

**ARTIFICIAL INTELLIGENCE TECHNOLOGY
AND EMPLOYMENT CONCERN: A STUDY
ON AVIATION MANAGEMENT STUDENTS**

YAPAY ZEKÂ TEKNOLOJİSİ VE İSTİHDAM
ENDİŞESİ: HAVACILIK YÖNETİMİ
ÖĞRENCİLERİ ÜZERİNE BİR ARAŞTIRMA

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Keywords:

Artificial Intelligence, Artificial Intelligence Technology, Employment, Aviation Management.

Anahtar Kelimeler:

Yapay Zekâ, Yapay Zekâ Teknolojisi, İstihdam, Havacılık Yönetimi.

ABSTRACT

The continuous development of new technologies and their application in the job market brings up a new question: What will be the impact on employment? Considering that machines have replaced human power with the emergence of artificial intelligence technology and its use in business sectors, it is obvious that it will create employment concerns. While AI contributes positively by reducing-by-reducing costs, minimizing errors, and increasing efficiency, it also appears to lead to employment loss. The purpose of this study is to examine in depth the opinions of aviation management students on the employment problems that artificial intelligence technology may create in the aviation sector. The sample of the research consists of first, second, third-, and fourth-year aviation management students. Feedback was received from 46 students. In this context, the data was analyzed with the qualitative data analysis program MAXQDA. Content analysis was conducted in the study and criterion sampling was used as the sampling method. The findings show that aviation management students expect artificial intelligence technology to cause unemployment. While it is known that this great development in technology creates employment concerns, it is a fact that artificial intelligence will create new professions and areas of expertise with the development process. Thus, it is anticipated that artificial intelligence technology will increase new employment opportunities.

ÖZ

Sürekli yeni teknolojilerin gelişmesi ve iş piyasasında uygulanmaya başlaması yeni bir soruyu gündeme getirmektedir: İstihdama etkisi nasıl olur? Yapay zekâ teknolojisinin gün yüzüne çıkması ve iş sektörlerinde kullanılmaya başlanmasıyla insan gücünün yerini makinelerin aldığı düşünülürse istihdam endişesi yaratacağı aşîkârdır. Çünkü yapay zekânın maliyetlerin düşmesi, hata payının azalması ve verimliliğin artması gibi olumlu katkıları olsa da istihdam kaybına yol açtığı görülmektedir. Bu çalışmanın amacı havacılık yönetimi öğrencilerinin yapay zekâ teknolojisinin havacılık sektöründe oluşturabileceği istihdam sorunlarına yönelik görüşlerinin derinlemesine incelenmesidir. Araştırmanın örneklemini birinci, ikinci, üçüncü ve dördüncü sınıf havacılık yönetimi bölümü öğrencileri oluşturmaktadır. 46 öğrenciden geri dönüt alınmıştır. Bu kapsamda veriler nitel veri analizi programı MAXQDA ile analiz edilmiştir. Çalışmada içerik analizi yapılmıştır ve örnekleme yöntemi olarak ölçüt örnekleme kullanılmıştır. Bulgular havacılık yönetimi öğrencilerinin yapay zekâ teknolojisinin işsizlik oluşturacağını beklediklerini göstermektedir. Teknolojideki bu büyük gelişmenin istihdam kaygısı oluşturduğu bilinmekle beraber, yapay zekânın gelişim süreciyle birlikte yeni meslek ve uzmanlık alanlarını doğuracağı bir gerçektir. Böylece yapay zekâ teknolojisinin yeni istihdam olanaklarını artıracığı öngörülmektedir.

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Alıntılanmak için/Cite as: İmadoğlu Kalkan T. (2025). Artificial Intelligence Technology And Employment Concern: A Study On Aviation Management Students, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 34 (Özel Sayı), 215-231

INTRODUCTION

It is an undeniable fact that the use of artificial intelligence is increasingly widespread around the world and that traditional professions will change, some may even disappear completely, and entirely new jobs, far beyond the conventional definition of work in terms of qualifications, will emerge. With artificial intelligence modeled on human thinking and learning abilities, humanity is facing a new form of social interaction. It is clear that this situation necessitates a rethinking of sociality and its various contexts economic, moral, and legal (Adaş and Erbay, 2022: 334). Artificial intelligence technologies have begun to influence consumer behavior and create new consumption habits. In addition, they are leading to the emergence of new concepts in the field of communication (Zengin, 2021: 700). The process of information processing that enables thinking, understanding, and action is referred to as artificial intelligence (Pirim, 2006: 84).

With artificial intelligence beginning to influence social life as a technology, the issue of employment/unemployment has come to the forefront. The acceleration of technological developments and innovations has led to negative effects on the employment structure (Sheikhi, 2022: 104). The increase in unemployment reduces both personal and societal income. It also increases inequality in income distribution and poverty. Since an unemployed individual cannot utilize their personal capacity, skills, and abilities, there may be a decline in those competencies over time, and the individual may become socially excluded (Karaali & Ülengin, 2008: 17). For this reason, aviation management students, like every individual, experience concerns about employment. The rapid increase in new job opportunities will lead to a relatively low share of automated jobs and, consequently, an increase in employment rates. In fact, this process develops a mechanism that counteracts the unemployment caused by automation. The automation process also leads to the creation of new jobs (such as producing and maintaining new machines). As a result, if the number of new jobs increases rapidly enough, the unemployment effect of automation will be reduced (Nakamura & Zeira, 2018: 22-23). Although artificial intelligence has created new occupational fields throughout its development, it has

also caused the disappearance of certain professions. The accelerated development of artificial intelligence today has also begun to accelerate the negative developments experienced in employment (İrhan, 2021: 31). The increased use of artificial intelligence technologies in airports, aircraft, and marketing has resulted in job losses. Therefore, the anxiety about unemployment caused by the advancement of artificial intelligence technologies is increasing (Kaya, 2023: 61). In this context, the aim of this study is to examine in depth the perceptions of aviation management students regarding the potential employment problems that artificial intelligence technology may create in the aviation industry.

The aviation sector stands as one of the most intensive domains for artificial intelligence (AI) applications. Technologies such as unmanned aerial vehicles (UAVs), autonomous ground services, and AI-assisted traffic management are radically transforming labor demands within the industry (Kaya, 2023). Consequently, examining future aviation professionals' perceptions of AI holds critical importance. While existing literature predominantly analyzes AI's employment impact through current professionals (Sheikhi, 2022), the concerns and expectations of pre-career students remain overlooked. This study adopts a phenomenological approach to capture transitional dynamics between education and employment. Given its high technological density and global competitiveness, aviation serves as an observable laboratory for AI's labor market effects. As an early indicator of AI-driven workforce transformation, the aviation sector provides predictive insights for other industries.

This study provides an original contribution by examining the perceptions of aviation management students, who are expected to be part of the sector in the future, regarding the employment concerns that artificial intelligence technology may create in the aviation industry. While the literature generally focuses on industry professionals, this research fills an important gap by addressing the perspectives of students in depth. Since artificial intelligence is not only a technological transformation but also generates socio-economic impacts, understanding how these effects are perceived by young professionals is a scientific and

practical necessity in reshaping educational, human resources, and sectoral strategies.

LITERATURE

Artificial Intelligence

According to Wang (2020), artificial intelligence is a type of algorithm or computerized system similar to the mental decision-making processes of people. In other words, it can be explained as the ability to learn by using past experiences with the mind. According to Zeng (2020), artificial intelligence is defined as the performance of tasks requiring intelligence with a human-like tool. Artificial intelligence is seen everywhere today, especially in areas such as health, advertising, transportation, finance, law, education, and HR. It affects the future of most jobs. Bersin (2017), the founder and director of Deloitte, drew attention to its versatility by saying, “Artificial intelligence is entering almost every piece of software.” The inclusion of artificial intelligence in today's world has also deeply affected the field of education (Popenici and Kerr, 2017). However, despite the increasing areas of use, it can be said that there is still uncertainty about how artificial intelligence technologies will be used in education and what benefits they will provide to administrators, educators, teachers, students, and parents. Therefore, when the benefits of artificial intelligence technology are fully understood, it will enable artificial intelligence to be used more effectively in education. When the literature is reviewed, there are studies on artificial intelligence. In the joint study conducted by Korobeynikova, et al. (2021), the effects of artificial intelligence on the use of management accounting in Russia were examined. For this purpose, they created guidelines for the use of artificial intelligence in management accounting of agricultural organizations. In the joint study conducted by Li, et al. (2020), the effects of artificial intelligence on accounting work, accounting theory and the ability of accounting personnel were examined through a field literature review. In the study, it was stated that artificial intelligence technologies could save accounting professionals from repetitive work, and various risks and concerns related to accounting development, such as reduced employment and over-reliance on technology problems, could arise. In the

study conducted by Fernando (2022), in a case analysis conducted by considering 6 countries, it was determined that the increasing presence of artificial intelligence technologies in society and public policy towards technology dominance tends to deepen international conflicts and asymmetries, create new technology governance dilemmas, deepen cyber war problems and control global information flow and digital progress.

Employment

In order for a person to be considered unemployed, they must not be working, they must be looking for work, and they must accept a job offer at the current wage level when offered. The unemployment rate is obtained by dividing the number of unemployed people in the economy by the number of labor force (Reynolds, 1974: 125). For employees, the allocation of labor to the employer's work in return for wages, salaries, etc., and for employers, the provision of work opportunities to employees in return for a fee indicates the phenomenon of employment (Ülgener, 1980: 73). In short, employment and unemployment are two different but complementary parts of the same reality.

The anxiety of finding a job among university students is affected by various factors such as economic conditions, social expectations, personal desires, and perceived adequacy in job search skills. For example, economic downturns, increased competition, and decreasing job opportunities can increase job search anxiety (Kim, Oh, & Rajaguru, 2022). In addition, societal pressures for post-graduation success and financial independence contribute to the psychological burden experienced by students (Wilkins and Huisman, 2015). Moreover, individual differences in personality traits, self-efficacy beliefs, and career goals also shape the experience of job search anxiety (Saks and Ashforth, 2000). When looking at literature, there are studies on employment. In the study conducted by Aghion, et al. (2019), the effects of artificial intelligence and automation on growth and employment were analyzed with various methods. In addition, the effects of robotization on employment in France between 1994 and 2014 were discussed. Empirical analyses on French data were conducted, firstly, they concluded that robotization reduced total employment at the employment region level

and secondly, uneducated workers were more negatively affected by robotization than educated workers. The study revealed that inappropriate labor market and education policies reduced the positive effects of artificial intelligence and automation on employment. In the study conducted by Abuselidze and Mamaladze (2021), the impact of artificial intelligence studies on employment in enterprises in Georgia was investigated and the current trends in Georgia regarding layoffs or disappearances together with automation, i.e. artificial intelligence studies, were analyzed depending on the scale of implementation. As a result of the study, it was determined that technological developments affect employment in two main ways: displacement effect and productivity effect. In the study conducted jointly by Gu, et al. (2022), the temporal and spatial dynamic characteristics of artificial intelligence development and service sector employment were examined using the fixed effect model in an empirical study based on regional panel data of China between 2007-2020 to analyze the impact mechanism of artificial intelligence development on the service sector. As a result of the study, it was determined that artificial intelligence has a direct impact on service sector employment and that artificial intelligence has a significant positive impact on service sector employment.

METHODOLOGY

The aim of this study is to examine the opinions of aviation management students regarding the potential employment problems that artificial intelligence technology may create in the aviation industry. Artificial intelligence technology, which has left its mark on our era, has begun to raise concerns about employment due to the opportunities it provides, the ease it brings to work, and the ability of a single person to perform tasks that previously required many. As in many other sectors, studies are being conducted on these issues in the aviation industry as well, due to the possibility that artificial intelligence technology may lead to employment problems.

The sample of this study consisted of undergraduate students from the Department of Aviation Management, specifically those enrolled in the 1st, 2nd, 3rd, and 4th years of the program. This research adopted a qualitative

research design, with a focus on the phenomenological approach, which aims to explore and understand participants' past experiences in depth (Creswell, 2013, p. 203). Within this design, the interview questions were constructed as open-ended, simple, and clearly formulated in a non-directive manner to allow for the emergence of authentic responses. After the research questions were formulated, approval was obtained from two experts.

Data Collection

Data were collected through face-to-face interviews conducted between January and February 2024. Since qualitative research is mostly conducted based on observations and interviews, it does not require large and broad samples; because after a certain point, both observations and interviews will start to repeat themselves (Shenton, 2004). In this context, the 46 data obtained in this study are sufficient. A total of 46 participants responded to the data collection process. During the interviews, participants were provided with a written interview form outlining the purpose and scope of the research. Each session lasted approximately 15 to 25 minutes. The semi-structured interview form consists of 13 questions: 9 open-ended and 4 demographics. The data were analyzed using MAXQDA software, which facilitates creative and systematic qualitative data analysis by organizing and processing both qualitative and quantitative data (Dereli, 2023, p. 149).

Data Analysis

In this study, content analysis was employed to extract recurring patterns and themes from participants' responses. For the sampling strategy, the study employed criterion sampling, a type of purposeful non-probability sampling. Criterion sampling involves selecting individuals who meet a specific set of predefined characteristics relevant to the research problem (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2012, p. 11). This method ensures that the participants possess qualities that contribute to the depth, reliability, and validity of the research findings. Validity in this context refers to the alignment of the data collection tool with the construct being measured and its ability to capture the full scope of the targeted phenomenon (Gürbüz & Şahin, 2018, p. 160). To enhance

trustworthiness, responses were recorded in written form, presented without interpretation, and supported by direct quotations from participants, in line with the principles of transparency in qualitative inquiry (Rubin & Rubin, 2005). Each participant was assigned a unique code (e.g., K1, K2, ..., K46), and the statements were categorized based on their thematic relevance. The unit of analysis for the study comprised students from the Aviation Management department. Based on the interviews, four main themes were identified and used to organize the data: aviation sector, artificial intelligence, career planning, and job selection.

This study was conducted with ethical approval from the Cappadocia University Ethics Committee 26.12.2023/E-64577500-050.99-62754.

The interview form with the participants is included in Table 1.

Table 1. Interview Form	
Demographic Questions	
1. Your gender, 2. Your grade level3. Number of siblings, 4. Your family's income	
Questions About Artificial Intelligence and Employment	
5. What do you think about the aviation sector?	
6. Do you think there is equal opportunity in the aviation sector? Explain.	
7. Do you have concerns about employment? Why?	
8. What kind of an impact do you think artificial intelligence technology has on business life?	
9. What is your level of knowledge about artificial intelligence technology? What are you doing to improve it?	
10. What are the positive and negative aspects of artificial intelligence?	
11. Do you think artificial intelligence technology creates new job opportunities in the aviation sector? Explain.	
12. When choosing a job, which one do you prefer, private or public? Why?	
13. Do you receive support from any person or institution in your career planning? Explain.	

In this study, which investigates the future concerns of aviation management students in the context of advancing technology, the following research questions were addressed:

- What are the perceptions of aviation management students regarding artificial intelligence technology?
- What are the perceptions of aviation management students concerning employment opportunities in the aviation sector?
- What is the level of knowledge aviation management students possess about the aviation industry?
- Does the use of artificial intelligence technology in the aviation sector increase unemployment?

FINDINGS

The findings including the demographic information of aviation management students participating in the study are given in Table 2.

Table 2. Demographic Characteristics of the Participants			
Demographic Variables		Frequency (N)	Percentage (%)
Gender	Female	25	54,3
	Male	21	45,7
Grade	1st grade	10	21,7
	2nd grade	17	37
	3rd grade	6	13,1
	4th grade	13	28,2
Number of Siblings	1	6	13
	2	21	45,7
	3	16	34,8
	4 and more	3	6,5
Family Income Status	0-15000	6	13,1
	15001-30000	15	32,6
	30001-45000	12	26,1
	45001 and more	13	28,2
Total		46	100

When Table 1 is examined, it is seen that 54.3% of the students participating in the study are female, 37% are in their second year, 45.7% have two siblings, and 32.6% have a family income between 15,001 and 30,000.

In this study, in line with artificial intelligence technology and employment in the aviation sector, the studies examined in the theme representation shown in Figure 1 are gathered under four themes. These are the aviation sector, artificial intelligence, job selection, and career planning.

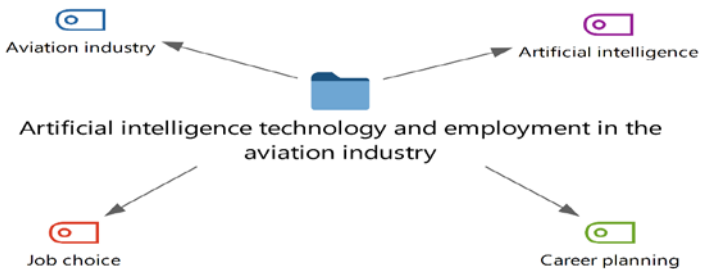


Figure 1. Theme Display

Within the research framework, four codes related to the theme of the aviation sector have been established. As seen in Figure 2, these are employment, equal opportunity, promising future, and convenience. Figure 3 presents the statistics of the sub-codes of the aviation sector.

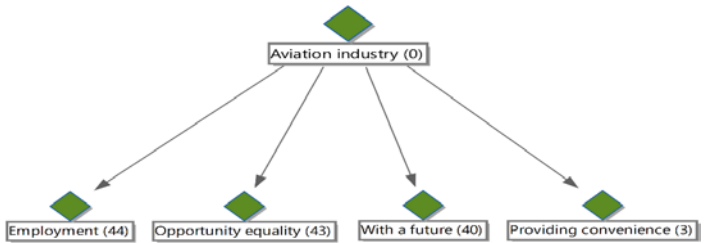


Figure 2. Hierarchical Code-Sub-Code Representation Of The Aviation Sector Theme

In the aviation sector theme, the topic of employment was heavily emphasized (33.8%). Within the employment code, words such as job search, anxiety, concern, difficulty, future, unemployment, favoritism, reference, opportunity, and job gateway were included. Some of the comments from participants are as follows: “It is a comfortable sector in terms of employment because it is very broad and comprehensive” (K1). “I think I can

improve myself in this sector and secure employment” (K17). “I have no employment concerns because I have full confidence in myself” (K27). While highly self-assured participants believed they could easily find jobs, there were also many participants who expressed anxiety about securing employment. Their comments included: "My only concern is references. Without them, getting hired becomes extremely difficult (P20)." "I think there is excessive employment in the country a severe imbalance between supply and demand. There is a huge surplus of labor in our economy. There is a need for workers, but unemployment is also very high (P38)." The statements from K1, K17, and K27 demonstrate an optimistic outlook. K1's statement reflects a perception that the sector's growth potential creates employment security. K17's expression indicates that skill development reduces employment anxiety. K27's remark reveals highly qualified individuals' tendency to underestimate systemic inequalities despite structural barriers. Conversely, the statements from K20 and K38 exhibit a pessimistic perspective. K20's comment exposes the influence of informal networks that supersede meritocratic principles in hiring practices. K38's statement highlights the paradox of simultaneous labor surplus and skilled personnel shortages within the sector.

Another frequently mentioned code in the aviation sector theme was equal opportunity (33.1%). The equal opportunity code included terms such as nepotism, interview, CV, and equality. Some participant comments were as follows: "I do not believe there is equal opportunity in any sector (P25)." "I do not think equal opportunity exists because people from unrelated fields are hired for positions in our profession (P22)." "I do not believe there is equal opportunity. No matter how good a person's CV is, it is useless without connections. Someone with no knowledge can easily surpass us (P16)." The statements from K25, K22, and K16 demonstrate the existence of negative perceptions. K25's statement indicates a system where the perception of organizational justice is completely absent. K22's expression reflects the professional identity crisis created by out-of-field employment. K16's remark serves as a striking example of how informal relationships in labor markets undermine meritocracy.

Conversely, the statements from K1 and K9 reveal positive

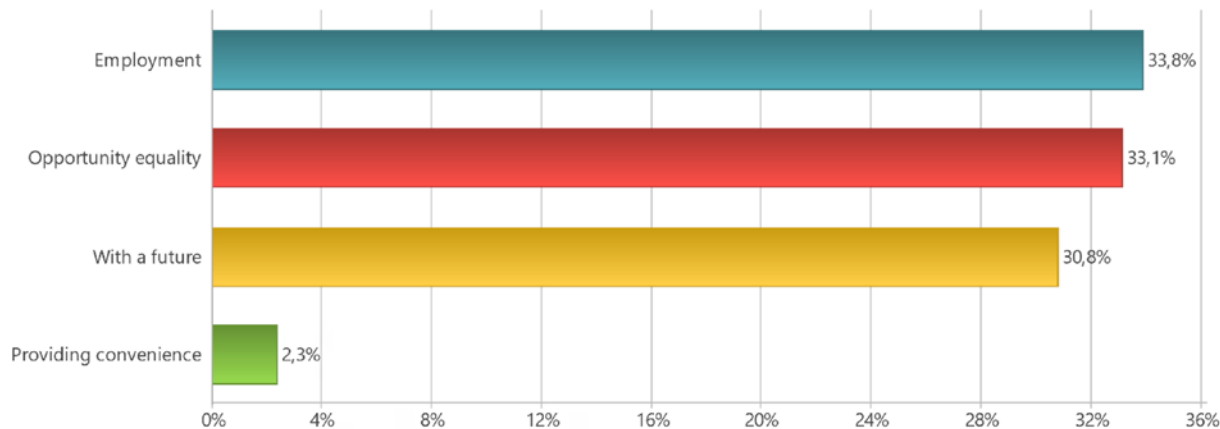


Figure 3. Statistics of the Subcodes of the Aviation Sector

perceptions. K1's comment points to the presence of "consistency" and "impartiality" principles. K9's statement aligns with the pursuit of "objectivity" in modern human resource management.

Alongside these negative remarks, there were also positive comments, such as: "I believe there is equal opportunity. Since there are required exams and interviews, I think there is fairness both in terms of job availability and hiring (P1)." "I think it is fair because the hiring process is the same for everyone, and all employees go through the same conditions (P9)."

Another frequently mentioned code under the aviation sector theme is the "promising future" code (30.8%). This code includes expressions such as open-ended, open to development, forward-looking, job opportunities, dynamic, and continuity. Some of the participants' comments are as follows: "It is a profession with many job opportunities and a promising future" (K19). "I think the aviation sector has a promising future. I believe job opportunities are quite high" (K3). "It is a sector that is always innovative, where development never ceases, and that has continuity" (K24). "I think it is a sector that is very open to development and grows and advances every day" (K9). No negative statements were encountered regarding this code. The statements from participants K19 and K3 demonstrate perceptions of growth potential within the aviation industry. K19's emphasis on "abundant job opportunities"

reflects expectations regarding labor market expansion in the sector. K3's comment about the "high availability of employment prospects" indicates a belief in aviation as a field offering both horizontal and vertical career opportunities. The expressions from K24 and K9 serve as indicators of technological dynamism. K24's focus on "innovation" and "development" points to the sector's continuous evolution within the conceptual framework of "creative destruction." K9's characterization of the industry as "constantly evolving" mirrors the perception that digital transformation is continually generating new areas of specialization within aviation.

Another code mentioned under the aviation sector theme is "providing convenience" (2.3%). The convenience code includes statements highlighting its usefulness in terms of speed and time. One participant's comment regarding this code is as follows: "In my opinion, the aviation sector is widely used and beneficial both in our country and globally. For example, when we want to purchase an item, we buy it online. Even if it's in a different city or country, it reaches us by air. Of course, this is not the only benefit of aviation; it also always provides convenience in military, political, and social aspects" (K38). Another participant stated: "I think it greatly facilitates life for people and brings comfort in every setting" (K39). One more participant expressed the following: "It is important in terms of saving time" (K40). The statements from participants K40 and K38 highlight the significance of temporal advantages. K40's

emphasis on "time savings" demonstrates the speed benefits inherent to aviation. K38's example of "transportation to diverse locations" can be interpreted within the conceptual framework of time-space compression (Harvey, 1989). The expressions from K38 and K39 suggest the notion of multidimensional convenience. K38's reference to military/political/social benefits illustrates the multifunctional nature of aviation. K39's characterization of providing "comfort in every setting" underscores the sector's contribution to quality of life.

Within the scope of the study, five codes were generated under the theme of artificial intelligence. As shown in Figure 4, these are positive aspects, negative aspects, employment, providing benefits, and security. Figure 5 presents the statistics of the sub-codes related to artificial intelligence. The reason for revisiting the employment code is the significant impact artificial intelligence has on employment.

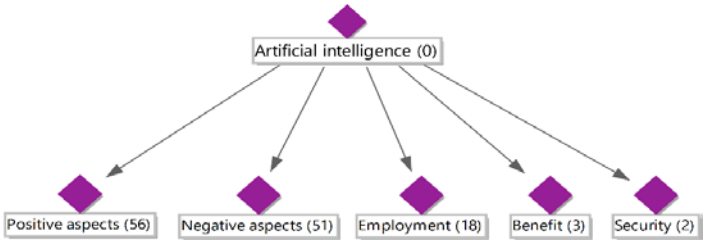


Figure 4. Hierarchical Code-Subcode Representation of The Artificial Intelligence Theme

The most frequently mentioned code under the artificial intelligence theme is the code for positive aspects (43.1%). Within the positive aspects code, terms such as speed, work efficiency, time saving, and ease of work were frequently used. Participants expressed the following opinions regarding the positive aspects of artificial intelligence: "Artificial intelligence has great potential in automating business processes. With the automation of routine tasks, employees are assigned to more strategic and creative roles, ... it makes employees more productive. It increases the quality of the work they do. It enables people to make better decisions" (K35). "It improves our standards of living and facilitates our work, bringing it to a level of standardization" (K34). The theme of "positive aspects," coded at a rate of 43.1%, indicates a notable optimism among participants toward artificial intelligence

(AI) technologies. K35's emphasis on the "automation of business processes" reflects the perceived potential of AI to assume routine tasks and redirect human resources toward more strategic roles. The codes of "time saving" and "work efficiency" point to a strong belief in AI's capacity to enhance productivity. K34's reference to "improving life standards" reveals positive expectations regarding the socio-economic impact of AI. The emphasis on "standardization" highlights AI's potential to ensure consistency and predictability in operational processes. In this context, participants' statements demonstrate a high level of awareness of AI's positive impact, particularly on operational efficiency and quality of life. This finding suggests that AI is not merely perceived as a technological innovation, but also as a socially transformative tool that enhances overall productivity.

Another frequently mentioned code under the artificial intelligence theme is the negative aspects code (39.2%). The concept of unemployment was heavily emphasized within this code. Some participants who highlighted the significance of this issue commented as follows: "In the coming years, I believe it will eliminate the impact of human labor and lead to unemployment" (K2). As artificial intelligence replaces human labor, the need for manpower will decrease, and the phenomenon of unemployment will come to the forefront. Participant K2's statement "I believe that in the coming years, the influence of human labor will diminish and lead to unemployment" is directly associated with the perceived threat of artificial intelligence (AI) to employment. This viewpoint particularly underscores the displacement effect that technological advancements may trigger within labor markets. The substitution of human labor with algorithms and automated processes implies that individuals engaged in low-skilled or repetitive jobs may face a heightened risk of unemployment. In this context, the development of AI technologies is not merely a technical advancement but represents a multifaceted transformation with significant social implications.

In addition to unemployment, the concept of laziness was also frequently mentioned. One participant expressed this concern as follows: "Its negative aspects include making people lazy, increasing emotional numbness, and the automation of tasks (K4)." K4's statement highlights

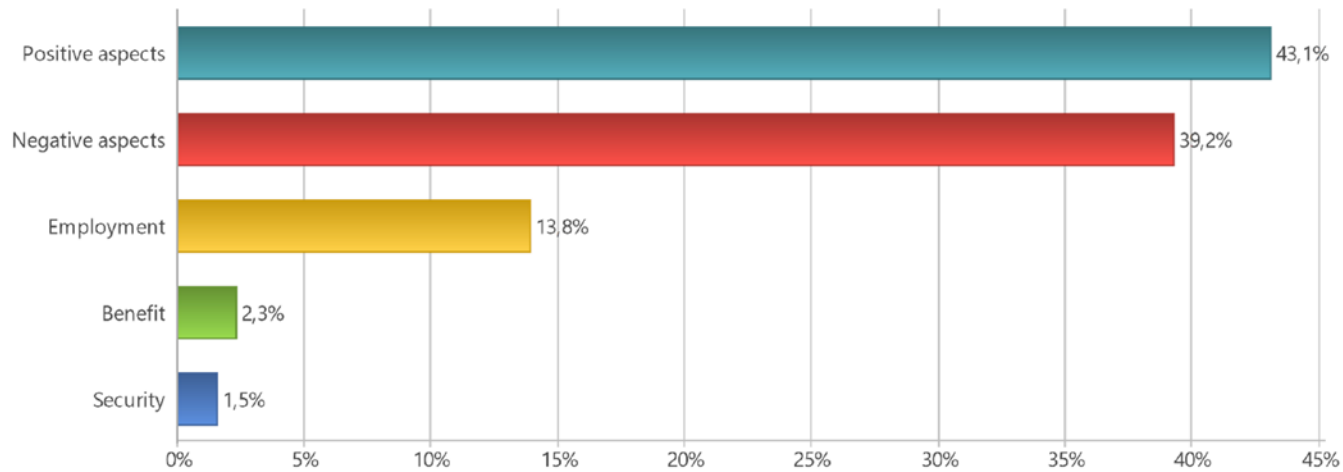


Figure 5. Statistics of Artificial Intelligence Subcodes

not only the economic implications of technological advancements but also their individual behavioral and psychological consequences. In this context, the expanding roles of artificial intelligence (AI) in human life are perceived to potentially lead to a decline in individuals' tendency to take responsibility, increased passivity, and cognitive inertia. As AI increasingly undertakes tasks previously performed by humans, feelings of lethargy and laziness are perceived to become more prominent, leading individuals to prefer easier alternatives. These participant evaluations reveal that criticisms directed at AI encompass not only external systems but also the internal dynamics and ethical development of the individual. Accordingly, it becomes evident that a balanced integration of technological tools into human life is essential, and the development of educational and societal models that prioritize active individual engagement is imperative.

One participant who drew attention to the operational dynamics of artificial intelligence (AI) expressed their view as follows: "Since it is a system that operates with commands, it is a technology with a high error rate (K9)." Another participant stated: "Due to chronic problems, many technological devices malfunction and become unusable. For example, thousands of Tesla vehicles were recalled because of AI-related issues. Additionally, it affects employment, as AI and machines are replacing human labor. Another issue is energy consumption for instance, it is said that ChatGPT consumes a glass of

water every second just for cooling purposes (K34)." The primary reason for the high volume of water consumption in the data centers training large language models such as ChatGPT lies in their substantial electricity needs, which generate continuous heat, leading to thermal issues in servers. The cooling systems employed to keep these servers at optimal temperatures operate using water (<https://bilimgenc.tubitak.gov.tr/makale/chatgpt-insanlardan-dha-fazla-su-tuketiyor-olabilir>). Participant K34's statement adopts a more holistic approach by addressing not only the individual but also the systemic, sectoral, and environmental implications of AI technology. The reference to technical problems in Tesla vehicles and the resulting recalls highlights that even advanced technologies can pose challenges in terms of safety and sustainability. Furthermore, the participant underscores the impact of AI on employment, drawing attention to the potential risk of structural unemployment resulting from the replacement of human labor by machines.

Another prominent code within the theme of artificial intelligence is employment (13.8%). One participant expressed this concern as follows: "I think people will have difficulty finding jobs. Drones can be given as an example. In recent months, a training aircraft was flown unmanned for the first time. As these technologies advance, it may become possible to fly an aircraft from a computer, and with perfect and error-free software, the entire flight could be handled by artificial intelligence

(K34).” Participants’ evaluations regarding this theme reflect perceptions of the transformative and, at times, threatening impacts of AI technologies on the labor market. In particular, participant K34’s statement “I think people will have difficulty finding jobs...” indicates an awareness of a trend toward the replacement of human labor by technological advancements. The example of unmanned training aircraft reflects concerns about a future in which not only routine tasks but also high-risk and expertise-intensive professions could be performed without human involvement. Similarly, participant K28’s statement “Since it has the capacity to perform existing jobs, the need for human labor is significantly decreasing.” demonstrates an awareness of AI’s capacity to undertake routine tasks in production and service sectors. Moreover, participant K15’s remark “Although new job areas may be created, the number of positions replaced by advancing technology is greater.” emphasizes a concern about net job loss, even in the presence of emerging employment opportunities. Such expressions illustrate how the widely debated “creation vs. displacement” dilemma in the literature is perceived by the participants.

Within the scope of the study, the code of benefit, which emerged under the theme of “artificial intelligence,” indicates that participants view AI as a tool with societal and sectoral utility (2.3%). Participants’ statements under this code suggest that the technology generates positive effects not only on an individual level but also within institutional and strategic contexts. Particularly, participant K45’s comment “Since AI is constantly evolving, it is very helpful in both work and daily life.” highlights the role of AI in facilitating individuals’ lives. This statement reflects a high level of awareness regarding the integration of technological advancements into everyday life. In addition, participant K43’s comment “I think unmanned aerial vehicles will contribute to my department.” and participant K38’s statement “It contributes to the defense industry, such as UAVs, UCAVs, and things like the F10.” reflect the perception that AI can directly contribute to educational and professional development processes through its field-specific applications. In this context, AI is considered not only a tool that facilitates existing tasks but also a technology that enables strategic innovation and capacity

enhancement in specific disciplines.

Another code mentioned under the theme of artificial intelligence is security. A participant emphasizing the importance of security expressed it as follows: “AI is used in many areas to maintain high-level security (K38),” and “In terms of security, the importance of jobs such as aircraft manufacturing, maintenance, and control is increasing (K39).”

Within the scope of the study, three codes were created under the theme of job selection. As shown in Figure 6, these are indecision, public sector, and private sector. Figure 7 presents the statistics of the sub-codes of job selection.

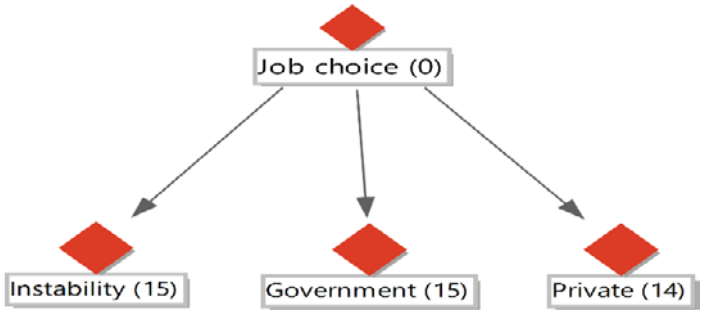


Figure 6. Hierarchical Code-Subcode Representation of the Job Selection Theme

The prominence of the codes indecision (34.1%) and public sector (34.1%) within the theme of job selection indicates a significant dilemma among participants regarding career choices. The preference for the private sector (31.8%) not showing a meaningful difference from these codes further reinforces the ambiguity in the selection process. One of the factors contributing to the high frequency of the indecision code is the perception that entering the public sector might be difficult due to the lack of personal references. Some participant comments on this issue are as follows: “I would like to work in the public sector. Since private sectors in Turkey are not regulated, I don’t think workers’ rights are protected (K42).”, “My definite choice is the public sector. The salary, vacation days, and benefits are better (K32).”, “The private sector will be my first choice. It is the sector where I think I will receive the quickest response in my effort to get a job right after graduation (K33).”, “I am considering progressing

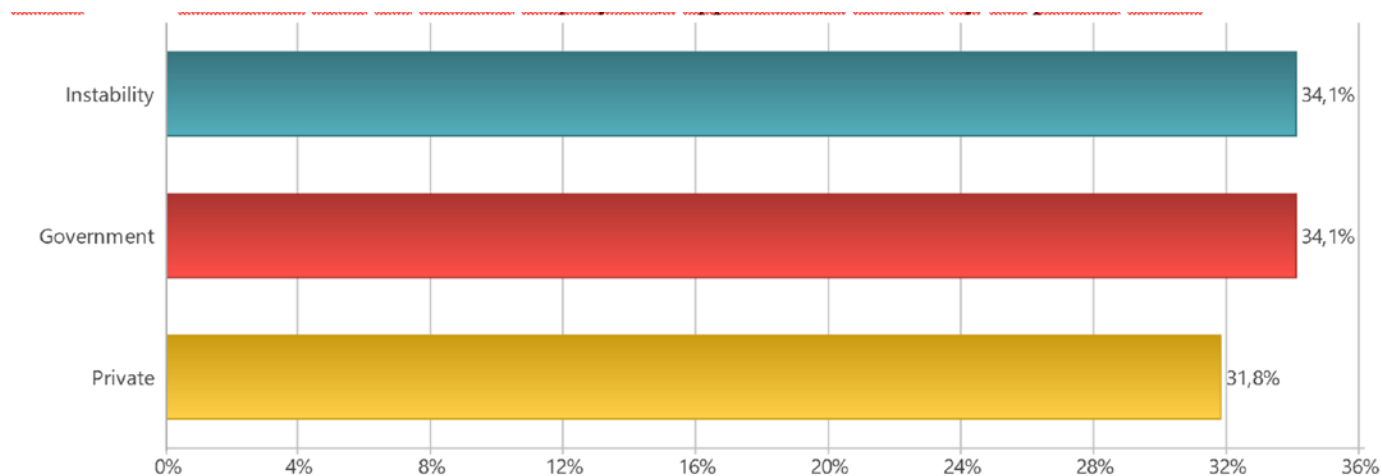


Figure 7. Statistics of the Sub-Codes of Job Selection

in the private sector because I think there are limited appointments and opportunities in the public sector (K26).” K42’s emphasis on the “lack of oversight” points to issues of corporate governance in the Turkish private sector. K32’s focus on “salary and fringe benefits” highlights the social protection dimension of public employment. K33’s emphasis on “rapid employment” reflects young people’s concerns about quick integration into the labor market. K26’s mention of the “appointment problem” draws attention to bottlenecks in public sector employment. These views can be associated with the flexible employment opportunities offered by the private sector.

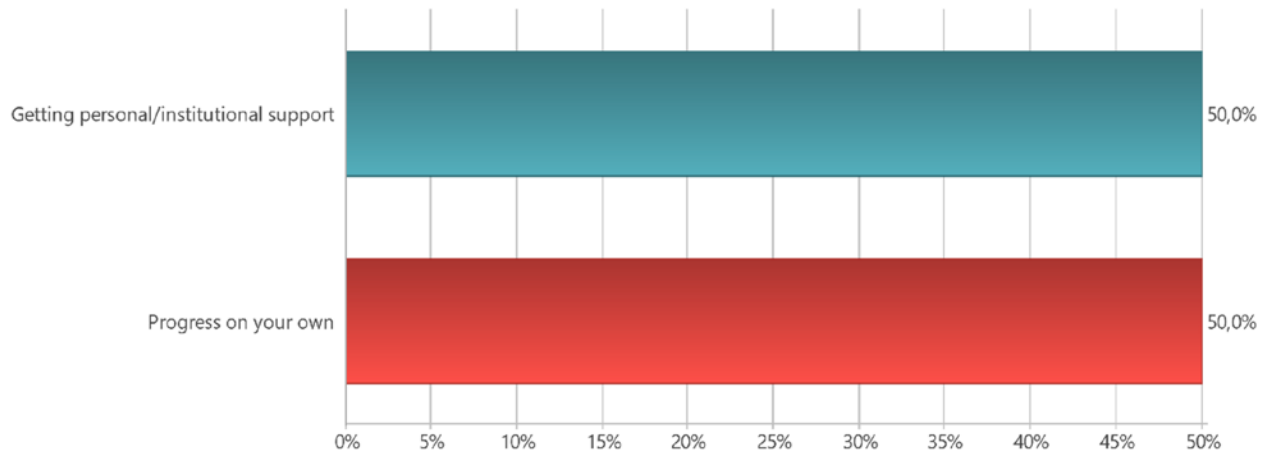
There are also participants who have not yet made a clear decision regarding the preference between the private and public sectors. Some of their statements are as follows: “I don’t think it is possible to distinguish between public or private sector employment at a time like this. In the current era, everyone should act based on specific criteria and self-awareness, and employment should be structured accordingly. One should choose the sector where there is more opportunity for the individual (K12).”, “I am considering choosing whichever offers more comfortable and suitable working conditions (K24).” K12’s reference to “specific criteria” emphasizes individual decision-making processes. K24’s emphasis on “more comfortable and suitable working conditions” reflects expectations related to work-life balance.

Within the scope of this study, two codes have been generated under the theme of career planning. As shown in Figure 8, these are receiving individual/institutional support and progressing independently. Figure 9 presents the statistics of the subcodes under the theme of career planning.



Figure 8. Hierarchical Code-Subcode Representation the Theme of Career Planning

The codes mentioned under the theme of career planning are receiving individual/institutional support and progressing independently (50%). Participants’ statements related to the code of receiving individual/institutional support are as follows: “I receive support from my family, professors, and university (K11).”, “I receive support from my teachers and close circle (K41).” K11’s reference to the triad of “family, professors, and university” illustrates the multi-layered nature of career support systems. K41’s emphasis on the interaction between teachers and close relations aligns with the collectivist tendencies embedded



in Turkish culture. Both participants indicate that they benefit from a combination of formal (institutional) and informal (personal) support mechanisms.

Participants' comments regarding the code of advancing independently are as follows: "Since I have been attending aviation high schools since secondary education, I have made a plan on my own (K1).", "I believe that there is no greater support than the one a person gives to themselves (K37)." Participants' explanations related to the code of advancing independently reveal that individual orientation and the perception of autonomy emerge as decisive elements in career planning. K1's statement, "Since I have been attending aviation high schools since secondary education, I have made a plan on my own," indicates that

the participant has developed a conscious and systematic career strategy in line with their vocational orientation from an early stage. On the other hand, K37's expression, "I believe that there is no greater support than the one a person gives to themselves," emphasizes the individual's intrinsic motivation and perception of self-efficacy. This statement demonstrates that, in addition to external support mechanisms, the confidence in one's own potential plays a critical role in career planning.

Figure 10 presents a word cloud generated based on the frequency of expressions used throughout the study. In constructing the distribution of expressions, the number of times each phrase appears in the text was taken into account. The word cloud includes only those expressions



Figure 10. Word Cloud

that appeared at least five times. Codes displayed in larger font sizes indicate expressions that were used more intensively, whereas those in smaller font sizes represent expressions with lower frequency. As a result of the word analysis, the most frequently associated words in this study were identified as aviation, I think, I don't think, job, artificial, employment, and intelligence.

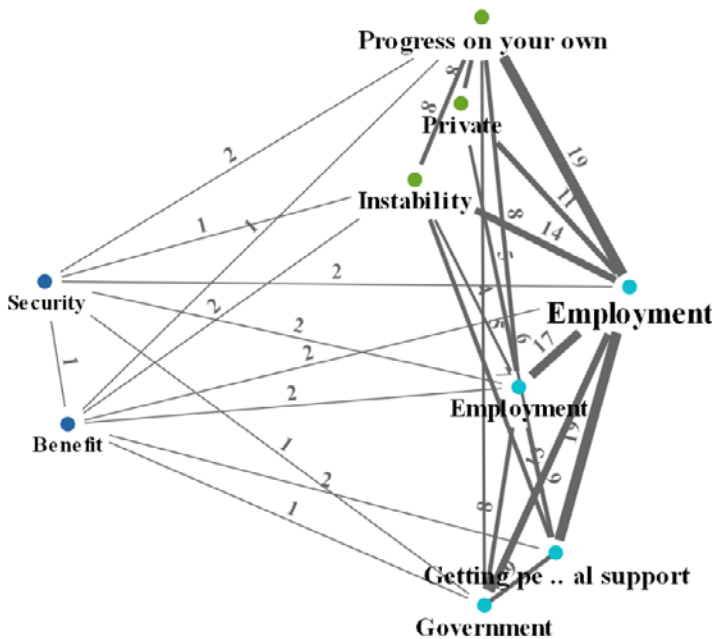


Figure 11. Code Map

The codes frequently mentioned throughout the study are illustrated in Figure 11. The map displays the relationships between codes and highlights which codes tend to co-occur. The thickness of the lines represents the strength of the association, with thicker lines indicating more frequent co-occurrence of codes. Accordingly, the participants referred to aviation-based employment, artificial intelligence-based employment, security, benefit generation, self-directed progress, private sector, public sector, individual/institutional support, and indecisiveness. Based on the code map, the most frequently co-occurring themes are employment, individual/institutional support, indecisiveness, self-directed progress, and private sector.

CONCLUSION AND RECOMMENDATION

The continuous development of new technologies and their implementation in the labor market raises a fundamental

question: What will be the impact on employment? With the emergence of artificial intelligence (AI) technologies and their increasing use across various sectors, concerns about machines replacing human labor have become evident, naturally leading to employment-related anxieties. Although AI contributes positively by reducing costs, minimizing errors, and increasing efficiency, it has also been associated with job losses. This concern is no different in the aviation sector, where AI is heavily utilized in nearly every domain. As AI technology advances, students’ pre-existing concerns about unemployment have become more pronounced. This study explores the views of undergraduate students in aviation management regarding AI technologies and employment anxiety. Adopting a qualitative design, the data were analyzed using Maxqda software.

This phenomenological research reveals that aviation management students perceive AI both as a source of opportunity (43.1% positive aspects) and as a threat to employment (39.2% negative aspects). Particularly within the aviation industry where AI is extensively implemented students acknowledge the potential of AI to create new job opportunities (K1, K35), yet also express growing concerns about unemployment due to automation replacing human roles (K2, K34). This dual perspective aligns with Nakamura and Zeira’s (2018) concept of the automation paradox, which suggests that while technological displacement initially reduces jobs, it ultimately stimulates labor demand through the emergence of new industries.

The perceived growth potential of the aviation sector (30.8% “promising future” code) alleviates some employment concerns due to students’ belief in the industry’s dynamic structure and its ability to sustain job opportunities (K3, K19). However, 33.8% of the coded responses emphasized employment concerns related to favoritism and reference-based hiring systems (K16, K20), supporting Sheikhi’s (2022) findings that AI may exacerbate labor market inequalities. Notably, upper-year students (3rd/4th years) demonstrated higher levels of AI awareness and career preparedness compared to first- and second-year students, which aligns with Kaya’s (2023) longitudinal analysis on the progression of technological anxiety among aviation students.

Regarding the research question “What are aviation management students’ perceptions of artificial intelligence technologies?”, the data indicate that students believe AI technologies will generate new employment opportunities. In response to the research question “What are aviation management students’ perceptions of job opportunities in the aviation sector?”, the findings reveal that students consider the aviation industry to offer abundant employment prospects due to its promising future. Concerning the research question “Does the use of artificial intelligence technologies in the aviation sector increase unemployment?”, the findings demonstrate that aviation management students anticipate that AI technologies will lead to employment-related problems. In addressing the research question “What is the level of knowledge aviation management students have about the aviation sector?”, the data reveal a divide: some students possess substantial knowledge about AI and show a tendency to research and learn, while others lack adequate information and show little effort to increase their knowledge. This discrepancy may be attributed to the fact that 3rd- and 4th-year students are closer to entering the workforce and therefore experience greater employment anxiety, which heightens their interest in AI; conversely, 1st- and 2nd-year students, who have two to three years before graduation, tend to feel less pressure regarding employment. These findings are supported by a range of previous studies (Akçakanat, 2024; Kaya, 2023; Adaş & Erbay, 2022; Takıl, Erden & Sarı Arasıl, 2022; Sheikhi, 2022).

In light of the data and analyses, it is recommended that students enhance their skill sets and competencies in alignment with current industry conditions and closely follow technological advancements to implement them in practice. Only in this way can they gain a competitive edge over their peers and increase their chances of securing employment. Consequently, the rate of unemployment-related anxiety may be significantly reduced. Furthermore,

integrating courses focused on artificial intelligence (AI) technologies into academic curricula could enable students to develop a deeper understanding of the subject. Since its emergence, AI has both created new occupational fields and led to the obsolescence of certain professions. Ultimately, rather than causing long-term employment issues, AI is expected to contribute to sustainable development by supporting business decision-making processes and enhancing competitive advantage. In this context, it would be beneficial to provide students with relevant information to help them develop a strategic action plan based on an awareness of this transformation.

One of the limitations of this study is its focus on a specific sample, conducted within a single university and in a single department (aviation management), which may limit the generalizability of the findings to other regions or disciplines. The study is also bound by the timeframe during which it was conducted; changes in students’ attitudes and perceptions may occur over time. Moreover, the exclusive use of qualitative analysis (via MAXQDA) may reduce the statistical robustness of the study.

To guide future research, it is suggested that studies should not be confined to a single study group or institution. In order to reach a more comprehensive sample, future research could also include employed individuals, thereby examining their perspectives on this issue. Conducting a quantitative counterpart to this qualitative study would allow for a more multifaceted evaluation. Future researchers are also encouraged to explore the universal and context-specific impacts of AI on workforce transformation in aviation, healthcare, and logistics; assess the effects of AI-related courses, such as unmanned aerial vehicle (UAV) operations, on employment readiness; and examine the effectiveness of internship programs in AI-supported roles (e.g., autonomous traffic management).

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Ethical Approval

This study was conducted with ethical approval from the Cappadocia University Ethics Committee 26.12.2023/E-64577500-050.99-62754.