dr. Nuray Demirel  
Ortak Tez Danışmanı: Dr. Murat Can Ocaktan

Şubat 2019, 102 sayfa

İş sağlığı ve güvenliği kavramı, özellikle sanayileşme ile birlikte tüm dünyada son derece önem kazanmıştır. Türkiye’de ise iş sağlığı ve güvenliği alanındaki yasal düzenlemelere rağmen, meslek hastalıkları ve iş kazaları artarak devam etmektedir. Meslek hastalıkları ve iş kazalarında yaşanan artışların temel sebeplerinden bir tanesi, güvenlik ikliminin yetersiz olmasıdır. Bu çalışmanın genel amacı, Türkiye’de havacılık ve uzay endüstrisinde, örgütsel vatandaşlık davranışları ve güvenlik iklimi ilişkisini incelemektir. Bu çalışmada takip edilen araştırma metodolojisi iki ana aşamayı içermektedir. İlk aşamada, kapsamlı bir literatür taraması yapılmıştır ve hedef çalışma alanı belirlenmiştir. İkinci aşamada veri toplama, verilerin istatistiksel analizi ve elde edilen sonuçların yorumlanması yoluyla nicel araştırmalar yapılmıştır. Ankete katılan çalışanlar, 7267 çalışanı bulunan bir havacılık ve uzay şirketindeki 400 personel olarak belirlenmiştir. Anketlerin uygulanacağı çalışanlar belirlenirken, tabakalı örnekleme yöntemi kullanılmıştır. Elde edilen veriler IBM SPSS Statistics 22 ve IBM SPSS Amos 21 programlarında analiz edilmiştir. Araştırmaya göre; havacılık ve uzay endüstrisinde yer alan şirkette örgütsel vatandaşlık davranışları ve güvenlik iklimi arasında ilişki olduğu görülmüştür.

Güvenlik iklimi ve örgütsel vatandaşlık davranışı kavramları ile ilgili birçok çalışma olmasına rağmen, iki kavramı da bütüncül olarak ele alan, kapsayıcı çalışmalar oldukça azdır. Bu tez çalışmasının ana yeniliği, güvenlik iklimi ile örgütsel vatandaşlık davranışı arasındaki ilişkiyi ilk defa geniş bir şekilde ele almasıdır.

Anahtar Kelimeler: Güvenlik İklimi, Örgütsel Vatandaşlık Davranışı, İş Sağlığı ve Güvenliği, Havacılık ve Uzay Endüstrisi



to my dear family and lovely husband

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# CHAPTER 1

## INTRODUCTION

### 1.1. Background Information

Occupational Health and Safety (OHS) is a concept that includes two concepts which are occupational safety and occupational health. Occupational safety can be defined as systematic works to protect employees and third parties from the risks that may arise from work, to eliminate situations that can harm health and to provide a better working environment (Gerek, 2000). Occupational health can be expressed as systematic studies aiming to prevent harm from work, to ensure that employees get better healthcare capacity and to ensure harmony between employee and work (Karakulle, 2012). As a result, OHS can be defined as systematic and scientific studies aimed at protecting against risks that may adversely affect the health and safety of employees at work life and outside the workplace due to various causes (Karakulle, 2012). According to International Labor Organization (ILO), occupational health and safety (OHS) is defined as “the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment.” This area is widely distributed to cover a wide range of disciplines, numerous workplaces, and environmental hazards. To organize and apply all building blocks of national OHS systems; a wide variety of structures, knowledge, skills, and analytical capacities are needed. Thus, protection has spread to both environment and workers (ILO, 2008). There are two important concepts that are closely related to work accident and occupational disease. Work accident is defined as “any occurrence taking place at the workplace or due to the performance of work which leads to fatality or physical or mental impairment to the

physical integrity of the victim” and occupational disease is defined as “any illness caused by exposure to occupational risks” in OHS law.

## **1.2. Statement of Research Problem**

Occupational diseases and work accidents are the important problems of work life. Also, the aerospace industry is a sector where catastrophic disasters occur. In order to reduce this problem, it is necessary to understand all dimensions of the reasons firstly. For the study, an aerospace company in Turkey has been selected and one of these dimensions which should be examined is the safety climate of workplace. The level of safety climate perceptions in aerospace industry in Turkey is unknown. Thus, understanding the concept of safety climate in the aerospace industry can help to reduce occupational accidents and occupational diseases. On the other hand, it is known that 88% of accidents are caused by unsafe behaviors. For this reason, it is expected that organizational citizenship behaviors play an important role in the occurrence of work accidents and occupational diseases. Also, the relationship between these two concepts and their interaction points can help to understand work accidents and diseases.

## **1.3. Objectives and Scope of the Study**

The primary objective of this study is to analyze organizational citizenship behaviors and safety climate level by using a survey, to examine their interaction points and to determine what can be done on the basis of safety climate to increase organizational citizenship behaviors.

The scope of this research study is an aerospace company in Turkey and covers the period of January 2018 to January 2019. There are six personal information questions, 20 propositions about organizational citizenship behaviors, and 20 propositions about

safety climate in the survey. This survey is applied to 400 people from 23 different departments in the target company.

The main goal of the current study will be achieved through the following objectives:

- to detect interaction points of organizational citizenship behaviors and safety climate level by using a survey in a selected aerospace company,
- determination of what can be done on the basis of organizational citizenship behaviors to increase the level of safety climate.

#### **1.4. Research Methodology**

The research methodology contains three main phases. These phases listed as:

1. Establishing a mixed survey of 40 propositions,
2. Implementation of the survey to 400 employees,
3. Determination of organizational citizenship behaviors and safety climate level in the company by using IBM SPSS Version 22 and IBM SPSS Amos 21.

#### **1.5. Expected Scientific and Industrial Contributions of the Study**

In this research; it is aimed to contribute to safety climate, organizational citizenship behavior and occupational health and safety (OHS) field. Although numerous works are done on organizational citizenship behavior and safety climate, this research offers the relationship of two concepts together. The study, which considers the two concepts as holistic, is almost negligible. By investigating the results of the study and the survey results, the relationship between occupational health and safety and organizational citizenship behavior in the aerospace industry are elucidated. The information obtained as a result of the comprehensive literature study are put into a conceptual framework and the practical results of the theoretical knowledge are provided by the field research. On the other hand, understanding the safety climate and its components is vitally important to predict the future trend of accidents and occupational diseases.

Thus, work accidents and occupational diseases can be controlled to a certain extent. With the reduction of them, financial and moral gains in industrial scale are provided.

### **1.6. Outline of the Thesis**

This study comprises of five chapters. In first chapter, some background information are given. The research problems, objectives and scope of the study are determined. Research methodology is explained. In addition, expected scientific and industrial contributions of the study are mentioned. In the second chapter, necessary detailed definitions related to the occurrence of work accidents are explained. The effects of organizational citizenship behaviors and safety climate on occupational health and safety are interpreted. In the third chapter, researched company has been studied in detail. The data collected from the field is examined and analyzed. In chapter four, the results are given and in chapter five, the conclusions drawn from the research findings and recommendations for future studies are presented in detail.

## CHAPTER 2

### LITERATURE SURVEY

#### 2.1. Occupational Health and Safety, Occupational Disease and Work Accident

Occupational Health and Safety (OHS) is a concept that includes both occupational safety and occupational health. Occupational health is a multidisciplinary concept and it is aimed at:

- the promotion and protection of the health of employees by controlling and preventing occupational accidents and occupational diseases by eliminating hazardous factors at work life,
- the establishment and development of safe and also healthy work, working environments, and work organizations,
- increasing the physical, psychological, mental, and social welfare of the employees; developing and maintaining working capacities; supporting vocational and social development in the workplace,
- Ensuring employees to live economically and socially productively and contribute positively to sustainable development.

Occupational health is an interdisciplinary, risk-focused activity that takes into account a person's physical, psychological, social and mental well-being, health and personal evolution. It has gradually evolved into a multidisciplinary and comprehensive approach (WHO, 2001).

While occupational health, addressing the rules of healthy work life; occupational safety deals with the technical rules for eliminating the hazards of the employee's body integrity (Demircioğlu and Centel, 2002). Safety can be defined as systematic studies to ensure a better working environment by eliminating the risks that may be caused

by the conduct of the work and by eliminating the risks that may be caused by the conduct of employees (Gerek, 2000). OHS is a multidisciplinary area that always touches on subjects related to economics, technology, law and other fields specific to diversified sectors and different activities as well as scientific fields such as medicine, ergonomics, physics, and chemistry (ILO, 2008).

Occupational health and safety is a comprehensive discipline that contains many areas of expertise. In the broadest sense, it should aim to:

- to keep at the highest level and maintain the physical, mental and social well-being of employees in all professions,
- the prevention of adverse health impacts of workers related with working conditions,
- the protection of workers in their employment against the risks arising from the factors affecting their health adversely,
- the placing and maintaining workers in a work environment adapted to social, psychological, mental and physical needs,
- The adaptation of work to employees.

Thus, the concept of OHS encompasses the mental, physical, and social well-being of the workers.

Occupational diseases and work accidents are one of the most important problems in workplaces. According to the International Labor Organization, much more than 2.3 millions of employees lost their lives every year as a result of work accidents or occupational diseases (ILO, 2017). Financial and moral losses as a result of accidents and diseases are enormous. The economic costs of occupational diseases and work accidents reach 5% of national income worldwide (ILO, 2009). Occupational disease is a kind of disease that happens because of exposure to work-related risk elements. There are many reasons why work-related diseases, factors in the working environment, and other risk factors may cause in the development of such diseases.

## 2.2. Effects of Workplace Accidents and Occupational Diseases on Work Life

Two of negative outputs of working life are work accident and occupational disease which are also accepted as an indicators in terms of OHS. These indicators reflect the general situation of occupational health and safety conditions in the country as well as the health status of the working population. Work accidents and diseases are global problems. These accidents cause psychological, physiological, and economical damages for employers, governments, and workers. More than 3.2 million people lose their lives each year around the world because of work-related accidents and diseases. In addition, every year 160 million new occupational diseases and 300 million non-fatal work accidents occur (The Ministry of Labor and Social Security, 2018)

Male workers are 94% more prone to work accidents than women workers according to the statistics of Social Security Institution (SGK). 1,700 employees lost their lives because of work accidents in 2011 which ranks at top followed by 1,626 and 1,444 in 2014 and 2010, respectively.

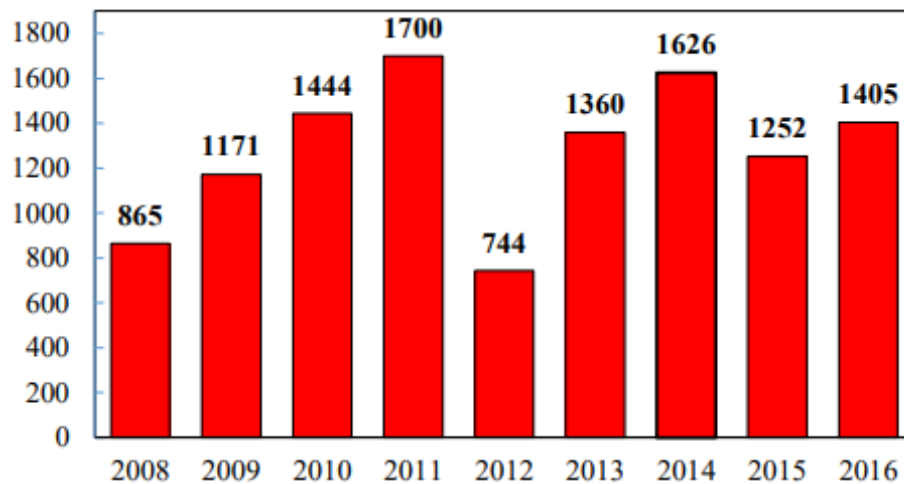


Figure 2.1. Number of fatal accidents in Turkey between 2008 and 2016 (SGK, 2017)

## **2.3. Safety Climate**

### **2.3.1. Concept of Safety Climate**

Zohar defines the term, safety climate as follows: “*understandings of personnel that are in common on the subject of the related significance of safety management in their professional attitude.*” (Zohar, 1980). The description that was set forth by Zohar describes the safety climate in a way that it is unified or commonly experienced social understanding concerning the related significance or the preference of safety against work rate in the establishment. Those socially common understanding educate the personnel of administration obligation for safety and well-being of theirs, regulating suitable duty attitudes in the process of the labor which has potential risks that are physical. Understandings of safety climate occur through using individual experiences which instruct the personnel related to the matter in common, for which the administration provide for their safety, which results in the development of harmonious attitude-consequence assumptions and behave in an appropriate way. That is to say, safety climate instructs the personnel on the subject of the first concern of safety in the process of production which poses physical and well-being risks, which leads to role attitude that is appreciatively adapted. A safety climate that is beneficial boots the safety attitude repetitiveness in the group of personnel who work in a dangerous setting and with the order reversed. The description above supports the visionary foundation of administrative climate study by which climate understandings mention the significance that the personnel links with the protocols, processes, and methods in which they participate and the attitudes that are anticipated and honored (Reichers and Schneider, 1990; Weick, 1995). Climate understandings are different from the alternative administrative atmospheres in the way of methods for more excellent adjustment or adaptation to that atmosphere. Since procedures, processes, and methods establish construction materials of the administrative atmosphere, climate understandings like plan-pursuing atmosphere understandings mention the essence of connections between or the related first preferences among the aforementioned essential features instead of referring to the analysis of particular



features in seclusion. Hence, safety climate has a connection with the understandings that became common through sharing concerning the first preference of safety protocols, processes, and methods and the matter in which safety obedient or improving attitude is approved and honored in the place of work (Zohar, 2000). As the safety protocols are conveyed and applied more consistently and more inclusively in the whole process of production, the administration obligation to personnel care gets better, establishing the center significance of safety climate.

### **2.3.2. Antecedents of Safety Climate**

Climate understandings occur from interpretation methods where the personnel test and describe the significance or the rationale of the activity that is fundamental for the network of established procedures, unofficial routines, and role anticipations that define the personnel's workplace (Weick, 2005). Evaluation of the individual significance of safety procedures and routines is managed with regards to anticipated first preferences of safeguard against outcome objectives, addressing the circumstances which instruct the personnel of deviation between safety support and execution. Safety climate understandings instruct the personnel on the subject of the possibility that safety attitude will be honored and appreciated under different types of work circumstances where monetary contributions in personnel safety keep up with those that are connected with production and gain.

### **2.3.3. Lack of Safety Climate**

The safety climate is considered as sub-dimension of organizational climate, which focuses on safety issues in the organization. The safety climate concept was first included in "The Summary of Report on the Post-Accident Review Meeting on the Chernobyl" by the International Atomic Energy Agency (IAEA). According to this report, organizational errors and the violation of workers have impact in the disaster

that occurred (Yule, 2003). Cox and Flin (1998) indicated that the immaturity of the safety climate was one of the main reason in the Piper Alpha catastrophe. Although the importance of this concept is understood, no detailed description and research about its measurability has been carried out.

According to Westrum and Adamski (1999), information flow is one of the most important feature of organizational climate. Five stages are defined which explain the stages of safety climate of an organization by Hudson (2001). These stages are entitled as pathological, reactive, calculative, proactive, and generative. In pathological level, safety for the organization is less important than not being caught. In reactive level, the organization tries to solve the accidents and incidents after occurrence. In calculative level, the organization has systems to manage hazards. However, the system is not implemented properly. Staff and also management follow the procedures of the organization, but there is no belief that these procedures are critical for work or operations. In proactive level, the organization has available systems to manage hazards. Management and staff have begun to gain belief that safety is really valuable. In generative level, safety behaviors are totally integrated into everything the organization does. The concept of safety and safe working associated with the value system of organization are internalized entirely as belief. The model which is formed by five stages, provide measuring the maturity level of an organization from pathological stage to generative stage. It is seen that the maturity level of the safety climate of the organization directly affects employee behaviors. Also, it is wise to expect more occupational accidents and occupational diseases in the pathological level workplace more than the generative level workplace.

## **2.4. Safety Culture**

### **2.4.1. Concept of Safety Culture**

Culture is a fundamental term which is difficult to describe but easy to say. For a very long time, the concept of culture is one of the hardest and examined subjects.

Nevertheless, there are many different definitions about it. According to Awadh and Saad (2013), culture is the combination of beliefs, communication and values which guides humans. One of the subtype of culture is considered as organizational culture. Organizational culture is a concept that includes beliefs, values, behavior sets and influences the behavior of each member of the organization (Armstrong, 1990).

Safety culture concept is considered as the sub-dimension of organizational culture which focuses on safety concept in an organization. When the literature is examined, it is seen that there is no consensus about the definition of safety culture. According to Cox and Cox (1991), the safety culture is defined as the reflection of beliefs, attitudes, values and perceptions related with safety which commonly shared by workers. Also, safety culture is explained by Lee (1996) as below:

*“The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, and organization’s health and safety management.”*

Guldenmund (2000) accepts the definition of Lee's safety culture as the clearest definition. As it can be understood from the definition, safety culture is a concept with behavioral, situational, and psychological aspects.

The safety culture concept is an important approach used in reducing accidents due to its multidimensional and changeable character. The strength of the approach stems from its diversity within each of organization. Even though the basic dimensions of the safety culture have been described, it is possible to change among the institutions and organizations. The influence of culture within an organization is defined by Westrum (2004) and it is likened the culture in an organization as a seater of a person. Therefore, the responses differ in each organization. Another property of this concept is that the culture is multidimensional. It comprises different concepts like reward and punishment or commitment of management. Also, it contains many concepts within a single tool. Thus, the whole picture can be drawn in terms of safety in organizations

by oneself. One of the most important features is that it is open to change (Parker *et al.*, 2006).

#### **2.4.2. Difference of Safety Climate and Safety Culture**

In the literature, organizational climate and culture are often used interchangeably. In addition; organizational culture is a concept in organizational level whereas the organizational climate is generally related to the motivation of individual (Dursun, 2012). The organizational culture contains organizational attitudes, beliefs, and values which are common for members of organization but the organizational climate is concerned with behaviors and attitudes of individuals. As well as climate changes, it is understood that cultural changes are necessary for behavioral changes. Lee (1996) suggest that the safety culture is more proper term because it is independent from individuals if compares with the safety climate. Notions, dimesions, definitions, and measurement methods related to the safety culture and safety environment continue to change in different studies. Although these two concepts have very close meanings to each other, they are considered to be different (Guldenmund, 2000). According to the general acceptance, culture has more stable, holistic, multidimensional, learned, shared, transferred, and functional structure. The reflection of cultural assumptions are considered as climate. For this reason, culture is like a core structure whereas the climate is a layer of that core. While simpler applications for the climate seem to be appropriate, more descriptive and deeper practices are required for culture. According to Reiman and Oedewald (2002), good safety culture criteria obtained from studies in the literature, defined as established safety policies, management competence, democratic practices, clear identification of competencies, obligations and responsibilities, safety priority processes, actual regulations and rules, relationship between justice and trust in all levels of the organization, regular tool and equipment maintenance, effective reporting and interpretation of even minor accidents are described as healthy information flow, appropriate design, adequate resource and continuous improvement from different institutional levels and workers. According to

Reiman and Oedewald (2002), good safety culture criteria defines as democratic practices, safety priority approach, established safety policies, competence of management, regular information flow from different institutional levels and employees, clear disclosure of obligations and responsibilities, safety priority processes, regular equipment controls, employee competence, trainings, high motivation, mutual trust between all employees, sense of justice, job satisfaction, employee competence, compliance with legal requirements, effective reporting and interpretation of all accidents, adequate design, adequate resource, and continuous improvement.

## **2.5. Organizational Citizenship Behavior**

Organizational citizenship behaviors (OCB), as the term, became a concept for the first time by Bateman and Organ (1983) with the concept of Barnard's willingness to cooperate (Barnard, 1968). Barnard (1968) criticized the classical theory of management for being far from the concept of cooperation and emphasized the importance of cooperation for organizations. Katz (1964) recognized that cooperation is essential for the more efficient and effective implementation of organizations, and otherwise they would be a fragile social system. Katz and Kahn (1966), defined three main areas of behavior for organizations. Firstly, the organization should attract employees to the system and keep them in the system. Secondly, the organization should ensure that employees take on more than minimum requirements. Thirdly, employees should exhibit innovative and spontaneous behavioral performance above the requirements. The third area of behavior of Katz and Kahn (1966) is not written. It is neither stated in contracts nor is it an officially expected task from the employees. OCBs have been described by Bateman and Organ (1983) as being useful for the organization. However, these behaviors are neither prescribed nor mandatory. These behaviors are optional and employees are not concerned about sanctions (Kwantes, 2003). In addition, OCBs are implemented by the organization without any formal incentives (Schnake, 1991). For this reason, OCBs include useful behaviors such as

assistance to colleagues, punctuality beyond what is expected, voluntary participation in tasks, active cooperation in practice (Farh *et al.*, 1990). Later times, organizational citizenship behavior is defined by Organ (1988) as below:

*“Individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system and that in the aggregate promotes the effective functioning of the organization. By discretionary, we mean that the behavior is not an enforceable requirement of the role or the job description, that is, the clearly specifiable terms of the person’s employment contract with the organization; the behavior is rather a matter of personal choice, such that its omission is not generally understood as punishable.”*

Organizational citizenship behaviors are neither a formal role obligation nor behavior to be guaranteed by contracts. Rather, OCBs are a group of behaviors and attitudes that are useful for the organization (Organ, 1990). This definition has three important components. First of all, work-related requirements of workers do not include organizational citizenship behavior. Secondly, there are no promised awards for organizational citizenship behavior. Thirdly, in general terms, organizational citizenship behaviors contribute to organizational effectiveness as time and labor. OCBs are role-surplus behaviors that take the principle of showing sensitivity to the organization or helping other colleagues (Finkelstein and Penner, 2004). Employees cannot be imposed or encouraged to exhibit OCB by managers and employers (Organ *et al.*, 2006). Some reasons are shown for how organizational citizenship behaviors increased organizational effectiveness by Podsakoff *et al.* (2000). Firstly; OCBs can increase productivity of employers. Secondly; OCBs may also increase administrative effectiveness. Because it allows managers to spend their time efficiently instead of wasting time with crisis management. Additionally; OCBs allow to be used of time for more productive purposes in the organization. Because less time is required for tasks such as training new workers. With the employees, who fulfill the courtesy dimensions of the OCB, the organization can be more productive. Because this can

help prevent courtesy conflicts between colleagues. OCBs may make an organization more appealing for potential workers.

## **2.6. Antecedents of Organizational Citizenship Behaviors**

Researchers assume that organizational citizenship behaviors increase organizational efficiency and research is focused on causes of citizenship behaviors. Empirical researches has focused on four main precursor categories: individual characteristics (Bateman and Organ, 1983; Smith *et al.*, 1983; Organ, 1988; Organ, 1994; Alotaibi, 2001; Parnell and Crandall, 2003), task characteristics (Podsakoff *et al.*, 1993; Podsakoff and MacKenzie, 1995; Podsakoff *et al.*, 1996a; Podsakoff *et al.*, 1996b), organizational characteristics (Podsakoff *et al.*, 1993; Podsakoff and MacKenzie, 1995; Podsakoff *et al.*, 1996a; Podsakoff *et al.*, 1996b; Kidwell *et al.*, 1997; Lambert, 2000), and leadership behaviors (Podsakoff *et al.*, 1990; Podsakoff *et al.*, 1996b; Kent and Chelladurai, 2001; MacKenzie *et al.*, 2001).

### **2.6.1. Individual Characteristics**

According to researches, role perceptions and employee attitudes are two basic reasons of organizational citizenship behaviors and emphasized by employee characteristics (Bateman and Organ, 1983; O'Reilly and Chatman, 1986; Smith *et al.*, 1983).

Employee attitude, is a moral concept which includes perceptions of fairness, organizational commitment, perceptions of leader supportiveness and worker satisfaction (Organ and Ryan, 1995). Perception of fairness is a concept that emerges with fair distribution of resources in the workplace, fair treatment of employees and compliance with relevant procedures (Moorman *et al.*, 1993). According to Organ and Konovsky (1989), workers are more likely to realize non-rewarded citizenship behaviors when trust the company to treat them fairly (Organ and Konovsky, 1989).

As a result; it causes employees to work to perform beneficial actions for the organization.

Leader supportiveness and fairness perceptions concepts have a strong relationship with each other because leader behaviors reflect an aspect of fairness perceptions (Namm, 2003). There are two explanations about the relationship between leader supportiveness and organizational citizenship behavior (Organ *et al.*, 1983). First, leader supportiveness may provide an exchange relationship about organizational citizenship behavior between leader and employees. Organ (1988) defended that when leaders treat workers more fairly, employees exhibit more organizational citizenship behaviors. Second, supportive leader behaviors contains organizational citizenship behaviors which aimed at helping another worker. The leader, may effect other employees to perform this type of helping behavior by acting as a role model. The concept of organizational commitment as defined by Reichers (1985), has a strong relationship with OCB (Organ and Ryan, 1995). Mowday *et al.*, (1982) defend that an employee who works above or beyond the job description requirements has an organizational commitment and this situation coincides with the concept of OCB. When workers are identified with an organization and internalize the values of the organization, exhibiting organizational citizenship behaviors should increase independently of penalties and sanctions. Organizational citizenship behaviors mirror the sacrifices made for the sake of organization and so are assumed to be carried out by workers who are psychologically connected to an organization (Schappe, 1988). Satisfaction is another significant concept for organizational citizenship behavior (Williams and Anderson, 1991). Perception of factors such as work, promotion, salary, managers and colleagues by employees, determine the level of employee satisfaction in the organization. Workers who are pleased with their jobs are more prone to behave in discretion than those who do not utility from the organization (Spector, 1997). Employee role perceptions and tendencies are also associated with some of the dimensions of OCB (Podsakoff *et al.*, 2000). Role conflict and role ambiguity are pretty much negatively connected to courtesy, sportsmanship and altruism however



not to civil virtue and conscientiousness. In addition, both role ambiguity and role conflict are related to worker satisfaction and satisfaction is associated with OCB; at least some of the relationship between ambiguity, conflict, and OCB is likely to be intervened by satisfaction.

### **2.6.2. Task Characteristics**

Podsakoff *et al.* (1993), Podsakoff and MacKenzie (1995), Podsakoff *et al.* (1996a), Podsakoff *et al.* (1996b) defend in their studies that task characteristics and citizenship behaviors have strong relationships. Three dimensions of task characteristics have a strong relationship with courtesy, civil virtue, sportsmanship, altruism, conscientiousness (Podsakoff *et al.*, 2000). These are task feedback, task routinization and intrinsically satisfying tasks. Task feedback refers to knowledge of workers about well performance in their duties (Podsakoff *et al.*, 1993). In addition, task routinization is the perceptions of employees about the repetitive nature of the work. Task feedback and intrinsically satisfying tasks are positively related to citizenship behavior, while task routinization are negatively related to OCBs. Thus, although not emphasized in the existing OCB literature, it appears that task characteristics are important determinants of citizenship behavior and deserve more attention in future research.

### **2.6.3. Organizational Characteristics**

The major components of the concept of organizational characteristics are organizational inflexibility, perceived organizational support, organizational formalization, and group cohesiveness (Organ *et al.*, 2006). Among all these components, group cohesiveness are evaluated and seen that positively and importantly related to conscientiousness, sportsmanship, courtesy, altruism, and civil virtue whereas perceived organizational support are evaluated and seen that importantly related to altruism (Podsakoff *et al.*, 2000). In addition to this, there is no

strong relationship between organizational formalization, organizational inflexibility and OCBs.

#### **2.6.4. Leadership Behaviors**

Leadership behaviors is the last component of the antecedents of the OCBs. According to Podsakoff *et al.* (2000), the leadership behaviors are divided by three categories as transactional leadership behaviors, transformational leadership behavior and behaviors identified with either the Path-Goal theory of leadership or the Leader-Member Exchange (LMX) theory of leadership. All these three groups of leadership are connected to organizational citizenship behaviors. The leaders from the first category, show fairness or unfairness of reward (MacKenzie *et al.*, 2001) whereas the leaders from the second category, inspire subordinates about performing above requirements in the organization (Podsakoff *et al.*, 1990). The last category leaders treat fairly to their subordinates who are expected to reciprocate exhibiting OCBs (Settoon *et al.*, 1996). Generally speaking, the transformational leadership behaviors have significant and consistent positive relationships with altruism, courtesy, conscientiousness, sportsmanship, and civil virtue. Two forms of transactional leader behavior are significantly related to altruism, courtesy, conscientiousness, sportsmanship, and civil virtue; one positively and the other negatively. Of the Path-Goal leadership dimensions, supportive leader behavior are found to be positively related to every form of OCB, and leader role clarification are positively related to altruism, courtesy, conscientiousness, and sportsmanship. Finally, leader-member exchange are positively related to altruism and overall citizenship behaviors. According to Randel (2002), there is also a relationship between group gender composition and work group conflict. In addition to this, a study is conducted about the effect of age and race dissimilarities on dimensions of organizational citizenship behaviors by Chattopadhyay (1999) and seen that race and age dissimilarities have strong influence on altruism. According to the researches, it is revealed that gender dissimilarities negatively affects males in female dominant groups in terms of altruism

and does not affect females in male dominated groups. Therefore, it can be stated that gender is prominent in women-weighted groups for men, but it is not evident in the groups where gender is dominated by men. According to Kanter (1977), the gender may be important when there are less women compared to men in an organization group which is opposed to findings of Chattopadhyay (1999). Based on all these studies, it is seen that the concept of identity salience should be investigated just like identity as a predictor of OCBs.

## **2.7. Dimensions of Organizational Citizenship Behavior**

After the emergence of the concept of organizational citizenship behavior, a large number of organizational citizenship behaviors have been proposed (Becker and Vance, 1993). Podsakoff *et al.* (2000), stated that almost thirty different forms of organizational citizenship behavior are defined as a result of literature reviews. However, there are conceptual confusions between these definitions. First, Smith *et al.* (1983), discussed two kinds of citizenship behavior. These are general compliance and altruism. According to Smith *et al.* (1983), altruism; refers to behaviors that aim to help directly and deliberately to a certain people in face to face conditions. Generalized compliance, refers to a type of non-personal conscientiousness. It does not provide immediate assistance to a single person in the organization, but indirectly helps other people. Williams and Anderson (1991) proposed two broad categories in this field. One of these is OCBO (OCB-organizational), which is an organization benefit and the other is OCBI (OCB-individual), which indirectly benefits individuals. In addition, Williams and Anderson (1991) signified in the previous studies that the OCBI dimension has marked by altruism and the OCBO dimension as general compliance. Lepine *et al.* (2002), stated that courtesy might be evaluated as citizenship behavior-individual; sportsmanship and civil virtue might be considered as organizational citizenship behaviors.

According to Organ (1989); organizational citizenship behaviors have five sub-dimensions. These are courtesy, civil virtue, altruism, conscientiousness and sportsmanship. Altruism refers to behaviors that involve the effect of helping a specific people for an organizationally appropriate problem or task. To teach a new worker how to use a machine is an example. Courtesy describes proactive actions that are precision to the perspectives of other incumbent officials before acting. Some examples about courtesy, refer to those who are proactive in responding to the rights and claims of others for shared resources. Sportsmanship is to keep the positive attitude of the employee when things go wrong, not to negatively affect the motivation of their superiors and other employees, and to effect the process of reaching an effective solution instead of complaining. Rather than complaining about problems that occur in the workplace, exhibiting an understanding attitude is a function of this dimension. Conscientiousness is the voluntary behavior of the employee by doing more than the task which is responsibility. It is the dimension of behaviors such as eliminating or minimizing the hazard and making extra effort in the case of hazard or in potentially hazardous conditions. Civil virtue is a concept that considers the workplace as a family, feeling the individual responsibility in every event that concerns the organization and exhibiting a voluntary, active participation in the meetings and discussions aimed at solving the problem. Civil virtue indicates the highest degree of interest and commitment to the entire organization (Podsakoff *et al.*, 2000). Civil virtue dimension has been entitled as civil virtue by Organ (1988, 1990), organizational participation by Graham (1991), and protecting the organization by George and Brief (1992). Coleman and Borman (2000) also defined three dimensions of organizational citizenship behaviors. These are interpersonal citizenship performance dimension, organizational citizenship performance dimension and job-task citizenship performance dimension.

Among all dimensions of organizational citizenship behavior studied and proposed, the five-dimension model of Organ (1988) is the most mentioned and accepted one (Podsakoff *et al.* 1990; MacKenzie *et al.*, 1991; Moorman, 1991; Moorman *et al.*,

1993; Niehof and Moorman, 1993; Tansky, 1993; Podsakoff and MacKenzie, 1994; Podsakoff *et al.*, 1996a; Podsakoff *et al.*, 1996b). This five-dimensional model presents a scientific way of classifying a variety of citizenship behaviors (Schnake and Dumler, 2003; Organ *et al.*, 2006).

## **2.8. Relationship Between Safety Climate and Organizational Citizenship Behavior**

Human being, which is the main element of the OHS system, is also the main subject of OCB. Organizational citizenship behavior is an important factor in preventing and reducing work accidents. There is a direct relationship between OCB and safety climate (Neal *et al.*, 2000). In a workplace, where desired behaviors of the employees is increasing, safety climate show the following results (Cooper, 2001):

- increase in occupational health and safety performance level,
- significant decrease in work accident rates and costs,
- development of cooperation, communication, and participation between employees and management,
- development of existing OHS management system,
- ownership of OHS by employees,
- to accept responsibility for all employees on occupational health and safety,
- understanding that there is a relationship between behaviors and accidents

Factors affecting employee behavior can be listed as values, beliefs, and standards (Daniellou *et al.*, 2011). It is stated that the formation of a safety climate in a work environment is related to the following behaviors as well as organizational citizenship behaviors (Demirbilek, 2005):

- to give feedback immediately after the behavior,

- find methods for identified unsafe behavior,
- create an objective and open language or communication channel,
- to keep the messages simple and to reach the target,
- to provide feedback in the current situation rather than to plan for the future,
- feedback according to situations, conditions, and characteristics of individuals

Avey *et al.* (2008), stated that characteristic properties such as optimism, efficacy, hope, and flexibility in work, interact strongly with organizational citizenship behaviors. In a workplace where organizational citizenship behaviors are exhibited, employees' involvement in decision-making mechanisms and positive occupational safety climate are higher. Especially in a working environment where the employees voluntarily participate in meetings related to OHS and inform relevant persons without neglecting a hazard or risk, the safety climate of the workplace develops even more.

## **2.9. A Review on Aerospace Industry**

The term aerospace is created by the combination of two different terms which are spaceflight and aeronautics. Aerospace industry is defined as all production processes dealing with vehicle flights inside and outside the world atmosphere. The aerospace industry deals with the exploration and production processes of all flight vehicles, fixed-wing and rotary-wing aircrafts, military aircrafts, missiles, space-launchers, and manned or unmanned space crafts.

According to Niosi and Zhegu (2010), one of the biggest superior technology employers in developed countries are in aerospace industry. There are 1,220,000 aerospace workers in countries such as 49% in the USA, 7.5% in Canada, 2.7% in Japan, and 5.7% in the rest of the world. In aerospace sector, the civil aviation manufacturing sub-sector has the largest share. In the year 2000, 66% of European aviation manufacturers were in the civilian sector and 33% were in the military

industry. In the USA, the figures were 59% and 41%, respectively (Niosi and Zhegu, 2010).

There are some obvious features in the aerospace industry. The tasks related to the aerospace industry such as development, production, assembly, integration, and testing are being carried out intensively. There are only a few global competitors for each sub-sector and the competition among the major players is very powerful. In addition, patents are less significant in the aerospace sector compared to other superior technology sectors. Because it is preferable to protect the innovations with privacy. Aerospace industry has conditions and human capital commitments for the design and use of aerospace products. Barriers to entry into the sector are very high. Newcomers face a tough and perpendicular learning curve. The aerospace industry necessitates excellent technological capabilities even at the very first phases of the emergence of the sector. Manufacturers need to comply with high international and technological standards as well as safety requirements from the first phases.

Work diversity is high in the aerospace industry. Also, there are various types of risks in this sector. For example, the most important risks faced by the employees working in the flight lines are considered as environmental risks. In addition to this, there are also risks arising from excessive workload, insomnia, fatigue, monotony, stress, and uncertainties. It is considered that the most important risk of the aerospace sector, especially the aircraft maintenance personnel, is occupational accidents or occupational diseases encountered due to the nature of the work (Kanbur *et al.*, 2015). One of the most important hazards encountered in the aerospace industry are chemical hazards. During the maintenance, painting, washing and cleaning phases, a lot of chemicals are used such as aviation fuels, hydraulic fluids, oils, cleaning solvents and paints (Nazlıoğlu, 2014). In addition, falling and slipping are the most common risks. Especially the falling risk is one of the most common hazard with 26.1%. Almost every one third of accidents occurring during maintenance activities are accidents that occur as a result of falling (Şimşek, 2014). The frequency of the falling risk and the level of hazard depend on the working area, equipment which are used, working hours,

fatigue, over work load and the safety precautions which are taken (Neitzel *et al.*, 2008). One of the other important hazards in aerospace industry is noise and it can be defined as unwanted and disturbing sound with an arbitrary structure. Flight lines are seen as working sites where noise problems are experienced (Erat, 2014). Another hazard is non-ergonomic working areas. In works which are done on the aircraft, the narrow working areas constitute an uncomfortable working areas. In workplaces with poor ergonomic structure, occupational musculoskeletal disorders are common health problems. Musculoskeletal system disorders are the main reasons for the decrease of work efficiency, loss of working days, fatigue, and injuries (Ayanoglu, 2008).

The sub-sector of the civil aviation industry has the largest share in the global aviation industry in terms of number of workers and financial figures. Turkey, has become one of the main countries in aerospace industry day by day. Turkish airlines have the capacity to compete with other countries in terms of capacity. One of the main players in civil aviation sector of Turkey are airline companies with airport and terminal operators, aircraft repair, and maintenance services. Also, ground handling companies, catering companies and air traffic control tools are complementary actors of the civil aviation industry. In Turkey, the number of workers is more than 150,000 and income in this sector is over 15 billion USD (TOBB, 2012). However, when compared to factors such as, knowledge generation and pursuing new technology, civil aviation is one of the leading sub-sectors of the aviation industry in Turkey. Sub-sectors other than civil aviation in Turkey interested in researching, developing and producing military aircraft, rocket and missile systems and space crafts. Also, in 2013, the satellite launch vehicles have started to support the sustainability of satellite programs and to gain satellite launch capability in order to reach the location independently (SSM, 2018).

As mentioned above, the aerospace industry is characterized by some important features, such as inadequate competition, non-homogeneous products, and economic issues. Therefore, to cope with low investment in new technology, manufacturers need state support. One of the major players in the public sector of Turkey are;



- Undersecretariat for Defense Industries (Savunma Sanayi Müsteşarlığı referred to as “SSM” in Turkish)
- Ministry of Transport, Maritime Affairs and Communication

For many years, Turkey has separated budget with the biggest portion to the defense sector. It is aimed to take place in the top 10 countries in the defense industry and to produce all land vehicles, sea vehicles, and unmanned aerial vehicles. Therefore, Turkey has changed its procurement policy for military needs and has focused on domestic production policy in recent years. In Figure 2.5, distribution of the model of SSM procurement is shown:

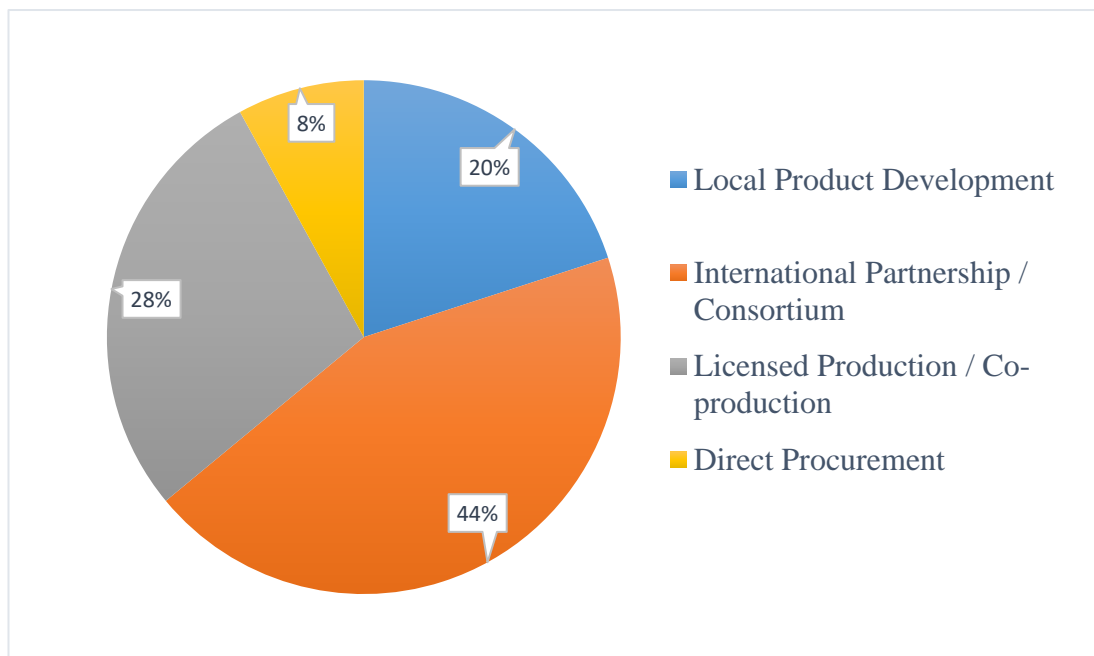


Figure 2.2. SSM Procurement Models Distribution (SSM, 2014)

## 2.10. Sampling Selection and Calculation in Survey Company

Sample selection in the researched company is another important point in the study. There are issues to consider while choosing the sample size and also participants.

Sample is a small clump selected from a specific universe according to certain rules and accepted to represent the universe which is chosen. Research is mostly done on sample sets and results obtained are generalized to relevant universes (Karasar, 2005). The sample is a part of the universe and is of great importance for both research and statistics. The most important feature of the sample is that it must be neutral and representative (Kaptan, 1983). The information obtained from the selected sample is used to reach the correct information about the universe. Sampling is intertwined with daily life of people. Most of the time people make decisions by taking advantage of sampling (Arıkan, 2004).

It is essential to have the right information and make right decision in scientific research. Therefore, there is a need to reach the right information and generalize it (Arıkan, 1994). The more generalized the results of a research, the better the value increases. Since science is a generalized information, it is important to try to obtain information that is generalizable in a wide range of research (Karasar, 2005). In some cases, the entire research universe can be reached. A selected research technique can be applied to all units in an orphanage for orphaned children or employees who work in a factory. These are small-scale universes whose numbers are limited. Generally the universe of the subjects to be examined is large. However, analyzing all the elements in the universe in detail is not possible in terms of both time and material conditions. In other words, analyzing the heaps of information that will be obtained as a result of examining all the details leads to a loss of time and labor. It is meaningless to deal with mass of information when a limited number of information is sufficient (Gökçe, 1988). The best research is the research which brings the most information by spending a certain time, labor and money. Excessive information collection leads to economic waste as well as under-collection of information leads to a risk of inaccessibility (Özçelik, 1981).

There may be various classifications of sampling types. It can be said that the classification is used in two ways as probabilistic and non-probabilistic. Probabilistic sampling is the type of sampling where the chances of selection of the units are equal.

The sampling of the units chosen by the researcher by initiative is non-probabilistic sampling (Yazıcıođlu and Erdoğan, 2004). Types of probabilistic sampling; simple random sampling, systematic sampling, stratified sampling and cluster sampling. Non-probabilistic sampling types are random sampling, quota sampling, purposive sampling and snowball sampling. Stratified sampling is used when there are sub-layers or sub-unit groups in a bounded universe. The important thing is to work on the universe based on the existence of sub-layers (Yıldırım and Şimşek, 2005).



## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1. Descriptive Analysis on Survey Company

The survey company was established on 28 June 1973 under the auspices of the Ministry of Industry and Technology in order to increase the independence in the defense sector. It is located in Ankara on a 4 million m<sup>2</sup> area with a state-of-the-art industrial facility of over 296,000 m<sup>2</sup> under roof. Today, the company operates in the fields of design, integration, modernization, production, and development of integrated aerospace systems from fixed and rotary wing air platforms to unmanned air vehicles and satellites. The investigated company which locates in top hundred global companies in defense and aerospace sector based its business on five strategic pillars as: aero structures group, airplane group, helicopter group, unmanned air vehicles group, and space systems group.

As mentioned before, aerospace industry is a sector where all the work is carried out meticulously with high level of education and qualified personnel. The same sensitivity is maintained in issues related to occupational health and safety. Among 7,267 employees, 1,268 of them are female and 5,999 of them are male in the target company. 157 work accidents occurred in 2017, while 121 work accidents occurred in 2018. According to this; it can be said that work accidents tend to decrease. Hand and finger injuries related to work accidents take first place with 48.76%. Eye and head injuries are also the most common conditions. Also, 9.09% of work accidents result in pain, 8.26% result in irritation and 5.79% result in fracture. On the other hand, there are no employees in the company who have experienced occupational diseases. Health checks are done in every three years for all employees to prevent occupational

diseases. Besides, occupational health and safety trainings are done periodically for all workers to increase awareness level.

### **3.2. Formation of Safety Climate and Organizational Citizenship Behavior Survey**

The scales are measurement tools that determine the rules to be followed, for sorting or quantifying the properties. The scales facilitate the measurement process and determine the quality of the results obtained. Scientific development is based on measurement. Measurements made with sensitive measurement tools increase this development (Tavşancıl, 2002). In order to validity and reliability of the scale, there are many criteria in development and use stages. Working in accordance with the standards and comments are required. Otherwise, the validity and reliability of the scale decreased, a number of errors and bias occur.

The first thing to be completed prior to the scale development is to investigate the available scales related to the subject to examine the sensitivities of these scales and to evaluate the necessity of creating a new scale (Deniz, 2007). There are some advantages of choosing to adapt a scale instead of developing a new scale. The most important of these is that it requires less time and cost. A further advantage arises in cases where the expertise knowledge is insufficient to scale in a different culture. In such inability, adapting a new scale is a more sensible option than developing a new scale. There are also some problems to make adaptation of a scale. The most important of them is to find an expert who knows both languages. Another problem is lack of psychometric properties of the scale after adaptation. Therefore, it is important to make the adaptation within a certain plan and system and to take into account the possible situations (Deniz, 2007).

If a new scale study is to be developed, the first step is to make a literature review. At this stage, attention should be paid to which questions and issues should be evaluated. The format for the measurement type should be determined and a pool of questions

should be established accordingly (DeVellis, 2003). In design phases, the substances should be simple, understandable and does not have more than one judgment and thought expression (Ekici, 2012). The next step is to refer to expert interpretation for the pool of substances created. Experts assess the necessity, clarity and specificity of the questions. Thus, they may suggest the removal or modification of some statements (DeVellis, 2003). Scope and appearance validity are evaluated with expert interpretation (Taşkın, 2010).

In this study, the scale formed according to the expert opinion is applied to the draft sample group. Trial application is important for the performance of the scale. The sample should represent the target audience. After the implementation of the draft, the scale is evaluated with validity and reliability analyzes and finalized (DeVellis, 2003). The process of formation of the safety climate survey consists of three main parts: (i) to create a pool of questions with a comprehensive literature review; (ii) to get expert comments, and (iii) to make an application by making a draft application to finalize.

As mentioned earlier, a comprehensive literature review was conducted before the survey was finalized. The thesis studies on organizational citizenship behaviors and safety climate were examined. Research thesis were used especially for the safety climate scale (Güven, 2014). Although there are many definitions and classifications related to organizational citizenship behavior in the literature research, it has benefited from the work of the Organ (1988), which has been used as a basis for many other studies. According to the Organ, organizational citizenship behaviors have five sub-dimensions (Organ, 1988). In addition, the five dimensions of the Organ (1988) measure the organizational citizenship behavior successfully (Güven, 2014). Therefore, it has been used in the scale of organizational citizenship behavior.

As a result of all these studies, a question pool has been created. In this question pool, there are 10 personal questions, 30 safety climate questions, and 30 organizational citizenship questions. Expert opinions were asked. In these interviews, some questions were removed and some questions were simplified. Employee opinions were also

asked. As a result, 6 personal questions, 20 safety climate questions and 20 organizational citizenship questions were identified. For ease of implementation, the questionnaire was transformed into one piece. The first 20 questions measure the safety climate while the second 20 questions measure the organizational citizenship behavior. The questions were scored with Likert type. An aerospace company has been selected for the implementation of the survey. Then, the target audience was determined from workers of the company. After the draft implementation, the validity and reliability of the scale was evaluated and the scale has reached its final state.

### 3.3. Statistical Analysis of Survey in Target Company

The number of required participants was determined before starting the survey. According to Yazıcıoğlu and Erdoğan (2004), 370 employees were required to conduct a survey with  $\pm 0.05$  sampling error. Thus, 400 surveys were conducted in the survey company for this study.

Table 3.1. *Required Sample Sizes for Different Sampling Errors*

Size of Universe	$\pm 0.03$ sampling error	$\pm 0.05$ sampling error	$\pm 0.10$ sampling error
<b>100</b>	92	80	49
<b>500</b>	341	217	81
<b>750</b>	441	254	85
<b>1000</b>	516	278	88
<b>2500</b>	748	333	93
<b>5000</b>	880	357	94
<b>10000</b>	964	370	95
<b>25000</b>	1023	378	96
<b>50000</b>	1045	381	96
<b>100000</b>	1056	383	96
<b>1000000</b>	1066	384	96
<b>100 million</b>	1067	384	96



The data of the research was transferred to IBM SPSS Statistics 22 and IBM SPSS Amos 21 programs and the analyses were completed. The frequency distributions for categorical variables are given when evaluating the data. First of all, the construct validity of survey was examined. According to this, an exploratory factor analysis was applied to the scale at first, and the structure of the dimensions formed according to the results of exploratory factor analysis was confirmed by confirmatory factor analysis. Then, Cronbach Alpha internal consistency coefficients were examined in order to determine the reliability of the confirmed measurement tools. The study was started when the scale and sub-dimensions turned out to be reliable. Safety climate scale consists of 16 components and one dimension which name is Factor 1 (F1). Organizational citizenship behavior scale consists of 13 components and 5 sub-dimensions. These; courtesy (3 components), sportsmanship (3 components), conscientiousness (3 components), altruism (2 components) and civil virtue (2 components) are the sub-dimensions which represent with F1, F2, F3, F4 and F5. Scale and sub-dimension scores of the participants were obtained by taking the average of the relevant components. In order to be able to decide the analyses to be applied, the Kolmogorov Smirnov test of normality was applied to the scale and sub-dimension scores. As a result of the test, it was seen that all the scores meet the assumption of normality ( $p>0.05$ ) and therefore, parametric tests were used in their comparison. One way Analysis of Variance (ANOVA) was used to determine whether there were any differences between two or more groups in terms of the average of the score and Tukey Test was used to determine which groups have differences. Pearson Correlation Coefficient was used to determine the degree of non-causal relationships between two numerical variables. In order to determine the effect of organizational citizenship behavior score and sub dimension scores on safety climate, simple linear regression analysis was applied.

Table 3.2. *Distribution of Demographic Features*

<b>Demographic Features</b>	<b>Number of People (n)</b>	<b>Percentage (%)</b>
<b>Age Group</b>		
18-24	49	12.3
25-34	199	49.8
35-44	117	29.3
45-54	32	8.0
55 and older	3	0.8
<b>Educational Status</b>		
	n=399	
High School	181	45.4
Associate Degree	128	32.1
Undergraduate Degree	78	19.5
Graduate Degree	12	3.0
<b>Work Year</b>		
0-5	99	24.8
6-10	100	25.0
11-15	105	26.3
16-20	40	10.0
21 or more	56	14.0
<b>Work Year in Survey Company</b>		
0-5	216	54.0
6-10	121	30.3
11-15	40	10.0
16-20	2	0.5
21 or more	21	5.3
<b>Accidents at Work</b>		
None	300	74.9
1	81	20.3
2	15	3.8
3	2	0.5
4 or more	2	0.5
<b>Field of Working</b>		
Production fields	209	52.3
Quality	37	9.3
Maintenance/ Repair	43	10.8
Logistics	17	4.3
Others	94	23.5
<b>Total</b>	<b>400</b>	<b>100.0</b>

When Table 3.2 is examined, while 12.3% of the participants were in the 18-24 age group, 49.8% were in the 25-34 age group, 29.3% in the 35-44 age group, 8.0% in the

45-54 age group and 0.8% is at the age of 55 and older. While 45.4% of the individuals are high school graduates, 32.1% have associate's degree, and 3.0% have a postgraduate degree. While 24.8% of the individuals has been working for 0-5 years, 25.0% works for 6-10 years, 26.3% works for 11-15 years, 10.0% for 16-20 years and 14.0% has been working for 21 or more years. While 54.0% of the individuals has been working in a company for 0-5 years, 30.3% working for 6-10 years, 100% for 11-15 years, 0.5% for 16-20 years and 5.3% has been working in the company for 21 or more years. While 74.9% of the individuals did not suffer from work accidents, 20.3% had 1 accident, 3.8% had 2, 0.5% had 3 and 0.5% had 4 or more occupational accidents. While 52.3% of the individuals had been working in the production unit, 9.3% work in quality, 10.8% work in maintenance/repair, 4.3% in logistics and 23.5% work in other units.



## CHAPTER 4

### RESULTS

#### **4.1. Construct Validity of Safety Climate and Organizational Citizenship Behavior Scales**

The construct validity is used to determine how well the feature that measurement tool aims to measure can be measured (Çokluk *et al.*, 2014). In order to examine the construct validity of the scale, factor analysis is applied, which helps large numbers of variables to gather under small groups. Factor analysis is a general name used mainly to reduce and summarize data. The general purpose of factor analysis is to summarize the relationship between data in an understandable and interpretable way and regroup the variables. It is used for reducing the variables in form of a small set to save time and to make interpretations easier. There are many mathematical complex numbers and criteria that are used for determining the importance of factors in factor analysis and to make interpretations easier. There are many mathematical complex numbers and criteria that are used for determining the importance of factors in factor analysis. There are two types of rotations which orthogonal and oblique rotation. Oblique rotation includes correlated factors, whereas orthogonal includes non-correlated factors. the interpretation of factor analysis is based on rotated factor loadings and often orthogonal rotation is used.

Exploratory factor analysis is performed to reveal the fundamental structures or dimensions underlying a large number of variables. A variable can be associated with any factor and can be loaded from it, depending on the relationship between the variables. In the exploratory factor analysis, the factor structure of the data is determined on the basis of factor weights, without a specific expectation or trial.

Confirmatory factor analysis is based on testing an expectation that certain variables will take place mainly on predetermined factors based on a theory. For this reason, the variables to be included in the analysis are selected in line with hypotheses and how much the variables are included in the desired factors are examined. While it is unknown how many factors are expected in EFA (exploratory factor analysis), it is tested by specifying the exact number in CFA (confirmatory factor analysis). The most common field of application is to examine and try to verify the factor structure of the scales that are expected to be in predetermined sub-dimensions of specific substances (Eroğlu, 2003).

## **4.2. Exploratory Factor Analysis and Results**

Factor analysis may not be suitable for all data structures. The suitability of the data for factor analysis can be examined by the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test of sphericity. The KMO coefficient provides information about the suitability of the data matrix for factor analysis and the suitability of the data structure for factor extraction. While KMO is expected to be higher than 0.60 for factorability, Bartlett test examines whether there is a relation between the variables on the basis of partial correlations (Büyüköztürk, 2014).

### **4.2.1. Results of Safety Climate Scale in Terms of Exploratory Factor Analysis**

When Table 4.1 is examined, Kaiser Meyer Olkin (KMO) value was found as 0.934. KMO value which is between 0 and 1 is expected to present a more reliable factor structure as it approaches 1 (Özdamar, 2018). While this value is accepted to be greater than 0.50; it can be interpreted that the sample size is normal between 0.50 and 0.70, good between 0.70 and 0.80, very good between 0.80 and 0.90 and perfect if it is greater than 0.90. Thus, it is seen that the results of factor analysis to be applied to the data will be useful and usable. As a result of Bartlett Test of Sphericity, it was found

that there was a significantly higher relation between the variables and that the data were suitable for applying factor analysis ( $p < 0.001$ ).

Table 4.1. *KMO Value of Safety Climate Scales and Bartlett's Test of Sphericity Results*

<b>Kaiser Meyer Olkin (KMO)</b>		0.934
<b>Bartlett Test Of Sphericity</b>	X <sup>2</sup>	5246.721
	df	190
	p; Level of significance	0.001***

\*\*\*:  $p < 0.001$

When Table 4.1 is examined, Kaiser Meyer Olkin (KMO) value was found as 0.934. KMO value which is between 0 and 1 is expected to present a more reliable factor structure as it approaches 1 (Özdamar, 2018). While this value is accepted to be greater than 0.50; it can be interpreted that the sample size is normal between 0.50 and 0.70, good between 0.70 and 0.80, very good between 0.80 and 0.90 and perfect if it is greater than 0.90. Thus, it is seen that the results of factor analysis to be applied to the data will be useful and usable. As a result of Bartlett Test of Sphericity, it was found that there was a significantly higher relation between the variables and that the data were suitable for applying factor analysis ( $p < 0.001$ ).

The principal component method was used for the safety climate scale that is composed of 20 components. As a result of the 20-component scale analysis, it is split into one sub-dimension. The explanation rate, the division of clauses and factor loadings of this single dimension are given in Table 4.2 and Table 4.3.

Table 4.2. *Variance Explanation Table of Safety Climate Scale*

<b>Factor</b>	<b>Initial Eigenvalues</b>		
	<b>Total</b>	<b>Variance Explained %</b>	<b>Cumulative %</b>
<b>F1</b>	10.16	50.81	50.81

When Table 4.2 is examined, it is seen that there is only one factor (F1) that the initial eigenvalue is greater than 1. It is suggested that the eigenvalue can be used to determine the factor structure and it is possible that there may be as much factor structure as the number which the eigenvalue is greater than 1 (Özdamar, 2018). The variance explanation rate of one dimension is 50.81%.

Which substances are included in the single dimension of the safety climate and the factor load of each component is examined in detail in Table 4.3 and it is seen that all factor loadings are above 0.400.

Table 4.3. *Factor Loadings Regarding Components of the Safety Climate Scale*

<b>Questions</b>	<b>F1</b>
<b>14</b>	0.822
<b>13</b>	0.799
<b>4</b>	0.787
<b>20</b>	0.784
<b>10</b>	0.773
<b>12</b>	0.770
<b>9</b>	0.763
<b>8</b>	0.762
<b>1</b>	0.755
<b>7</b>	0.752
<b>18</b>	0.744
<b>15</b>	0.721
<b>3</b>	0.714
<b>2</b>	0.711
<b>11</b>	0.674
<b>19</b>	0.631
<b>17</b>	0.606
<b>5</b>	0.531
<b>16</b>	0.529
<b>6</b>	0.504



#### 4.2.2. Results of Organizational Citizenship Scale in Terms of Exploratory Factor Analysis

When Table 4.4 is examined, Kaiser Meyer Olkin (KMO) value was found to be 0.816. KMO value which can vary from 0 to 1 is stated to present a more reliable factor structure as it approaches 1 (Özdamar, 2017). While this value is accepted to be greater than 0.50; It is interpreted mediocre if it is between 0.50 and 0.70; good between 0.70 and 0.80; very good between 0.80 and 0.90 and perfect if it is greater than 0.90 as a sample size. Thus, it is seen that the results of factor analysis to be applied to the data will be useful and usable. As a result of the Bartlett's Test of Sphericity, it was found that there is a significantly higher relation between the variables and the data is suitable for applying factor analysis ( $p < 0.001$ ).

Table 4.4. *KMO Value of Organizational Citizenship Scale and Bartlett's Test of Sphericity Results*

<b>Kaiser Meyer Olkin (KMO)</b>		0.816
<b>Bartlett Test Of Sphericity</b>	X <sup>2</sup>	1968.801
	df	78
	p; Level of Significance	0.000***

\*\*\*:  $p < 0.001$

For the organizational citizenship behavior scale that is composed of 20 components, varimax rotation and principal component method were used. As a result of factor analysis, the components with a factor loading less than 0.400 and components that are loaded to more than one dimension were extracted from the scale and the component number decreased from 20 to 13. Extracted components are question 25, question 28, question 30, question 31, question 33, question 34 and question 40. As a result of the scale that consists of 13 components is divided into 5 sub-dimensions. Explanation ratios, distribution of components and factor loadings of this 5 sub-dimensions are given in the tables below.

Table 4.5. Variance Explanation Table of Organizational Citizenship Behavior Scale

Factor	Initial Eigenvalue			Total Factor Loadings (Rotated)		
	Total	Variance Explained %	Cumulative %	Total	Variance Explained %	Cumulative %
<b>F1</b>	4.83	37.14	37.14	2.20	16.93	16.93
<b>F2</b>	1.74	13.35	50.49	2.09	16.10	33.03
<b>F3</b>	1.14	8.77	59.25	1.96	15.05	48.08
<b>F4</b>	1.10	7.03	66.29	1.85	13.43	61.51
<b>F5</b>	1.02	6.32	72.60	1.74	11.10	72.60

When Table 4.5 is examined, it is seen that there are 5 factors (F1, F2, F3, F4, F5) with initial eigenvalues greater than 1. It is suggested that the eigenvalue can be used to determine the factor structure and there may be as much factor structure as the number which the eigenvalue is greater than 1 (Özdamar, 2018). The explained variance ratio indicates the strength of the factor structure of the scale. F1 sub-dimension explains 16.93%, F2 sub-dimension explains 16.10%, F3 sub-dimension explains 15.05%, F4 sub-dimension explains 13.43%, F5 sub-dimension explains 11.10% of the total variance. The variance explanation rate of the sub-dimensions is 72.60%. The number which the eigenvalue is greater than 1 (Özdamar, 2018). The variance explanation rate of the sub-dimensions is 72.60%. Which components are included in the 5 sub-dimension of the organizational citizenship scale and the factor loadings of each component is examined in detail in Table 4.6 and all factor loadings are found to be over 0.400.

Table 4.6. *Factor Loading Values Regarding Sub-Dimensional Components of Organizational Citizenship Scale*

Questions	F1	F2	F3	F4	F5
39	0.786				
35	0.659				
32	0.567				
28		0.774			
38		0.616			
37		0.597			
21			0.812		
22			0.803		
23			0.623		
24				0.903	
27				0.891	
26					0.777
29					0.770

F1= Courtesy, F2= Sportsmanship, F3= Conscientiousness,

F4= Altruism, F5= Civil Virtue

### 4.3. Confirmatory Factor Analysis Results

While exploratory factor analysis determines which variable groups are highly correlated with which factor, confirmatory factor analysis is used to determine whether variable groups that contributes to the number of determined factors are sufficiently represented by these factors. Confirmatory factor analysis fulfills the function of examining the validity of the structures determined by exploratory factor analysis or verifying the results of the previously made scale determination with new data structures. CFA functions both to reevaluate evidential results and to control the hypothetical structures identified by EFA (Özdamar, 2018).

#### **4.3.1. Results of Safety Climate Scale in Terms of Confirmatory Factor Analysis**

As a result of the exploratory factor analysis, the measurement model, which was established to verify the structure consisting of 20 components and a single sub-dimension was analyzed by CFA. As a result of the analysis, it was seen that the model was not in decent compliance and therefore model improvement studies were conducted.

First of all, the factor loading values of the components were examined and four components which did not have any contribution to the model were removed from the model. These are question 2, question 5, question 6 and question 12. However, by looking at the modification index table, reduced chi-square values were examined for possible changes in the model.

The model was carried out by linking conceptually appropriate cases which shows the highest modification index (M.I.) values. These are e8, e9; e11, e13 and e13, e14. The fit index values of the model were also examined and it is seen that the measurement model was confirmed. As a result, the verified measurement model is presented in Figure 4.1. When the measurement model in Figure 4.1 is examined, it can be seen that which components the measurement model verified with 16 components and a single sub-dimension consists of, on the other hand, it is also seen that standardized regression coefficients of the paths on single-headed arrows, in other words, factor loadings. Question 1, 3, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, and 18 are in Factor 1.

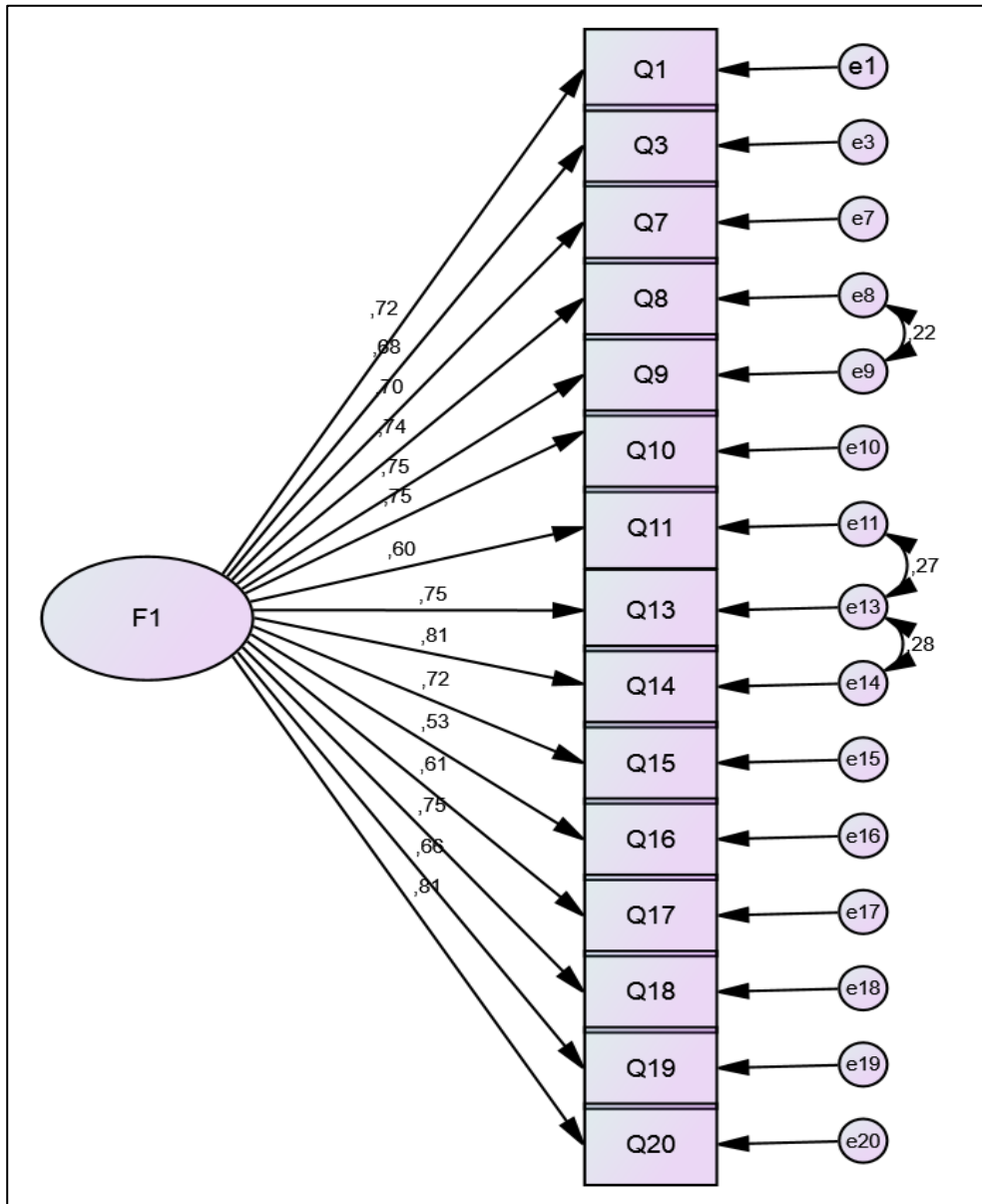


Figure 4.1. Measurement Model of Safety Climate Scale

In Table 4.7, the factor loading of each component was examined in detail and it was found that there was no value below 0.400. According to this, we may say that question 20 component is the strongest indicator of the F1 dimension with a value of 0.81.

Table 4.7 *Factor Loading Values of Safety Climate Components*

<b>Questions</b>	<b>Factor Loading</b>
<b>1</b>	0.716
<b>3</b>	0.679
<b>7</b>	0.700
<b>8</b>	0.744
<b>9</b>	0.754
<b>10</b>	0.754
<b>11</b>	0.597
<b>13</b>	0.753
<b>14</b>	0.805
<b>15</b>	0.717
<b>16</b>	0.526
<b>17</b>	0.610
<b>18</b>	0.749
<b>19</b>	0.657
<b>20</b>	0.810

The goodness of fit values should be examined secondly in the results of confirmatory factor analysis. Most commonly, the chi-square test is used to evaluate the model's fit to data. However, there are reasonable concerns because the chi-square test is sensitive to sample size. As the sample size increases, the chi-square test tends to reject the model and accept it in low sample numbers, too. For this reason, many goodness of fit values has been developed as an alternative to the chi-square.

First of all, the goodness of fit based on goodness of fit index (GFI) should be examined. GFI basically rescales the difference between sample covariances and implied covariances, producing a value of 0 for an incompatible model and a value of 1 for a perfectly matched model. In general, models with GFI values of 0.90 and above can be stated as acceptable compatible models. Although GFI is a measure of goodness of fit reported frequently in studies, it is affected by sample size and especially by the complexity of the model. Adjusted goodness of fit index (AGFI) is the adjusted goodness of fit derived from GFI value. Similarly, models with AGFI values of 0.90 and above are acceptable compatible models.

Secondly, Goodness-of-Fit Values Relying on Baseline Model should be examined. The basic logic of goodness-of-fit values which is examined under this heading is determining how good the model which is produced as a consequence of the theory and with parameter values is, compared with the baseline, in other words, the worst model possible. These are the goodness-of-fit values of incremental fit index (IFI), Tucker-Lewis index (TLI) and comparative fit index (CFI). If the IFI has a value above 0.90 such as the goodness-of-fit values in this group, it is considered as an indicator of sufficient compliance. It is preferred by some researchers more often because it is relatively less sensitive to sample size. TLI or NNFI value non-normed fit index (NNFI), is one of the goodness of fit values, which is least affected by the sample size among the goodness of fit values. Therefore, they are reported very often. Again, having a value above 0.95 indicates a good model fit and having a value above 0.90 indicates an acceptable model fit. Even some resources indicates that the degree of sufficient fit can be reduced to 0.80. The value of CFI is also one of the goodness of fit values which is least affected by sample size. However, it is sensitive to the complexity of the model. Its values can pass over 1 or drop below 0. However, in such cases, the values are fixed to 0 or 1.

Root mean square of error approximation (RMSEA) value is a measure of the discrepancy based on  $F_0$  and can be calculated as  $RMSEA = \sqrt{(F_0/df)}$ . As can be seen from the formula, this discrepancy is actually a mismatch calculated per degree of exemption. The fact that it is one of the goodness of fit criteria which is the least sensitive to sample size, makes this value one of the most frequently reported values. Although there is a risk of it being sensitive to the complexity of the model due to the degree of exemption that is at the denominator while calculating, the fact that the degree of exemption is not exactly a measure of the complexity of the model, takes RMSEA value one step further. The SRMR (Standardized RMR) value refers to the difference between observed and predicted covariances. For RMSEA and SRMR, values less than 0.08 indicates acceptable fit and values below 0.05 indicates good fit.

Table 4.8. *Fit Index Values and Goodness of Fit Values of Measurement Model*

$\chi^2$ :326.555 df:87 p:0.000	Fit Index Values of The Model	Goodness of Fit Values (Acceptable Fit)
$\chi^2/df$	3.754	$\leq 3$ (4-5)
<b>GFI</b>	0.905	$\geq 0.90$ (0.89-0.85)
<b>AGFI</b>	0.869	$\geq 0.90$ (0.89-0.85)
<b>IFI</b>	0.932	$\geq 0.95$ (0.94-0.90)
<b>TLI (NNFI)</b>	0.918	$\geq 0.95$ (0.94-0.90)
<b>CFI</b>	0.932	$\geq 0.95$ (0.94-0.90)
<b>RMSEA</b>	0.080	$\leq 0.05$ (0.06-0.08)
<b>SRMR</b>	0.041	$\leq 0.05$ (0.06-0.08)

Table 4.8 shows the fit index values for the measurement model created with one dimension and 16 components. Firstly, the most commonly used fit index chi-square ( $\chi^2$ ) goodness of fit test and p value were examined and the model was found to be significant. However, since the chi-square value is very sensitive to the sample size, this value alone is not sufficient for evaluating the fit between the model and the data. Therefore, other fit values were also examined. When the fit index values obtained for the measurement model were examined, it can be said that GFI and SRMR values have a good fit while AGFI, IFI, TLI, CFI and RMSEA values have an acceptable fit.

#### **4.3.2. Results of Organizational Citizenship Behavior Scale in Terms of Confirmatory Factor Analysis**

As a result of exploratory factor analysis, the measurement model made for validating the structure consisting of 13 components and 5 sub-dimensions was analyzed by CFA. Sub- dimensions are Factor 1 (F1), Factor 2 (F2), Factor 3 (F3), Factor 4 (F4) and Factor 5 (F5). As a result of the analysis, it was seen that the model showed adequate fit and the validated measurement model was presented below in Figure 4.2:



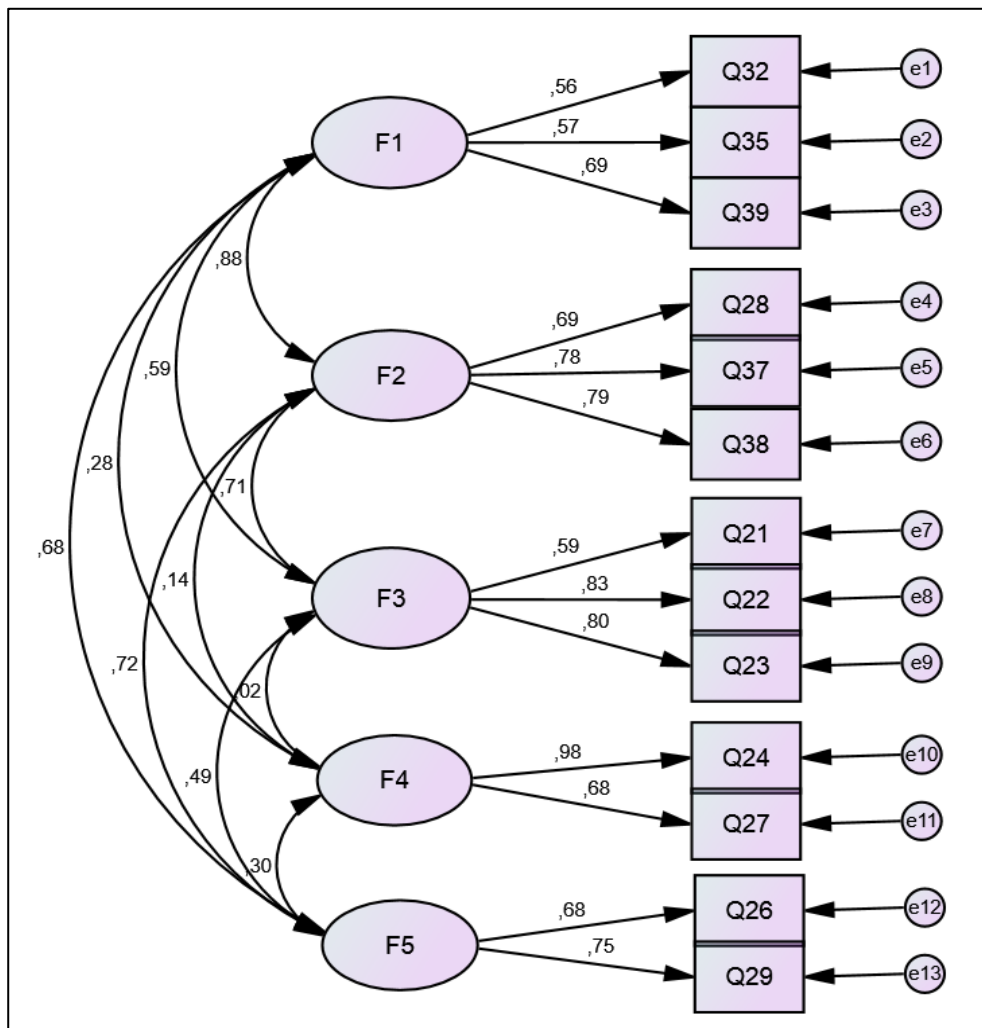


Figure 4.2. Measurement Model of Organizational Citizenship Behavior Scale

When the measurement model in Figure 4.2 is examined, it is seen that which components the measurement model verified with 13 components and 5 sub-dimensions are composed of, on the other hand, it is seen that standardized regression coefficients of the paths on single-headed arrows, in other words, factor loadings. The values on the double-headed arrow indicate the correlation values between the sub-dimensions. In Table 4.9, the factor loading of each component is examined in detail and it was found that there was no value below 0.400.

Table 4.9. *Factor Loading Values of Organizational Citizenship Behavior Components*

<b>Components</b>	<b>Factor Loadings</b>
<b>F1=Courtesy</b>	<b>Values</b>
Question 39	0,786
Question 35	0,659
Question 32	0,567
<b>F2=Sportmanship</b>	<b>Values</b>
Question 28	0,774
Question 38	0,616
Question 37	0,597
<b>F3= Conscientiousness</b>	<b>Values</b>
Question 21	0,812
Question 22	0,803
Question 23	0,623
<b>F4=Altruism</b>	<b>Values</b>
Question 24	0,903
Question 27	0,891
<b>F5=Civil Virtue</b>	<b>Values</b>
Question 26	0,777
Question 29	0,770

According to this, it is seen that the question 39 component is the best indicator of F1 sub-dimension having a value of 0.79, question 28 component is the best indicator of F2 sub-dimension having a value of 0.77, question 21 component is the best indicator of F3 sub-dimension having a value of 0.81, question 24 component is the best indicator of F4 sub-dimension having a value of 0.90, question 26 component is the best indicator of F5 sub-dimension having a value of 0.78.

Table 4.10. *Fit Index Values and Goodness of Fit Values of Measurement Model*

$\chi^2$ :218.026 df:55 p:0.000	Fit Index Values of The Model	Goodness of Fit Values (Acceptable Fit)
$\chi^2/df$	3.964	$\leq 3$ (4-5)
GFI	0.924	$\geq 0.90$ (0.89-0.85)
AGFI	0.874	$\geq 0.90$ (0.89-0.85)
IFI	0.916	$\geq 0.95$ (0.94-0.90)
TLI (NNFI)	0.900	$\geq 0.95$ (0.94-0.90)
CFI	0.915	$\geq 0.95$ (0.94-0.90)
RMSEA	0.080	$\leq 0.05$ (0.06-0.08)
SRMR	0.048	$\leq 0.05$ (0.06-0.08)

Table 4.10 shows the fit index values of the measurement model. Firstly, the most commonly used fit index chi-square ( $\chi^2$ ) goodness of fit test and p value were examined and the model was found to be significant. However, since the chi-square value is very sensitive to the sample size, this value alone is not sufficient for evaluating the fit between the model and the data. Therefore, other fit values were also examined. When the fit index values obtained for the measurement model were examined, it is seen that GFI and SRMR values have a good fit while AGFI, IFI, TLI, CFI and RMSEA values have an acceptable fit.

#### 4.4. Reliability Analysis Results

When Table 4.11 is examined, as a result of the reliability analysis, it is detected that the "Safety Climate" scale consisting of 16 components is highly reliable ( $\alpha=0.941$ ). It is detected that "Organizational Citizenship Behavior" scale consisting of 13 components is highly reliable ( $\alpha=0.826$ ), "Courtesy" sub-dimension consisting of 3 components is relatively reliable ( $\alpha=0.628$ ), "Sportsmanship" sub-dimension consisting of 3 components is relatively reliable ( $\alpha=0.780$ ), "Conscientiousness" sub-dimension consisting of 3 components is relatively reliable ( $\alpha=0.775$ ), "Altruism" sub-dimension consisting of 2 components is relatively reliable ( $\alpha=0.796$ ), "Civil Virtue" sub-dimension consisting of 2 components is relatively reliable ( $\alpha=0.677$ ).

Table 4.11. *Reliability Analysis of Safety Climate, Organizational Citizenship and Sub-Dimensions*

<u>Scales</u>	<b>Number of Components</b>	<b>Cronbach Alfa</b>	<b>Reliability Level</b>
<b>Safety Climate Scale</b>	16	0,941	Highly reliable
<b>Organizational Citizenship Behavior Scale</b>	13	0,826	Highly reliable
<u>Sub-Dimensions</u>	<b>Number of Components</b>	<b>Cronbach Alfa</b>	<b>Reliability Level</b>
<b>Courtesy</b>	3	0,628	Relatively reliable
<b>Sportsmanship</b>	3	0,780	Relatively reliable
<b>Conscientiousness</b>	3	0,775	Relatively reliable
<b>Altruism</b>	2	0,796	Relatively reliable
<b>Civil virtue</b>	2	0,677	Relatively reliable

0.00 <  $\alpha$  < 0.40 Not Reliable

0.40 <  $\alpha$  < 0.60 Low Reliability

0.60 <  $\alpha$  < 0.80 Relatively Reliable

0.80  $\alpha$  < 1.00 Highly Reliable

#### **4.5. Correlation Analysis Results**

When the results of Pearson correlation analysis applied to the scales and their sub-dimensions are examined in Table 4.12, it was seen that there was an average relationship in the positive direction between safety climate and organizational citizenship behavior and sub-dimensions except for the altruism ( $p < 0.001$ ). The correlation coefficients vary from 0.473 to 0.621. It was seen that there was a high

level of significant positive linear relationships between courtesy, sportsmanship, and civil virtue sub-dimensions, and an average level of positive linear relationship between altruism sub-dimensions ( $p < 0.001$ ). Correlation coefficients vary from 0.507 to 0.805. It was seen that there was high and average level of significant positive linear relationship between organizational citizenship sub-dimensions ( $p < 0.01$ ). Also, there was no relation between conscientiousness and altruism. The correlation coefficients vary from 0.215 to 0.620.

Table 4.12. Examination of the Relation between Safety Climate and Organizational Citizenship and Sub-Dimensions

<u>Scales</u>		1	2	3	4	5	6	7
<b>1.Safety Climate</b>	<b>r</b>	1						
	<b>p</b>							
<b>2.Organizational Citizenship Behavior</b>	<b>r</b>	0.621	1					
	<b>p</b>	0.000***						
<u>Sub-Dimensions</u>		1	2	3	4	5	6	7
<b>3.Courtesy</b>	<b>r</b>	0.487	0.771	1				
	<b>p</b>	0.000***	0.000***					
<b>4.Sportsmanship</b>	<b>r</b>	0.600	0.805	0.620	1			
	<b>p</b>	0.000***	0.000***	0.000***				
<b>5.Conscientiousness</b>	<b>r</b>	0.571	0.686	0.429	0.562	1		
	<b>p</b>	0.000***	0.000***	0.000***	0.000***			
<b>6.Altruism</b>	<b>r</b>	0.081	0.507	0.215	0.137	0.042	1	
	<b>p</b>	0.105	0.000***	0.000***	0.006**	0.404		
<b>7.Civil virtue</b>	<b>r</b>	0.473	0.724	0.470	0.545	0.380	0.224	1
	<b>p</b>	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	
<b>r</b>		<b>Level Of Relation</b>			<b>Direction Of Relation</b>			
0,00		No Relation			r= negative relation if it is – r= positive relation if it is +			
0.01 – 0.29		Low						
0.30 – 0.69		Average						
0.70 – 0.99		High						
1.00		Perfect relation						

\*\* :  $p < 0.01$

\*\*\* :  $p < 0.001$

r = Correlation Coefficient

p = Level of Significance

#### 4.6. Regression Analysis Results

When the results of simple linear regression analysis applied to determine the effect of safety climate on the organizational citizenship behavior in Table 4.13 is examined, it is seen that the regression model is statistically significant ( $F=249.998$ ;  $p < 0.001$ ). 38.6% of the change in the organizational citizenship behavior ( $R^2 = 0.386$ ) is explained by the safety climate that is included in the model. According to this; it can be said that the coefficient of safety climate in the model is significant ( $p < 0.001$ ). Organizational citizenship behavior has a positive effect on safety climate. In other words, 1 unit increase in organizational citizenship behavior score resulted in an increase of 0.431 (B) units in the safety climate score.

Table 4.13. *The Effect of Safety Climate on Organizational Citizenship Behavior and its Significance in the Model*

Independent Variable	B	Std. Error	Beta	t	p	95% CI for (B)	
						Bottom	Top
Constant	2,367	0.105		22.470	0.000	2.160	2.575
Safety Climate	0,431	0.027	0.621	15.811	0.000***	0.377	0.484
<b>Model Summary:</b> $R=0,621$ ; $R^2 = 0,386$ ; $Adj. R^2 = 0,384$ ; $F= 249,998$ ; $p=0,000$ ***							

Dependent Variable = Organizational Citizenship Behavior

\*\*\*:  $p < 0.001$

Std. Error= Standard Error,  $Adj. R^2$ =Adjusted  $R^2$

t, F=Test Statistics, p=Level of Significance

B=Unstandardized regression coefficients

Beta=Standardized regression coefficients

CI = Confidence Interval

Table 4.14. *The Effect of Safety Climate on Courtesy Sub-Dimension and the Significance of its Coefficient in the Model*

Independent Variable	B	Std. Error	Beta	t	p	95% CI for (B)	
						Bottom	Top
Constant	2.567	0.141		18.206	0.000	2.289	2.844
Safety Climate	0.406	0.036	0.487	11.128	0.000***	0.334	0.477
<b>Model Summary:</b> R=0.487; R <sup>2</sup> =0.237; Adj. R <sup>2</sup> =0.235; F=123.823; p=0.000***							

Dependent Variable = Courtesy

\*\*\*: p < 0.001

Std. Error= Standard Error, Adj. R<sup>2</sup> =Adjusted R<sup>2</sup>

t, F=Test Statistics, p=Level of Significance

B=Unstandardized regression coefficients

Beta=Standardized regression coefficients

CI = Confidence Interval

When the results of simple linear regression analysis applied to determine the effect of safety climate on courtesy sub-dimension in Table 4.14 is examined, it is seen that the regression model is statistically significant (F=123.823; p<0.001). 23.7% of the change in courtesy (R<sup>2</sup>=0.237) is explained by the safety climate that is included in the model. According to this; it is seen that the coefficient in the model of safety climate dimension is significant (p<0.001). Safety climate dimension has a positive

effect on courtesy sub-dimension. In other words, a 1-unit increase in safety climate dimension score resulted in an increase of 0.406 (B) units in courtesy score.

Table 4.15. *The Effect of Safety Climate on Sportsmanship Sub-Dimension and the Significance of its Coefficient in the Model*

Independent Variable	B	Std. Error	Beta	t	p	95% CI for (B)	
						Bottom	Top
<b>Constant</b>	0.798	0.203		3.934	0.000	0.399	1.196
<b>Safety Climate</b>	0.707	0.047	0.600	14.952	0.000***	0.614	0.800
<b>Model Summary:</b> R=0.600; R <sup>2</sup> = 0.360; Adj. R <sup>2</sup> = 0.358; F= 223.566; p=0.000***							

Dependent Variable = Sportsmanship

\*\*\*:  $p < 0.001$

Std. Error = Standard Error, Adj. R<sup>2</sup> = Adjusted R<sup>2</sup>

t, F=Test Statistics, p = Level of Significance

B = Unstandardized regression coefficients

Beta = Standardized regression coefficients

CI = Confidence Interval

When the results of simple linear regression analysis applied to determine the effect of safety climate dimension on sportsmanship sub-dimension in Table 4.15 is



examined, the regression model was found to be statistically significant ( $F=223.566$ ;  $p<0.001$ ). 36.0% of the change in sportsmanship sub-dimension ( $R^2=0.360$ ) is explained by the safety climate sub-dimension that is included in the model. According to this; it can be said that the coefficient in the model of safety climate dimension is significant ( $p<0.001$ ). Safety climate has a positive effect on sportsmanship sub-dimension. In other words, a 1-unit increase in safety climate score resulted in an increase of 0.509 (B) units in the sportsmanship sub-dimension score.

Table 4.16 *The Effect of Safety Climate on Conscientiousness Sub-Dimension and the Significance of its Coefficient in the Model*

Independent Variable	B	Std. Error	Beta	t	p	95% CI for (B)	
						Bottom	Top
Constant	2.290	0.143		15.993	0.000	2.008	2.571
Safety Climate	0.514	0.037	0.571	13.890	0.000***	0.441	0.587
<b>Model Summary:</b> $R=0.571$ ; $R^2=0.326$ ; $\text{Adj. } R^2=0.325$ ; $F=192.939$ ; $p=0.000$ ***							

Dependent Variable = Conscientiousness

\*\*\*:  $p<0.001$

Std. Error = Standard Error,  $\text{Adj. } R^2 = \text{Adjusted } R^2$

t, F = Test Statistics, p = Level of Significance

B = Unstandardized regression coefficients

Beta = Standardized regression coefficients

CI = Confidence Interval

When the results of simple linear regression analysis applied to determine the effect of safety climate on conscientiousness sub-dimension in Table 4.16 is examined, the

regression model was found to be statistically significant ( $F=192.939$ ;  $p<0.001$ ). 32.6% of the change in conscientiousness sub-dimension ( $R^2=0.326$ ) is explained by safety climate that is included in the model. According to this; it can be said that the coefficient in the model of safety climate is significant ( $p <0.001$ ). Safety climate has a positive effect on conscientiousness sub-dimension. In other words, a 1-unit increase in safety climate score resulted in an increase of 0.514(B) units in the conscientiousness sub-dimension score.

Table 4.17. *The Effect of Safety Climate on Altruism Sub-Dimension and the Significance of its Coefficient in the Model*

Independent Variable	B	Std. Error	Beta	t	p	95% CI for (B)	
						Bottom	Top
Constant	2.767	0.296		9.336	0.000	2.185	3.350
Safety Climate	0.125	0.077	0.081	1.625	0.105	-0.026	0.275
<b>Model Summary:</b> R=0.081; $R^2=0.007$ ; Adj. $R^2=0.004$ ; $F=2.641$ ; $p=0.105$							

Dependent Variable = Altruism

Std. Error = Standard Error, Adj.  $R^2$ = Adjusted  $R^2$

t, F =Test Statistics, p = Level of Significance

B = Unstandardized regression coefficients

Beta = Standardized regression coefficients

CI = Confidence Interval

When the results of simple linear regression analysis applied to determine the effect of safety climate on altruism sub-dimension in Table 4.17 is examined, it is seen that the regression model is not statistically significant ( $F=2.641$ ;  $p>0.05$ ).

Table 4.18. *The Effect of Safety Climate on Civil Virtue Sub-Dimension and the Significance of its Coefficient in the Model*

Independent Variable	B	Std. Error	Beta	t	p	95% CI for (B)	
						Bottom	Top
Constant	1.872	0.192		9.372	0.000	1.494	2.250
Safety Climate	0.532	0.050	0.473	10.698	0.000***	0.434	0.630
<b>Model Summary:</b>							
R=0,473; R <sup>2</sup> =0,223; Adj. R <sup>2</sup> = 0,221; F= 114,457; p=0,000***							

Dependent Variable = Civil Virtue

\*\*\*:  $p<0.001$

Std. Error = Standard Error, Adj. R<sup>2</sup> = Adjusted R<sup>2</sup>

t, F = Test Statistics, p = Level of Significance

B = Unstandardized regression coefficients

Beta = Standardized regression coefficients

CI = Confidence Interval

When the results of simple linear regression analysis applied to determine the effect of safety climate on civil virtue sub-dimension in Table 4.18 is examined, the regression model was found to be statistically significant ( $F=114.457$ ;  $p<0.001$ ). 22.3% of the change in civil virtue sub-dimension ( $R^2=0.223$ ) is explained by the civil virtue sub-dimension that is included in the model. According to this; it can be said that the coefficient in the model of safety climate is significant ( $p<0.001$ ). Safety climate has a positive effect on civil virtue sub-dimension. In other words, a 1-unit

increase in safety climate score resulted in an increase of 0.532 (B) units in the civil virtue sub-dimension safety climate score.

#### 4.7. Comparison Results of Demographic Characteristics

According to Table 4.19 differences between age groups are given.

Table 4.19. Examination of the Differences Between Age Groups in terms of Safety Climate, Organizational Citizenship Behavior and Sub-Dimension Average of Score

<b>Scales</b>	<b>Age Group</b>	<b>N</b>	<b>Avg.</b>	<b>Std. Deviation</b>	<b>F</b>	<b>p</b>	<b>Difference</b>
<b>Safety Climate</b>	18-24	49	3.89	0.765	3.788	0.011*	2-4
	25-34	199	3.71	0.788			
	35-44	117	3.80	0.661			
	45 and older	35	4.14	0.665			
<b>Organizational Citizenship Behavior</b>	18-24	49	4.00	0.544	1.301	0.274	-
	25-34	199	3.99	0.558			
	35-44	117	3.97	0.469			
	45 and older	35	4.16	0.376			
<b>Sub-Dimension</b>							
<b>Courtesy</b>	18-24	49	4.00	0.684	2.457	0.063	-
	25-34	199	4.13	0.646			
	35-44	117	4.05	0.599			
	45 and older	35	4.33	0.379			
<b>Sportsmanship</b>	18-24	49	4.20	0.627	2.380	0.069	-
	25-34	199	4.19	0.705			
	35-44	117	4.26	0.536			
	45 and older	35	4.50	0.453			
<b>Conscientiousness</b>	18-24	49	4.23	0.674	2.582	0.053	-
	25-34	199	4.18	0.735			
	35-44	117	4.27	0.601			
	45 and older	35	4.51	0.430			
<b>Altruism</b>	18-24	49	3.43	1.208	1.947	0.121	-
	25-34	199	3.30	1.101			
	35-44	117	3.18	1.119			
	45 and older	35	2.87	1.347			
<b>Civil Virtue</b>	18-24	49	3.90	0.913	2.059	0.105	-
	25-34	199	3.90	0.835			
	35-44	117	3.79	0.829			
	45 and older	35	4.19	0.777			

\*:  $p < 0.05$

Avg. = Average Std. Deviation = Standard Deviation

F = One-way Analysis of Variance (ANOVA) Difference = Tukey Test

p = Level of Significance

When Table 4.19 is examined, as a result of one-way analysis of variance (ANOVA), no statistically significant difference was found between age groups according to the average of score of organizational citizenship behaviors and its sub-dimensions ( $p < 0.05$ ). There was a statistically significant difference between the age groups according to the average of safety climate score ( $p < 0.05$ ). According to this, it is seen that the average of safety climate score (3.71) of the individuals between the ages of 25-34 is significantly lower than the average of the score (4.14) of individuals at the age of 45 or older.

When Table 4.20 is examined, as a result of one-way analysis of variance (ANOVA), no statistically significant difference was found between educational status according to the average score of safety climate, organizational citizenship behavior, and courtesy, conscientiousness, altruism and civil virtue sub-dimensions ( $p < 0.05$ ). There was a statistically significant difference between the educational status according to average of sportsmanship sub-dimension score ( $p < 0.05$ ). According to this, it can be said that the sub-dimension score average of individuals that are graduated from high school (3.71) is significantly lower than the average of the score (4.14) of individuals that have a undergraduate (4.36) and graduate degree (4.36).

Table 4.20. Examination of the Differences between Educational Status in Terms of Safety Climate, Organizational Citizenship Behavior and Sub-Dimension Average of Score

<b>Scales</b>	<b>Educational Status</b>	<b>N</b>	<b>Avg.</b>	<b>Std. Deviation</b>	<b>F</b>	<b>P</b>	<b>Difference</b>
<b>Safety Climate</b>	High School Degree	181	3.82	0.737	1.773	0.152	-
	Associate's Degree	128	3.85	0.768			
	Under Graduate Degree	78	3.73	0.740			
	Graduate Degree	12	3.37	0.685			
<b>Organizational Citizenship Behavior</b>	High School Degree	181	3.97	0.561	1.134	0.335	-
	Associate's Degree	128	4.07	0.440			
	Under Graduate Degree	78	3.97	0.555			
	Graduate Degree	12	4.08	0.330			
<b>Sub-Dimensions</b>							
<b>Courtesy</b>	High School Degree	181	4.11	0.638	0.869	0.457	-
	Associate's Degree	128	4.15	0.629			
	Under Graduate Degree	78	4.01	0.602			
	Graduate Degree	12	4.17	0.438			
<b>Sportsmanship</b>	High School Degree	181	4.16	0.662	2.725	0.044*	1-2.4
	Associate's Degree	128	4.36	0.587			
	Under Graduate Degree	78	4.21	0.649			
	Graduate Degree	12	4.36	0.437			
<b>Conscientiousness</b>	High School Degree	181	4.21	0.663	0.703	0.551	-
	Associate's Degree	128	4.27	0.737			
	Under Graduate Degree	78	4.22	0.616			
	Graduate Degree	12	4.47	0.437			
<b>Altruism</b>	High School Degree	181	3.19	1.202	1.000	0.393	-
	Associate's Degree	128	3.27	1.180			
	Under Graduate Degree	78	3.38	0.968			
	Graduate Degree	12	2.83	0.985			
<b>Civil Virtue</b>	High School Degree	181	3.88	0.804	1.926	0.125	-
	Associate's Degree	128	3.98	0.842			
	Under Graduate Degree	78	3.73	0.949			
	Graduate Degree	12	4.17	0.492			

\*:p<0,05

Avg.= Average Std. Deviation = Standard Deviation

F = One-way Analysis of Variance(ANOVA), Difference = Tukey Test

p = Level of Significance

In Table 4.21 differences between work years in terms of safety climate, organizational citizenship behavior and sub-dimension average of score are given.

Table 4.21. Examination of the Differences between Work Years in terms of Safety Climate, Organizational Citizenship Behavior and Sub-Dimension Average of Score

<b>Scales</b>	<b>Work Year</b>	<b>N</b>	<b>Avg.</b>	<b>Std. Deviation</b>	<b>F</b>	<b>P</b>	<b>Difference</b>
<b>Safety Climate</b>	0-5	99	3.84	0.784	0.672	0.611	-
	6-10	100	3.75	0.745			
	11-15	105	3.74	0.717			
	16-20	40	3.81	0.932			
	21 and more	56	3.91	0.586			
<b>Organizational Citizenship Behavior</b>	0-5	99	3.99	0.623	1.403	0.232	-
	6-10	100	3.98	0.462			
	11-15	105	3.98	0.529			
	16-20	40	4.18	0.462			
	21 and more	56	3.96	0.407			
<b>Sub Dimensions</b>	<b>Work Year</b>	<b>N</b>	<b>Avg.</b>	<b>Std. Deviation</b>	<b>F</b>	<b>P</b>	<b>Difference</b>
<b>Courtesy</b>	0-5	99	4.06	0.694	1.842	0.120	-
	6-10	100	4.09	0.598			
	11-15	105	4.06	0.676			
	16-20	40	4.35	0.477			
	21 and more	56	4.12	0.482			
<b>Sportsmanship</b>	0-5	99	4.15	0.758	1.193	0.313	-
	6-10	100	4.22	0.590			
	11-15	105	4.30	0.630			
	16-20	40	4.37	0.527			
	21 and more	56	4.24	0.535			
<b>Conscientiousness</b>	0-5	99	4.13	0.750	1.250	0.289	-
	6-10	100	4.24	0.688			
	11-15	105	4.26	0.644			
	16-20	40	4.26	0.677			
	21 and more	56	4.38	0.526			
<b>Altruism</b>	0-5	99	3.46	1.166	5.965	0.000***	4-2,3,5
	6-10	100	3.19	1.063			
	11-15	105	3.10	1.164			
	16-20	40	3.79	0.869			
	21 and more	56	2.80	1.201			
<b>Civil Virtue</b>	0-5	99	3.97	0.857	0.442	0.778	-
	6-10	100	3.88	0.811			
	11-15	105	3.86	0.887			
	16-20	40	3.94	0.690			
	21 and more	56	3.80	0.893			

\*\*\*: p <0.001

Avg. = Average Std. Deviation = Standard Deviation F = One-way Analysis of Variance (ANOVA) Difference = Tukey Test

p = Level of Significance

When Table 4.21 is examined, as a result of one-way analysis of variance (ANOVA), no statistically significant difference was found between working year according to the average score of safety climate, organizational citizenship behavior and courtesy, sportsmanship, conscientiousness and civil virtue sub-dimensions ( $p < 0.05$ ). There was a statistically significant difference between the working year according to average of altruism sub-dimension score ( $p < 0.05$ ). According to this, it can be said that the altruism sub-dimension score average (3.79) of individuals that are working for 16-20 years is significantly higher than the average of the score of individuals that are working for 6-10, 11-15, 21 years and more.

When Table 4.22 is examined, as a result of one-way analysis of variance (ANOVA), no statistically significant difference was found between working year in survey company according to the average score of safety climate, organizational citizenship behavior and sportsmanship, conscientiousness, and civil virtue sub-dimensions ( $p < 0.05$ ). There was a statistically significant difference between the working year in survey company according to average of courtesy and altruism sub-dimension score ( $p < 0.05$ ). According to this, it can be said that the courtesy sub-dimension score average of individuals working in survey company for 11-15 years is significantly lower than the average of the score of individuals that are working in survey company for 6-10 and 16 and more years; altruism sub-dimension score average of individuals working in survey company for 16 and more years is significantly lower than the average score of individuals working between other year ranges.



Table 4.22. Examination of the Differences between Work Years in Survey Company in terms of Safety Climate, Organizational Citizenship Behavior and Sub-Dimension Average of Score

<b>Scales</b>	<b>Work Year in Survey Company</b>	<b>N</b>	<b>Avg.</b>	<b>Std. Deviation</b>	<b>F</b>	<b>P</b>	<b>Difference</b>
<b>Safety Climate</b>	0-5	216	3.84	0.762	1.984	0.116	-
	6-10	121	3.70	0.706			
	11-15	40	3.72	0.741			
	16 and more	23	4.06	0.786			
<b>Organizational Citizenship Behavior</b>	0-5	216	4.01	0.540	0.838	0.474	-
	6-10	121	4.00	0.466			
	11-15	40	3.89	0.593			
	16 and more	23	4.08	0.425			
<b>Sub- Dimensions</b>	<b>Work Year in Survey Company</b>	<b>N</b>	<b>Avg.</b>	<b>Std. Deviation</b>	<b>F</b>	<b>P</b>	<b>Difference</b>
<b>Courtesy</b>	0-5	216	4.10	0.638	3.803	0.010*	3-2,4
	6-10	121	4.15	0.566			
	11-15	40	3.85	0.720			
	16 and more	23	4.36	0.425			
<b>Sportsmanship</b>	0-5	216	4.20	0.666	1.903	0.128	-
	6-10	121	4.29	0.587			
	11-15	40	4.18	0.654			
	16 and more	23	4.49	0.470			
<b>Conscientiousness</b>	0-5	216	4.22	0.670	2.089	0.101	-
	6-10	121	4.22	0.666			
	11-15	40	4.21	0.772			
	16 and more	23	4,58	0.463			
<b>Altruism</b>	0-5	216	3.37	1.166	5.626	0.001**	4-1,2,3
	6-10	121	3.18	1.024			
	11-15	40	3.24	1.050			
	16 and more	23	2.37	1.375			
	0-5	216	3.94	0.830	1.192	0.313	-
	6-10	121	3.87	0.803			
	11-15	40	3.68	0.844			
	16 and more	23	3.98	1.102			

\*:  $p < 0.05$  \*\*:  $p < 0.01$

Avg. = Average Std. Deviation = Standard Deviation F = One-way Analysis of Variance (ANOVA) Difference = Tukey Test

p = Level of Significance

When Table 4.23 is examined, as a result of one-way analysis of variance (ANOVA), no statistically significant difference was found between accidents at work according to the average score of courtesy, sportsmanship, and altruism sub-dimensions ( $p < 0.01$ ). There was a statistically significant difference between the accidents at work according to average of safety climate, organizational citizenship behavior and

conscientiousness, civil virtue sub-dimension score ( $p < 0.05$ ). According to this, it can be said that safety climate, organizational citizenship and conscientiousness, civil virtue sub-dimension score average of individuals who had two or more accidents at work is significantly lower than the average of the score of individuals who had none or one accident at work.

Table 4.23. Examination of the Differences Between Number of Accidents at Work in terms of Safety Climate, Organizational Citizenship Behavior and Sub-Dimension Average of Score

	Work Accident	N	Avg.	Std. Deviation	F	P	Difference
Safety Climate	0	300	3.82	0.737	4.964	<b>0.007**</b>	3-1,2
	1	81	3.82	0.745			
	2 and more	19	3.27	0.777			
Organizational Citizenship Behavior	0	300	4.02	0.524	5.845	<b>0.003**</b>	3-1,2
	1	81	4.04	0.459			
	2 and more	19	3.61	0.531			
<b>Sub-Dimensions</b>							
Courtesy	0	300	4.13	0.608	1.548	0.214	-
	1	81	4.06	0.667			
	2 and more	19	3.89	0.629			
Sportsmanship	0	300	4.25	0.655	1.702	0.184	-
	1	81	4.27	0.489			
	2 and more	19	3.98	0.813			
Conscientiousness	0	300	4.25	0.684	5.274	<b>0.005**</b>	3-1,2
	1	81	4.32	0.553			
	2 and more	19	3.77	0.802			
Altruism	0	300	3.24	1.172	1.743	0.176	-
	1	81	3.33	1.037			
	2 and more	19	2.79	1.134			
Civil Virtue	0	300	3.93	0.837	6.714	<b>0.001**</b>	3-1,2
	1	81	3.93	0.767			
	2 and more	19	3.21	0.962			

\*\*: $p < 0,01$

Avg.=Average Std. Deviation=Standard Deviation F=One-way Analysis of Variance(ANOVA)

Difference=Tukey Test

p=Level of Significance

In table 4.24 differences between number of accidents at work in terms of safety climate, OCB and sub-dimension average of score are given.

Table 4.24. Examination of the Differences Between Number of Accidents at Work in terms of Safety Climate, Organizational Citizenship and Sub-dimension Average of Score

<b>Scales</b>	<b>Place of Work</b>	<b>N</b>	<b>Avg.</b>	<b>Std. Deviation</b>	<b>F</b>	<b>p</b>	<b>Difference</b>
<b>Safety Climate</b>	Production Areas	209	3.90	0.739	10.682	0.000***	1,2,3-4,5
	Quality	37	4.00	0.818			
	Maintenance / Repair	43	4.07	0.541			
	Logistics	17	3.35	0.678			
	Other	94	3.45	0.686			
<b>Organizational Citizenship Behavior</b>	Production Areas	209	4.04	0.505	3.895	0.004**	1,2,3-4,5
	Quality	37	4.12	0.507			
	Maintenance / Repair	43	4.13	0.530			
	Logistics	17	3.83	0.615			
	Other	94	3.85	0.497			
<b>Sub- Dimensions</b>							
<b>Courtesy</b>	Production Areas	209	4.17	0.628	2.770	0.027*	1,3-5
	Quality	37	4.15	0.488			
	Maintenance / Repair	43	4.19	0.610			
	Logistics	17	4.02	0.712			
	Other	94	3.93	0.622			
<b>Sportsmanship</b>	Production Areas	209	4.29	0.658	4.983	0.001**	1,2,3-4,5
	Quality	37	4.35	0.451			
	Maintenance / Repair	43	4.46	0.437			
	Logistics	17	4.04	0.696			
	Other	94	4.03	0.652			
<b>Conscientiousness</b>	Production Areas	209	4.32	0.598	4.343	0.002**	1,2-4
	Quality	37	4.42	0.542			
	Maintenance / Repair	43	4.20	0.867			
	Logistics	17	3.80	1.000			
	Other	94	4.10	0.657			
<b>Altruism</b>	Production Areas	209	3.19	1.128	0.459	0.766	-
	Quality	37	3.38	1.266			
	Maintenance / Repair	43	3.38	1.451			
	Logistics	17	3.35	1.027			
	Other	94	3.21	1.007			
<b>Civil Virtue</b>	Production Areas	209	3.90	0.813	2.441	0.046*	3-5
	Quality	37	3.99	1.083			
	Maintenance / Repair	43	4.19	0.617			
	Logistics	17	3.74	0.921			
	Other	94	3.73	0.845			

\*:p<0,05 \*\*:p<0,01 \*\*\*:p<0,001 Avg.= Average Std. Deviation = Standard Deviation  
F = One-way Analysis of Variance(ANOVA)

Difference = Tukey Test,

p = Level of Significance

When Table 4.24 is examined, as a result of one-way analysis of variance (ANOVA), no statistically significant difference was found between fields of working according to the average score of altruism sub-dimensions ( $p < 0.05$ ). There was a statistically significant difference between the field of workings according to average of safety climate, organizational citizenship and courtesy, sportsmanship, conscientiousness, civil virtue sub-dimension score ( $p < 0.05$ ). According to this, it is seen that safety climate, organizational citizenship behavior and sportsmanship sub-dimension score average of individuals who works in quality and maintenance/repair fields is significantly higher than the average of the score of individuals who works in logistics and other fields; the courtesy sub dimension score average of individuals who works in production and maintenance/repair fields is significantly higher than the average of the score of individuals who works in other fields; conscientiousness sub dimension score average of individuals who works in production and quality fields is significantly higher than those who works in logistics; civil virtue sub dimension score average of the score of individuals who works in maintenance/repair fields is significantly higher than those who works in other fields.

#### **4.8. Discussions**

The concept of occupational health and safety appears as an actor that plays a key role in the economic and organizational well-being of companies. Because it is a necessity to ensure the safety of employees in the workplace, in which all the enterprises owe their own assets and continuity. OHS is an area that has been studied by many disciplines. The purpose of many studies in this area is the prevention or reduction of

occupational accidents, related deaths and occupational diseases. In order to change the bad results in cases where OHS is not considered, it has been tried to prevent accidents, deaths and occupational diseases by making legal arrangements firstly. On the other hand, it cannot be satisfied only with such solutions and it is evident by the accident and death news which is increasing day by day. A mentality change is needed to prevent occupational accidents for a stronger OHS which is only possible by shaping the concept of climate which directs individuals and influences perceptions and actions. In order to shape the concept of organizational citizenship behaviors positively, it is necessary to ensure that safety climate should be increased. The safety climate and organizational citizenship behavior are the key points of this goal. Increasing the safety climate is particularly important in a meticulous sector, such as the aerospace industry. This study on the safety climate and organizational citizenship behavior is thought to contribute to the literature. Also, the researchers who inspire the survey used in this study will contribute to the literature with new scales.



## CHAPTER 5

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1. Conclusions

Findings obtained from the answers are as follows: The first 20 questions of the survey were related with safety climate and 20 questions related to organizational citizenship behaviors. The number of positive responses to the first 20 questions was 62.6%, the number of undecided responses was 15.8% and the number of negative responses was 21.6%. On the other hand, the number of positive responses to the second 20 questions was 74.3%, the number of undecided responses was 13.4% and the number of negative responses was 12.3%. The average of answers of safety climate scale is 3.15. The perception of the importance given to the safety climate in the researched aerospace company is above average. In addition to this, the average of answers of organizational citizenship behavior scale is 4.13. Thus, it can be said that employees, who works in the researched aerospace company, exhibit high level of organizational citizenship behaviors.

- According to the survey, it was seen that there was a significant relationship between safety climate and the courtesy, sportsmanship, civil virtue, conscientiousness sub-dimensions except altruism. In other words, as safety climate increases organizational citizenship behaviors also increase in survey aerospace company.
- Safety climate perception of the workers between the ages of 25-34 is significantly lower than the workers at the age of 45 or older. Thus, it can be said that younger employees have a lower perception of safety in survey aerospace company.

- Also, educational status are also important to exhibit organizational citizenship behavior. As education level increases, organizational citizenship behaviors are also increases.
- Work year has relationship between safety climate and also organizational citizenship behaviors. In addition, altruism is at the highest level at the work experience year of 16-20.
- In addition to this, work year in target aerospace company has a relationship between safety climate and organizational citizenship behavior. Especially, the altruism of workers in aerospace company that are working for 16-20 years is significantly higher than the workers in aerospace company that are working for 6-10, 11-15, 21 years and more.
- One of the research problems of the thesis is to examine the relationship between occupational accidents and safety climate. Work accident rates of workers have relationship between safety climate perceptions and organizational citizenship behaviors. If the safety climate increases in a working environment, the work accidents are reduced. In addition, the relationship between occupational diseases and safety climate could not be observed.
- Workplace in the company has relationship safety climate and organizational citizenship behaviors. In other words, as the workplace changes within the workplace, perception of employees about safety climate and organizational citizenship behavior also changes.
- The most important contribution to achieving the desired level of safety climate belongs to the senior management. Safety climate can be increased by many actions such as participation of employees in decision-making processes, use of effective communication language, organizing activities to raise awareness. Organizational citizenship behaviors should be handled within the organization with a holistic approach and converted into behavioral patterns by rules. In order to increase the level of safety climate in the workplace to the



desired level, employees should be made aware of the importance of the issue and the necessary dynamics should be mobilized and a positive image should be created. One of the ways to increase the level of safety climate is to make the members of the organization a good citizen of the organization.

## **5.2. Recommendations**

- In order to increase organizational citizenship behavior and safety climate in an organization among employees, a variety of activities should be organized. First of all, safety concept should be made a value.
- According to the results, younger employees have lower safety perception. To decrease this situation, regular meetings between employees and employers strengthen the safety climate while identifying cultural elements that are not recognized or diminished within the organization. By creating a family atmosphere in the workplace, the unity and solidarity of the employees can be strengthened and the organizational citizenship behavior can be reinforced. Social projects should be organized and popular studies should be carried out to increase the safety perception of younger employees.
- In addition to this, it is seen that educational status and organizational citizenship behaviors have relationship according to the results. Training and seminars should be provided to all employees on how to deal with hazards and risky behavior. It is possible to draw attention to the hazards in practice, especially with organizational trainings. For workers with low levels of education, more occupational health and safety trainings should be organized. By making a risk assessment, the action map can be determined and strategies to be taken can be developed. Social activities can be organized with the participation of the families of the employees. Thus, a strong safety climate can be created.

- Also, work year is another important point for safety climate and organizational citizenship behaviors. A system in which inexperienced employees can be trained by experienced employees can be organized. Thus, it can be ensured that the employee has the knowledge and experience in a shorter time in subjects such as work and occupational safety. A safety climate can be created by learning the concept of occupational safety in an organization.
- Rotation can be performed between employees within the company. Thus, workers can learn many different jobs at the same time. In addition to this, the difficulties that may arise from routine work can be reduced. Also, homogenous distribution of safety climate perception among groups can be ensured. Consequently; employees can demonstrate organizational citizenship behavior throughout the company.
- According to this research conducted in an aerospace company; organizational citizenship behaviors have the function of internalizing and reinforcing the safety climate. In order to reach the targeted safety climate and to ensure the organizational citizenship behavior at the desired level, the internal communication mechanisms should be used effectively and the obstacles should be eliminated. It is possible to transfer, learn and share organizational citizenship behaviors with communication method. On the other hand, identifying and reporting the incidents, deficiencies and faults of accident-related events with the relevant authorities is vital. Therefore, feedback through a healthy and effective communication method reveals existing mistakes and shortcomings. Thus, strategic planning can be carried out. In the literature, it was stated that the achievement of a strong safety climate could be achieved by the employees exhibiting organizational citizenship behavior. In order to get a qualified reaction from the employees, it should be felt that the worker is valuable and important for the organization.

- Finally, the study was carried out in one of Turkey's leading aerospace company. In order to make generalizations, researches on larger samples should be done. With different questions and methods, increasing the number of samples in different organizations, an important contribution can be made to examine the concepts of safety climate and organizational citizenship behaviors in an academic sense.



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## APPENDICES

### A. Ethics Committee Approval

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ  
APPLIED ETHICS RESEARCH CENTER



ORTA DOĞU TEKNİK ÜNİVERSİTESİ  
MIDDLE EAST TECHNICAL UNIVERSITY

DUMLUPINAR BULVARI 06800  
ÇANKAYA ANKARA/TURKEY  
T: +90 312 210 22 91  
F: +90 312 210 79 59  
ueam@metu.edu.tr  
www.ueam.metu.edu.tr

Sayı: 28620816 / 214

11 MAYIS 2018

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Doç.Dr. Nuray DEMİREL

Danışmanlığını yaptığınız yüksek lisans öğrencisi Mahmure Dilayla KILIÇASLAN'ın "Türkiye'de Havacılık ve Uzay Sektörü'nde Örgütsel Vatandaşlık Davranışlarının Güvenlik Kültürü'ne Etkisi" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay 2018-SOS-087 protokol numarası ile 11.05.2018 - 30.12.2018 tarihleri arasında geçerli olmak üzere verilmiştir.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Ayhan SOL

Üye

Prof. Dr. Ş. Halil TURAN

Başkan V

Prof. Dr. Ayhan Gürbüz DEMİR

Üye

Doç. Dr. Yaşar KONDAKÇI

Üye

Doç. Dr. Zana ÇITAK

Üye

Doç. Dr. Emre SELÇUK

Üye

Dr. Öğr. Üyesi Pınar KAYGAN

Üye

## B. Organizational Citizenship Behavior and Safety Climate Scale in Turkish

1. Yaşınız?

18-24     25-34     35-44     45-54     55 ve üstü

2. Eğitim Seviyeniz?

Lise     Lisans     Ön lisans     Lisans Üstü     Doktora

3. Kaç yıldır çalışıyorsunuz?

0-5     6-10     11-15     16-20     21 ve üstü

4. Bu firmada kaç yıldır çalışıyorsunuz?

0-5     6-10     11-15     16-20     21 ve üstü

5. Çalıştığınız işyerinde kaç defa iş kazası geçirdiniz?

0     1     2     3     4 ve üstü

6. Bu işyerinde nerede çalışıyorsunuz?

Üretim alanlarında     Kalite     Bakım-onarım     Lojistik     Diğer

Soru No.		Kesinlikle	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle
		(1)	(2)	(3)	(4)	(5)
1	Bireysel anlamda şirketimizde iş sağlığı ve güvenliği bilinçlenmesi en üst seviyededir.					
2	Şirketimizdeki bütün çalışanlar tehlike anında nasıl davranacağını ve tehlikeyi nasıl kontrol altına alacağını bilir.					
3	Şirketimiz, bizlerin güvenliği ve sağlığı için sürekli ve kararlı bir şekilde uygulamalı eğitim düzenler.					
4	Şirketimiz, iş sağlığı ve güvenliği kurallarının uygulanması konusunda taviz vermez.					
5	Şirketimiz, iş sağlığı ve güvenliği konusunda hassas davranan ve kuralları tam uygulayan çalışanları ödüllendirir.					
6	Şirketimiz çalışanları, iş güvenliğine aykırı davranışlarda bulunanlara karşı disiplin cezaları gibi yaptırımlar uygulanacağını bilir.					
7	Şirketimiz çalışanları, riskli davranışlarda bulunmaktan kaçınır.					
8	Şirketimizde her zaman risk değerlendirmesi yapılır ve buna göre politikalar belirlenir.					
9	Çalışanlarımız, iş sağlığı ve güvenliği ile ilgili toplantılarda düzenli olarak yer alır ve tartışmalara aktif olarak katılır.					

<b>10</b>	Şirket yönetimi, iş sağlığı ve güvenliği konusunda stratejik planlama ve uygulamalarda çalışanlarına danışır.					
<b>11</b>	İşe yeni başlayan tecrübesiz çalışanlar, iş sağlığı ve güvenliği konusunda uzman bir başka çalışanın yanında işe başlayıp gereken eğitimi alır.					
<b>12</b>	Tecrübeli çalışanlar, iş sağlığı ve güvenliği ile ilgili konularda veya buna yönelik gelişim ve değişim faaliyetlerinde şirkette aktif rol oynar.					
<b>13</b>	İş sağlığı ve güvenliği konusunda çalışanlar arasında güçlü bir iletişim ve bilgi alışverişi vardır.					
<b>14</b>	İşimizde iş sağlığı ve güvenliği konusunda bireysel davranış yerine işbirliği hakimdir.					
<b>15</b>	İşin yürütümü esnasında bireysel çalışmadan ziyade, takım çalışması hakimdir.					
<b>16</b>	Çalışanlarımız, işin yürütümü esnasında ölüm korkusu ve sağlığın kaybolması endişesi duymazlar.					
<b>17</b>	İş sağlığı ve güvenliği konusunda gerekli uyarılar yapılır ve dikkat edilmesi yönündeki yazılı talimatlar görebileceğimiz şekilde asılır.					
<b>18</b>	İşte kasıtlı ve riskli hareketlere tolerans tanınmaz.					
<b>19</b>	Üstlerimizle iş sağlığı ve güvenliği ile ilgili her zaman görüşebiliriz.					
<b>20</b>	İş sağlığı ve güvenliği konusunda herhangi bir çatışma olması durumunda problem şirketimizde kolayca çözülür.					

21	Şirketimizde iş sağlığı ve güvenliğine aykırı hareket eden birini uyarırım ve üstlerime bildiririm.					
22	Üstlerim beni uyarmasa dahi herhangi bir tehlike söz konusu olduğunda veya riskli bir iş veya faaliyette gerekli tedbirleri alırım.					
23	Güvensiz davranışlarda bulunmaktan kaçınırım.					
24	Tehlike anında kendi hayatımı hiçe sayıp arkadaşlarımı kurtarmaya çalışırım.					
25	Verilen eğitimler haricinde iş sağlığı ve güvenliği hakkında kendimi yetiştiririm.					
26	İş sağlığı ve güvenliği ile ilgili düzenlenen faaliyetlere her zaman aktif olarak katılırım.					
27	Yaptığım işlerde kendimden çok diğer çalışanların sağlığını ve güvenliğini düşünürüm.					
28	İş sağlığı ve güvenliğinin her zaman öncelik olduğuna inanarak çalışırım.					
29	İş sağlığı ve güvenliği ile ilgili faaliyetler, eğitim ve seminerlere kendi isteğimle katılırım.					
30	Arkadaşlarımda güvensiz davranışlarını görürsem onları uyarırım ama üstlerime anlatmam.					
31	İş sağlığı ve güvenliği ile ilgili yapılan yazılı ve sözlü uyarıları ciddiye alır, duyuru panosundaki yazıları düzenli takip eder, iş sağlığı ve güvenliği kurul kararlarını her zaman okur gerekirse yanımda bulundururum.					

32	İş sağlığı ve güvenliği konusunda anlaşmazlık çıktığı zaman çözümlenmesine yardımcı olurum.					
33	Herhangi bir tehlike anında ne yapacağımı, hangi prosedürleri uygulayacağımı bilirim.					
34	İşe başlamadan önce uyarılmasam da gereken teçhizatı ve gereçleri kontrol ederek işe başlarım.					
35	Kişisel koruyucu donanımını unutmuş veya kaybetmiş birine derhal yardımcı olurum.					
36	İş sağlığı ve güvenliği ile ilgili sorunları şikâyet ederek vaktimi boşa harcamam.					
37	Şahsi kanaat ve hislerimden ziyade, iş sağlığı ve güvenliği ile ilgili kurallara uyarım.					
38	Yaptığımız işin tehlikeli işler sınıfında olduğu bilinci ile iş sağlığı ve güvenliği konusunda gerekli tedbirleri alır ve hazırlıklarımı yaparım.					
39	Arkadaşlarım çok tehlikeli iş yapıyorlarsa tecrübeme dayanarak onlara yardım ederim.					
40	İş sağlığı ve güvenliği ile ilgili yapılan veya yapılacak olan değişimlere destek olurum.					



**C. Organizational Citizenship Behavior and Safety Climate Scale in English**

1. Age?

18-24     25-34     35-44     45-54     55 and above

2. Level of Education?

High School    Undergradution    Association    Graduation    Doctorate

3. How many years do you work?

0-5     6-10     11-15     16-20     21 and above

4. How many years do you work in this company?

0-5     6-10     11-15     16-20     21 and above

5. How many work accident do you have in your company?

0    1    2    3    4 and above

6. Where do you work in the company?

Manufacturing area    Quality    Maintenance    Logistics    Other

Question Number		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
		(1)	(2)	(3)	(4)	(5)
1	In the individual sense, our company is at the top level in terms of occupational health and safety awareness.					
2	All employees in our company know how to behave in danger and how to control danger.					
3	Our company continuously and practically organizes hands-on training for the safety and health of us.					
4	Our company does not compromise on the application of occupational health and safety rules.					
5	Our company rewards employees who are sensitive to occupational health and safety and who are fully enforcing the rules.					
6	Our company employees know that sanctions will be imposed, such as disciplinary punishments, against those who behave in a manner that is contrary to work safety.					
7	Our company employees avoid risky behavior.					
8	Risk assessment is always carried out in our company and policies are determined accordingly.					

<b>9</b>	Our employees are regularly present at work health and safety meetings and actively participate in discussions.					
<b>10</b>	The company management consults its employees in strategic planning and implementation of occupational health and safety.					
<b>11</b>	Newly started inexperienced employees start work and receive training, alongside another employee who specializes in occupational health and safety.					
<b>12</b>	Experienced employees play an active role in the company related to occupational health and safety or in its development and change activities.					
<b>13</b>	There is strong communication and information exchange among employees on occupational health and safety.					
<b>14</b>	In our work, cooperation is more prevalent in terms of occupational health and safety than individual behavior.					
<b>15</b>	During the course of work, team work is dominant, rather than individual work.					
<b>16</b>	Our employees do not have to worry about fear of death and loss of health during their work.					
<b>17</b>	The necessary precautions are taken regarding occupational health and safety and are posted in such a way that we can observe written instructions for attention.					

<b>18</b>	There is no tolerance for deliberate and risky movements.					
<b>19</b>	We can always talk to our superiors about work health and safety.					
<b>20</b>	If there is any conflict in occupational health and safety, it is easily solved in our company.					
<b>21</b>	I inform my managers about employees who acting against occupational health and safety rules and warn them in our company.					
<b>22</b>	Even if my managers do not warn me, I take the necessary precautions in case of any danger or in a risky activity.					
<b>23</b>	I avoid risky and dangerous behavior in work time.					
<b>24</b>	I disregard my own life in danger and try to save my friends.					
<b>25</b>	I am self-educated person about occupational health and safety, beyond given training and conferences.					
<b>26</b>	I always participate in meetings and activities.					
<b>27</b>	I think of the safety and health of other employees than myself while working.					

28	I always work by believing that occupational health and safety is always a priority.					
29	I take part in activities, training and seminars voluntarily, related to occupational health and safety.					
30	I warn my friends about their dangerous movements and activities, but I do not delate to the upper authorities.					
31	I take the written and verbal warnings about occupational health and safety seriously, follow the articles on the bulletin board regularly, read the occupational health and safety board decisions at all times and keep them with me if necessary.					
32	When there is a disagreement on occupational health and safety, I help to resolve it.					
33	In case of any danger, I know what to do and what procedures to follow.					
34	Even if I am not warned before starting to work, I always start by checking the necessary tools and equipment.					
35	I help someone who has forgotten or lost his / her personal protective gear.					
36	I don't waste my time complaining about occupational health and safety issues.					
37	Rather than my personal conviction and feelings, I adhere to the rules on occupational health and safety.					

38	I take the necessary precautions about occupational health and safety with the awareness that the work we are doing is in the hazardous class and I do my preparations.					
39	If my friends do a very dangerous job, I help them with my experience.					
40	I support changes in occupational health and safety.					