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Skills of Different IT Departments and Recommendations for Those Who Want to Work in This Field

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Abstract

This study examines the qualifications of different IT departments and provides recommendations for those who aspire to work in this field. With the rapid advancement of technology and the digital transformation of the business world, the importance of IT departments has increased. However, variations in qualifications among different IT departments raise questions for those interested in working in this field. In this context, there is a growing need for a skilled workforce and collaboration between educational institutions and employers is necessary. With the increase in job opportunities in the IT sector, investment in enhancing employees' skills and utilizing new training methods is recommended. The rapid development of the IT sector in Turkey and the increasing demand for qualified workforce should also be taken into consideration. Those who aspire to work in the IT sector should receive proper education to specialize in a specific area and continuously update their qualifications.

Keywords: IT industry, employment, personal development

1. Introduction

With the rapid advancement of technology and the business world keeping up with digital transformation, Information Technology (IT) departments have gained significant importance. Almost all businesses require IT departments to make their operational processes more efficient and effective. However, due to variations in qualifications among different IT departments, individuals interested in working in this field may have questions about which areas to focus on. With the increasing job opportunities in the IT sector in the United States, attention is drawn to the growing need for a skilled workforce, emphasizing the importance of collaboration between educational institutions and employers to meet this demand (Moon, Bartholomew, & Weitlauf, 2017).

The results of another study conducted in Malaysia indicate that employees in the IT sector are insufficient in areas such as software development, network management, and database management (Ünal, İ., 2017). With the increase in job opportunities in the IT sector, there is a growing need for a skilled workforce, emphasizing the importance of employers investing more in talent development. Furthermore, solutions such as collaboration between educational institutions and employers, the use of new and innovative training methods, and the establishment of programs within companies to develop internal talent are recommended (Michael, O. E., 2019). The rapidly developing nature of the IT sector in Turkey and the increasing demand for a qualified workforce are evident in the data from the Turkish Statistical Institute (TÜİK) in 2022. The IT sector has increased its share in the country's economy and the number of people employed in the sector has approached 400,000. Therefore, enhancing the availability of young generations in the IT sector is believed to contribute to the sector's development.. (TÜİK. (2022). Information and Communication Technology Statistics). The Ministry of National Education (MEB) has set goals in its 2018-2023 Strategic Plan to provide technology-focused education to students, update and enrich the curriculum of computer courses to enhance the use of information technology and software development skills. In line with these goals, the content of computer courses in secondary education is being aligned with the needs of the IT sector (Ministry of National Education, 2019, 2018-2023 Strategic Plan). Additionally, the demand for IT workforce in Turkey is supported by data from the Turkish Employment Agency (İŞKUR). According to İŞKUR data, the unemployment rate in the IT sector in Turkey is quite low, and the need for qualified professionals in the IT sector is continuously increasing (İŞKUR, 2021, Labor Market Report 2020). The IT sector is one of the fastest-growing industries today, encompassing various disciplines. However, this rapid growth increases the demand for a skilled workforce. Individuals aspiring to work in the IT sector need to receive proper education and guidance to specialize in a specific area. Research emphasizes the need for continuous updating of competencies for IT professionals. Therefore, regular training and development programs can help IT professionals enhance their qualifications and assist employers in gaining a competitive advantage. IT departments need to be equipped with employees possessing different qualifications to adapt to the digital transformation of businesses. As a result, IT departments can be more efficient by

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employing specialized professionals in different fields (Çavuş, 2004). As advancements in IT and software progress rapidly, students should be provided with up-to-date information about new technologies and trends. Particularly, the introduction and development of computational thinking skills, which emerge as a new concept, should be the first step in the process of equipping teachers with the responsibility of teaching these skills. Moreover, identifying individual shortcomings, deficiencies, and inadequacies through tutorial supervision, observations, and program implementation, and involving relevant teachers in personal professional development programs are believed to have a positive impact. As a result, students will not only understand existing technologies but also quickly adapt to new technologies used in the business world. Additionally, students need to be equipped not only with technical skills but also with skills such as analytical thinking, problem-solving, communication, and collaboration. These skills are crucial for students to succeed in the business world (İliç, Mercimek, 2017). Information technology plays a significant role in business processes in the business world. However, many businesses lack adequate tools to measure the impact of information technology. Therefore, a suitable measurement system should be developed to assess the effects of information technology on business performance. This measurement system will assist businesses in utilizing information technology more efficiently and enhance overall business performance (Dulkadir & Akkoyun, 2013). The use of IT within organizations also increases employee motivation. As businesses rapidly progress towards institutionalization, the need for IT has become even greater. Hence, there is a requirement for employees who are skilled and knowledgeable in the field of IT. By providing support to individuals proficient in this field and offering necessary training to those lacking expertise, businesses positively contribute to employee motivation. When employee motivation is increased, overall business performance improves (Varışlı, 2021). In today's digitalized world with rapid technological advancements, the importance of information technology (IT) departments is emphasized. IT departments manage the digital infrastructure, resolve technological issues, and contribute to the successful implementation of the company's digital strategy. However, there may be variations in competency levels among different IT departments.

This study provides important guidance for individuals interested in working in the IT sector, aiming to help businesses succeed in their digital transformation processes. By examining the competencies of IT departments, the study offers appropriate training and guidance recommendations for those who want to work in this field. The objective of the study is to present strategies that will assist in the effective management of digital infrastructures within businesses. Additionally, it will contribute to enhancing the employability of the younger generation in the IT sector and play a crucial role in meeting the demands of the labor market. This study has an academic nature and aims to be a valuable resource for individuals interested in the IT industry. The minimum competencies required for individuals working in different departments within the IT field are summarized above. The variations in tasks performed by different sub-departments lead to differences in the required competencies. Expressing the necessary competencies and what needs to be done to acquire them by experts working in these areas is considered to be a guiding factor for individuals who aspire to work in the IT sector. Therefore, this study aims to present competencies and recommendations based on the opinions obtained through interviews with professionals specialized in various sub-departments of the IT sector. Within this scope, the research problem is defined as follows: What are the most in-demand competencies among different IT departments today, and what recommendations are there to acquire these competencies? The sub-problems that seek answers related to this problem are as follows:

1. What are the competencies?
2. What should be done to acquire these competencies?

2. Corporate Framewok

Software, network systems, cybersecurity, artificial intelligence, data analysis, and help desk departments are vital departments for businesses in today's technology age. These departments perform critical functions such as protecting digital assets, managing network and computer systems, developing software and applications, and resolving user issues. Through a review of the literature in the field, it is evident that IT departments consist of several subunits, but six departments stand out and receive more focus and attention, indicating the presence of distinct activities within them. Therefore, this study specifically identifies these six departments.

2.1 Software Department

The software development department is responsible for the development and maintenance of a company's or organization's software-based products. Those who wish to work in the software development department should first enhance their technical skills, practice and master programming languages and software development tools, and develop skills such as effective communication within a team, problem-solving abilities, teamwork, and project management. Various positions within this department include software engineers, software developers, test engineers, project managers, and product managers. (Bass, McDermott, Lalchandani, 2015). The software department should consist of individuals who closely follow technological advancements, possess analytical

thinking skills, adapt well to teamwork, and have strong communication skills. Additionally, a team that is open to learning and change, has developed problem-solving abilities, pays attention to details, and takes a customer-focused approach will ensure successful completion of software projects. Employees in the software department should continuously improve themselves, be open to learning and implementing new technologies. Furthermore, they should establish strong communication with other teams during the software development process, adapt well to teamwork, and understand customer requirements to provide suitable solutions. Consequently, to enhance the qualifications of the software department and improve the skills of employees, it is necessary to stay up to date with technological innovations, participate in training, and continuously improve in areas such as project management and communication. Furthermore, having knowledge in areas such as user experience, design, and testing is important in understanding customer needs and providing appropriate solutions. (Kaptanoğlu, Gündüzyeli, 2021). Employees in the software department also work on understanding customer needs and requirements, troubleshooting issues during code development, ensuring software testing, measuring performance, and ensuring the sustainability and security of the software. Additionally, documentation of the software and user training are also responsibilities of the department. It is important for employees in the software department to have access to the technological infrastructure required to access tools, hardware, and software used in software development. Finally, effective management of the department and adopting a culture of open communication can increase employee productivity and happiness.

2.2 Cybersecurity Department

The cybersecurity department is a department created to protect and defend an organization's (company, government agency, etc.) digital systems against cyber threats. This department develops cybersecurity policies, identifies security vulnerabilities, and takes measures to prevent them. It also establishes defense and response strategies against cyber attacks and provides cybersecurity training. The cybersecurity department is responsible for the confidentiality, integrity, and accessibility of digital data. It should consist of individuals who closely follow current technological advancements, possess analytical thinking skills, and are capable of working in teams. Additionally, having an experienced team that can produce solutions to protect sensitive information, develop defense strategies against current cybersecurity threats, and handle crisis management plays a vital role in ensuring the organization's cybersecurity. Those considering working in the cybersecurity department should keep up with current technological advancements, gain knowledge about cybersecurity threats, and develop analytical thinking skills. Technical proficiency is highly important while working in the cybersecurity department. Some of the required skills may include:

- Understanding of network security concepts
- Knowledge of firewalls, IDS/IPS, antivirus, and other security devices
- Ability to perform technical security assessments such as penetration testing and vulnerability scanning
- Familiarity with data encryption techniques and protocols

Technical skills in configuration management, system administration, and database management Furthermore, improving crisis management and communication skills, developing defense strategies against current cybersecurity threats, and adopting a customer-focused approach are important for playing an effective role in ensuring the organization's cybersecurity. To enhance the capabilities of the cybersecurity department and improve employees' skills, it is necessary to receive cybersecurity training, enhance crisis management and communication skills, closely follow current technological advancements, and develop defense strategies against current cybersecurity threats. Additionally, the organization should adopt a customer-focused approach and establish effective communication between the cybersecurity department and other teams, which is crucial for maintaining cybersecurity (Hekim, Başıbüyük, 2013).

2.3 Network Systems Department

Network Systems departments are responsible for meeting the information processing needs of organizations, managing and maintaining the network infrastructure. They oversee network hardware and software, monitor network performance, establish and enforce network security policies. Additionally, the Network Systems department keeps up with emerging technologies, optimizes the network infrastructure, and implements necessary improvements to enhance its efficiency. The technical knowledge required for individuals aspiring to work in the Network Systems department can be outlined as follows:

- Network hardware and software: Understanding how network management, network hardware, and software work, including the tools used to manage connections and data flow between network devices.
- Network protocols: It is important to have knowledge about network protocols such as TCP/IP, DNS, DHCP, and SNMP. These protocols are essential for ensuring the proper functioning of the network infrastructure.

- Security: Professionals in the Network Systems department should have knowledge of network security. They need to be familiar with identifying security vulnerabilities, implementing preventive measures against attacks, and authenticating the identities of users accessing the network.
- Backup and recovery: Understanding the backup and recovery of network data is crucial. This ensures the quick reestablishment of the network in cases of data loss or disruptions.
- Troubleshooting: The Network Systems department must possess troubleshooting skills to identify and resolve network problems. They should also be able to provide improvement recommendations to enhance network efficiency and address performance issues.

Individuals who wish to work in the Network Systems department should possess not only technical skills but also strong communication and collaboration abilities. The Network Systems department plays a critical role in ensuring smooth information and communication flow among different units within an organization. Therefore, it is important for employees in the Network Systems department to have the skills to effectively communicate and collaborate with other departments. Additionally, individuals working in the Network Systems department should be prepared to continuously learn and stay up-to-date with the latest technological advancements. This may involve participating in certification programs or relevant courses, attending conferences, and utilizing other resources to stay technically current (Kendall, K. E., & Kendall, J. E. ,2003).

2.4 Artificial Intelligence Department

The Artificial Intelligence Department is a division within an organization that focuses on artificial intelligence technologies. This department is responsible for the design, development, implementation, and management of artificial intelligence systems. These technologies can be applied in a wide range of applications, such as natural language processing, image processing, robotics, and games.

The technical knowledge required for individuals who want to work in the Artificial Intelligence Department can be listed as follows:

- Mathematics: Proficiency in mathematical subjects such as linear algebra, probability theory, differential equations, and statistics is necessary.
- Programming: Knowledge of programming languages such as Python, Java, C++, and R is required.
- Data Science: Familiarity with data cleaning, data analysis, and data mining is important.
- Machine Learning: Understanding machine learning algorithms, linear and nonlinear regression, classification, and clustering techniques is necessary.
- Natural Language Processing: Knowledge of natural language processing techniques, language modeling, and word vectors is required.
- Deep Learning: Familiarity with deep learning networks, neural networks, CNN, RNN, and LSTM is important.
- Computer Vision: Knowledge of image processing techniques, image segmentation, and classification is necessary.

In addition to technical knowledge, individuals working in the artificial intelligence department should possess the following qualities:

- Innovative Thinking: Employees in the artificial intelligence department should continuously generate new ideas and provide innovative solutions.
- Problem Solving: The artificial intelligence department is designed to tackle challenging problems. Therefore, employees should be skilled in problem identification, analysis, and resolution.
- Communication Skills: Employees in the artificial intelligence department should be able to explain technical concepts to both technical and non-technical personnel. Therefore, strong communication skills are crucial.
- Teamwork: Employees in the artificial intelligence department work in teams. Thus, the ability to collaborate, interact with others, and work effectively as part of a team is important.
- Learning Agility: Artificial intelligence is a rapidly evolving field, with new technologies and methods emerging continuously. Therefore, individuals working in the department should be open to learning and development.

The above-mentioned qualities are essential for individuals working in the artificial intelligence department, beyond their technical knowledge. These qualities can contribute to their success and increase work efficiency. The responsibilities of employees in the artificial intelligence department include developing new artificial intelligence applications, improving existing applications, conducting data analysis, managing artificial intelligence projects, and promoting artificial intelligence technologies both internally and externally within the company.

2.5 Help Desk Department

The Help Desk Department is a unit where a company provides customer support services. This department handles and resolves issues, requests, and complaints related to products or services that customers may have. Help desk departments interact with customers through various communication channels such as telephone, email, live chat, or ticketing systems. The main duty of the help desk department is to promptly and effectively address customer issues in order to enhance customer satisfaction. The department must work efficiently to maintain the highest level of customer satisfaction. Therefore, employees in this department should possess high technical knowledge, strong communication skills, and problem-solving abilities. Additionally, time management and stress management skills are important for providing quick and accurate responses to customer inquiries. Help desk department employees should also undergo regular training based on the business needs, keep up with technological advancements, and continuously update their skills. (Güzel, 2020).

For those considering working in the help desk department in businesses, the technical knowledge they should possess includes the following:

- Basic knowledge of computer hardware and software: Help desk department employees should have knowledge of basic computer hardware and software to understand and resolve technical issues faced by customers.
- Knowledge of network and internet technologies: Help desk departments also handle customer issues related to network and internet connectivity. Therefore, employees should have knowledge of network and internet technologies.
- Database management: Help desk department employees are responsible for managing customer data related to products and services. Therefore, having knowledge of database management is important.
- Communication technologies: The help desk department uses various technologies to directly communicate with customers. Therefore, employees should have knowledge of communication technologies.
- Problem-solving skills: Help desk department employees should possess problem-solving skills to quickly and effectively resolve customer issues. These skills can enhance customer satisfaction and maintain the company's reputation.

2.6 Data Analysis Department

The Data Analytics Department collects, analyzes, and derives meaningful insights from a company's data to support its strategic decisions. The employees in this department are responsible for tasks such as data collection, analysis, interpretation, and reporting. The technical skills required for individuals interested in working in the Data Analytics Department include:

- Database Management: Employees in the data analytics department should have knowledge of database management for data collection, storage, and management purposes.
- Data Mining: Employees in the data analytics department should be familiar with data mining techniques to identify patterns and relationships within the data.
- Programming Languages: Employees in the data analytics department should be able to use programming languages to analyze and report data. Commonly used languages in this field include Python, R, etc.
- Statistics: Employees in the data analytics department should have knowledge of statistics for data interpretation and reporting.
- Data Visualization: Employees in the data analytics department should be able to create visualizations such as graphs, tables, and infographics using tools to represent the data.

The personel skills required for individuals interested in working in the Data analysis department include:

- Analytical Thinking: Employees in the data analytics department should have analytical thinking skills to analyze and interpret data.
- Problem-Solving: Employees in the data analytics department should have problem-solving skills to identify and solve issues within the data.
- Communication: Employees in the data analytics department should be effective communicators when sharing analyzed data with other teams within the company.
- Teamwork: Employees in the data analytics department should have teamwork skills as they collaborate with other teams to analyze and interpret data.
- Openness to Learning: Employees in the data analytics department should be open to continuous learning as data analytics technologies evolve rapidly.

3. Method

3.1 Research Methodology

This study was conducted in accordance with the Case Study method. Case study is a strategic approach where a single case or event is examined in detail, systematic data collection is conducted, and real-life situations are observed. In this study, focusing on the IT sector employees in a company, the research was carried out in line with the case study methodology.

3.2 Study Group

The participants of the study were selected from experienced professionals working in different IT departments. The selection of participants was based on the characteristics of their respective departments. A interview form was used as the data collection tool for the study. The sample of the research consists of 32 personnel working in various IT departments of Belbim A.Ş, a subsidiary of Istanbul Metropolitan Municipality. To select the participants, departments that are relevant to the purpose of the research were initially identified. Participants were randomly selected from among individuals working in these departments and positions. The interviews were conducted individually. Demographic information, including age, gender, experience, and education status of the participants, was collected. The average age of the participants is 33. Among the participants, 19 are male and 13 are female. The average work experience of the participants is 7.8 years. One participant has an associate degree, 21 participants have a bachelor's degree, and 10 participants have a master's degree.

Table1.Demographic Information

Demographic Information	**Value**
Average Age	33
Total Number of Participants	32
Number of Males	19
Number of Females	13
Average Work Experience 7.8	7,8 years
Number of Participants with Associate Degree	1
Number of Participants with Bachelor's Degree	21
Number of Participants with Master's Degree	10

3.3 Procedures

The process started with interviews conducted to examine the competencies of different IT departments and gather recommendations for those who want to work in the IT industry. Notable points from the interviews were quickly noted and then analyzed using content analysis methods. These analyses were used to determine the requirements of IT departments and the skills that prospective employees should acquire.

3.4 Data Collection Instruments

A semi-structured interview form was designed to answer the research questions of this study. The prepared form was reviewed by a subject expert, who is a faculty member, and made ready for implementation. The form consists of six open-ended semi-structured questions to gather demographic information such as age, gender, education level, work experience, and department, as well as information regarding recommendations and competencies. The interviews were conducted face-to-face on an individual basis. The interviews encompassed participants' competencies, skills, experiences, and career advice. The form was prepared to collect information about the years of experience, gender, department, and education level of individuals working in the IT sector, and also to learn their professional qualifications and opinions about their careers.

3.5 Data Analysis

The data obtained from the interviews were analyzed using content analysis methods. The findings have provided recommendations for building a successful career in the IT sector.

4. Findings

The data was collected through interviews and analyzed using content analysis method. In this section, the obtained data will be presented in the form of frequency tables.

Table 2. Findings regarding software department competencies

Competencies	**Frequency(n=5)**	**Percentage**
Programming languages	1	20%
Database management	1	20%
Project management	1	20%
Software testting	1	20%
Network management	1	20%
Data analysis	1	20%
Software architecture	1	20%
Security	1	20%
Front-end technologies	1	20%
UI/UX design	1	20%
Web applications	1	20%
Machine learning	1	20%

The table presents the competencies possessed by 5 individuals working in the software department and the percentage of individuals having each competency. Each competency is expressed by one person, and the frequency of each competency is 1. The percentage column represents the distribution in percentage for each competency, with each competency having a 20% ratio.

Table 3. Findings Regarding Recommendations for the Software Department

Recommendations	**Frequency(n=5)**	**Percentage**
Participaiting in online training courses	3	60%
Keeping up withcurrent technology and industry trends	3	60%
Sharing knowledge	2	40%
Continuous self-improvement	2	40%
Team work	1	20%
Internal company training programs	1	20%
Certification	1	20%
Networking	1	20%

According to the above table, the recommendations with the highest frequency are "Participating in online training courses" and "Keeping up with current technology and industry trends" (60%). Following that, the recommendations for "Knowledge sharing" and "Continuous self-improvement" have a frequency of 40%. "Teamwork", "Internal company training programs", "Certification", and "Networking" are other recommendations, each with a frequency of 20%.

Table 4. Findings Regarding Cybersecurity Department Competencies

Competencies	**Frequency(n=5)**	**Percentage**
Network security	4	80%
Penetration testing	3	60%
DLP management	2	40%
Cyber incident response	2	40%
Ethical hacking	2	40%
Crisis management	2	40%
Firewall management	1	20%
Threat assessment	1	20%
SOC management	1	20%
Threat analysis	1	20%
Security management	1	20%

According to the table, the competency with the highest frequency is "Network security" (80%). The second highest competency is "Penetration testing" with a frequency of (60%). The competencies of "DLP management", "Cyber incident response", "Ethical hacking", and "Crisis management" have a frequency of 40%. The competencies of "Firewall management", "Threat assessment", "SOC management", "Threat analysis", and "Security management" have a frequency of 20%.

Table 5. Findings Regarding Recommendations for the Cybersecurity Department

Recomenmendations	**Frequency(n=5)**	**Percantage**
Self-improvement	5	100%
Education and certifation	2	40%
Monitoring security threats	1	20%
Creating a test environment	1	20%

According to the above table, the recommendation with the highest frequency is "Self-improvement", emphasized by all participants (100%). The recommendation for "Education and certifications" is suggested by 40% of the participants. "Monitoring security threats" and "Creating a test environment" are other recommendations, each with a frequency of 20%.

Table 6. Findings Regarding Competencies for the Network Systems Department

Competencies	**Frequency(n=5)**	**Percantage**
Switching	5	100%
Routing	4	80%
SDN	4	80%
Cloud technologies	4	80%
Network management	3	60%
Firewall	3	60%
VPN	3	60%
Linux sistem administration	3	60%
SAN	2	40%
Ağ design	1	20%
Load Balancer	1	20%
WAN	1	20%
Active Directory	1	20%
Windows server	1	20%

According to this table, the most common competencies include Switching (100%), Routing (80%), SDN (Software-Defined Networking) (80%), and Cloud technologies (80%). This indicates that the employees in the department generally possess a good competency in these areas. Other competencies have lower frequencies.

Table 7. Findings Regarding Recommendations for the Network Systems Department

Recommendations	**Frequency(n=5)**	**Percantage**
Communication skills	2	40%
Technical document comprehension	2	40%
Problem-solving skills	2	40%
Leadership skills	2	40%
Self-improvement	1	20%
Openness to new technologies	1	20%
Teamwork	1	20%

According to the above table, the recommendations with the highest frequency are communication skills, technical document comprehension, problem-solving skills, and leadership skills. Each of them has a frequency of 40%. Self-improvement, openness to new technologies, and teamwork recommendations have a frequency of 20% each. This table demonstrates which skills and attributes are considered important based on the recommendations provided by the employees in the network systems department.

Table 8. Findings related to the competencies of the Artificial Intelligence department.

Competencies	**Frequency(n=5)**	**Percantage**
Data mining	5	100%
Machine learning	5	100%
Pythhon, Keras, Tensorflow	5	100%
Natural language processing	4	80%
Deep learning	3	60%
Artificial neural networks	2	40%

According to the table, the competencies of "Data mining," "Machine learning," and "Python, Keras, Tensorflow" rank highest with a percentage of 100%. Following them are the competencies of "Natural language processing" (80%), "Deep learning" (60%), and "Artificial neural networks" (40%).

Table 9. Findings on recommendations for the Artificial Intelligence department.

Recommendation	**Frequency(n=5)**	**Percantage**
Self-improvement	5	100%
Domain expertise	1	20%
Project participation	1	20%
Professional training	1	20%
Open-source projects	1	20%
Coding skills	1	20%

According to the above table, the recommendation with the highest frequency is "Self-improvement", which has been given by all participants and has a frequency of 100%. The recommendations for domain expertise, project participation, professional training, open-source projects, and coding skills each have a frequency of 20% and are evenly distributed among the competencies.

Table 10. Findings regarding the competencies of the Help Desk department.

Competencies	**Frequency (n=6)**	**Percantage**
Technical skills	2	33.33%
Communication skills	2	33.33%
Project management	1	16.67%
Team coordination	1	16.67%
Teamwork	1	16.67%
Cloud computing expertise	1	16.67%
Professional development	1	16.67%
Goal setting	1	16.67%
Participation in mentorship programs	1	16.67%

According to the table, the competencies of "Technical skills" and "Communication skills" are ranked highest with a percentage of 33.33%. Following them are the competencies of "Project management," "Team coordination," "Teamwork," "Cloud computing expertise," "Professional development," "Goal setting," and "Participation in mentorship programs" with a percentage of 16.67%.

Table 11. Findings regarding recommendations for the Help Desk department

Recommendation	**Frequency (n=6)**	**Percantage**
Self-improvement	3	60%
Online courses and certifications	2	40%
Cloud computing	2	40%
Teamwork	1	20%
Presentation skills	1	20%
Professional networking	1	20%

According to the above table, the highest frequency recommendation is "Self-improvement", which was given by 3 participants and has a frequency of 60%. The recommendations for online courses and certifications, as well as cloud computing, were given by 2 participants each and have a frequency of 40%. The recommendations for teamwork, presentation skills, and professional networking have a frequency of 20% each.

Table 12. Findings on skills of Data Analysis department.

Competencies	**Frequency (n=6)**	**Percantage**
Data mining	4	66.67%
Data visualization	4	66.67%
Statistics	2	33.33%
Big data management	2	33.33%
Big data analysis	2	33.33%
Programming	1	16.67%

Continued Table 12

Database management	1	16.67%
Machine learning	1	16.67%
Business intelligence	1	16.67%

According to the table, "Data mining" and "Data visualization" skills are ranked highest with a percentage of 66.67. Following them are "Statistics," "Big data management," and "Big data analysis" skills with a percentage of 33.33. "Programming," "Database management," "Machine learning," and "Business intelligence" skills have a lower percentage of 16.67.

Table 13. Findings regarding recommendations for the Data Analysis department.

Recommendation	**Frequency (n=6)**	**Percantage**
Continuous self-improvement	2	33.3%
Keeping up with new technologies	2	33.3%
Enhancing data security	2	33.3%
Collaborating to develop strategies	1	16.7%
Developing technical and communication skills	1	16.7%
Effectively presenting findings	1	16.7%
Keeping track of tools used in data analysis	1	16.7%

According to the above table, the recommendations with the highest frequency are "Continuous self-improvement," "Keeping up with new technologies," and "Enhancing data security." Each recommendation was provided by 2 participants and has a frequency of 33.3%. The participants who suggested collaborating to develop strategies, developing technical and communication skills, effectively presenting findings, and keeping track of tools used in data analysis have a frequency of 16.7% each.

Table 14. Findings on common competencies Across departments.

Competencies	**Frequency (n=32)**	**Percantage**
Data mining	9	28.12
Machine learning	8	25.00
Network security	7	21.88
Firewall management	4	12.50
Data analysis	3	9.38
Programming	2	6.25
Database management	2	6.25

According to the table, the highest percentage of competency is "Data mining" (28.12%), indicated by 9 individuals. Following that are "Machine learning" (25.00%), "Network security" (21.88%), "Firewall management" (12.50%), "Data analysis" (9.38%), "Programming" (6.25%), and "Database management" (6.25%).

Table 15. Findings on common recommendations Across departments.

Recommendations	**Frequency (n=32)**	**Percantage**
Continuous self-improvement	18	33.3
Certification	5	15.62
Communication skills	4	12.50
Teamwork	4	12.50

In the table, the recommendation of "Continuous self-improvement" has the highest frequency, suggested by 56.25% of the participants. This emphasizes the need for employees to continuously renew themselves to advance their careers and enhance their knowledge and skills. The recommendation of "Certification" has a frequency of 15.62%, and 12.50% of the participants have suggested both "Communication skills" and "Teamwork".

5. Results and Discussion

The data obtained in this study, which aims to determine the competencies and recommendations of employees working in different IT departments and provide guidance to those who want to pursue a career in this field, are highly informative and guiding. When examining the information that overlaps with the data from

the Tübider IT Industry Association (2020), individuals who aspire to work in the software department should focus on identifying their desired position and acquiring the relevant competencies for that position. To learn and develop these competencies, it is important to participate in online training programs and stay updated with current technology and industry trends. Those planning a career in the cybersecurity department should acquire skills such as network security, penetration testing, and DLP management, while continuously updating and improving themselves through education and certifications. As for individuals aspiring to work in the network systems department, they should obtain skills in switching, routing, SDN, cloud technologies, network management, and firewall, while also honing their communication skills, problem-solving abilities, and technical documentation comprehension. Those considering a career in the field of Artificial Intelligence, as mentioned by Taştan (2018), should have a command of machine learning, data mining, and programming languages. Additionally, they should continuously develop themselves in response to ever-changing technologies and aim to become experts in a specific area. For those aspiring to work in the help desk department, it is important to acquire technical skills, communication skills, and teamwork abilities, while also continuously updating and improving themselves through online courses and certifications. In the data analysis department, competencies such as data mining, statistics, data visualization, and big data stand out. In recent times, the field of big data has become a highly valuable area in terms of job opportunities. Employees in the data analysis department should also continuously improve themselves, keep track of new technologies, and be inclined towards teamwork. In this study and the conducted literature review, all departments emphasized the importance of focusing on a specific area and becoming an expert in that field. They also highlighted the significance of continuously monitoring and adapting to changing technologies, developing oneself, strengthening technical and communication skills, and considering data mining, network security, and machine learning as the most valuable competencies and recommendations.

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Appendix

Appendix -1. Demographic Information

Age:
Gender:
Education Level:
Work Experience:
IT Department you work in:

Appendix -2. Interview Questions

- What skills do you believe you possess in your profession, and how did you develop these skills?
- What is the most significant achievement in your career, and what skills did you use to accomplish this achievement?
- What do you see as one of the most important trends in the IT industry, and how do you plan to adapt to this trend?
- Which skills do you consider critical for someone working in an IT department, and how can we develop these skills?
- What advice do you have for young IT professionals regarding building a career, and what recommendations would you give them?
- Which software tools are you currently using actively?