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YÖNETİCİLER İÇİN KARAR BİLİMLERİ (İNGİLİZCE) BİLİM DALI

THE EFFECT OF AGILE PROJECT MANAGEMENT METHODS ON JOB SATISFACTION: A RESEARCH ON INFORMATION TECHNOLOGY EMPLOYEES

Yüksek Lisans Tezi

Rana Elif DİNÇER

İstanbul, 2024

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ABSTRACT

The purpose of this study is to assess the impact of using agile project management methodology on employee job satisfaction and intention to leave the job, both directly and through the mediating effect of Hackman and Oldham's Job Characteristics Model (1974) on job satisfaction. The study also aims to identify the factors influencing employee job satisfaction and intention to leave the job, as well as to determine job satisfaction levels overall and by dimensions.

To achieve this, a multi-item questionnaire was administered to 217 information technology employees who have experience with agile project management processes in the information technology department. Confirmatory and exploratory factor analyses were conducted to validate the scales and identify the study's dimensions, and structural equation model was used to test the model.

The results indicate that agile project management practices have a direct impact on employee job satisfaction. Additionally, it is noteworthy that agile project management practices positively influence job satisfaction through feedback and task significance from job characteristics. Although the study did not find a significant relationship between agile project management practices and employees' intention to leave the job, it is expected to provide valuable insights for potential future studies on this topic.

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ÖZET

Bu çalışmanın amacı, çevik proje yönetim metodolojisinin çalışanların iş tatmini ve işi bırakma niyeti üzerindeki doğrudan etkisini ve Hackman ve Oldham'ın İşin Özellikleri Modeli'nin (1974) iş tatmini üzerindeki aracı etkisini değerlendirmektir. Ayrıca, çalışmanın amacı arasında çalışanların iş tatmini ve işi bırakma niyetini etkileyen unsurları belirlemek ve iş tatmini düzeylerini genel olarak ve boyutlar bazında saptamak da bulunmaktadır.

Bu amacı gerçekleştirmek için, bilgi teknolojileri departmanında çevik proje yönetim süreçleri konusunda deneyime sahip 217 bilgi teknolojisi çalışanına çok maddeli bir anket uygulanmıştır. Ölçeklerin doğrulanması ve çalışmanın boyutlarının belirlenmesi amacıyla keşfedici ve doğrulayıcı faktör analizleri yapılmış ve modeli test etmek için yapısal eşitlik modeli kullanılmıştır.

Sonuçlar, çevik proje yönetimi uygulamalarının çalışanların iş tatmini üzerinde doğrudan bir etkisi olduğunu göstermektedir. Ayrıca, çevik proje yönetimi uygulamalarının, işin özelliklerinden geri bildirim ve işin anlamlılığı aracılığıyla iş tatminini olumlu etkilediği dikkat çekicidir. Çalışma, çevik proje yönetim uygulamaları ile çalışanların işi bırakma niyeti arasında anlamlı bir ilişki bulamasa da, bu konu hakkında gelecekte yapılacak çalışmalar için değerli bilgiler sunması beklenmektedir.

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LIST OF ABBREVATIONS

ADT	: Agile Development Team
APM	: Agile Project Management
DoD	: Definition of Done
ERG	: Existence-Relatedness-Growth Theory
JCM	: Job Characteristics Model
JSS	: Job Satisfaction Survey
KPI	: Key Performance Indicators
IT	: Information Technologies
ISD	: Information System Development
PMBoK	: Project Management Body of Knowledge
PMI	: Project Management Institute
PMLC	: Project Management Life Cycle
PID	: Project Initiation Document
SDD	: Software Design Document
SDLC	: Software Development Life Cycle
SRS	: Software Requirement Specification
UAT	: User Acceptance Test
PO	: Product Owner
QA	: Quality Assurance
VIE	: Valance, Instrumentality, Expectancy
WIP	: Work in Progress

INTRODUCTION

There are some important requirements of organizations in today's globalizing and rapidly changing business world. Organizations' efforts to not lose their positions, increasing profit rates and strengthening their place in the competitive market are some of them. Therefore, it can be said that giving priority to digitalization in business processes is an indispensable requirement for organizations. This is a very critical requirement, especially for information technology departments, which are one of the departments that aim to achieve maximum efficiency in terms of product quality and speed in the minimum time. Another critical issue for information technology departmants is project management processes. In increasingly complex and international business environments, successful and effective execution of project management processes is seen as a factor that increases the success of the organization.

Agile project management, which is also the subject of this thesis, stands out as a different methodology from traditional project management approaches. It is seen that success in IT projects comes with agile management that aims to respond quickly and flexibly to changing customer needs. It is seen that agile project management, which prioritizes communication and collaboration between teams, has various effects on employees' attitudes towards work.

In this thesis, the relationship of agile project management practices with job satisfaction and turnover intention has been examined through perceived job characteristics. For this purpose, an “Agile Project Management Job Satisfaction” survey was conducted to 217 IT employees. This thesis aims to examine the effects of agile methodologies on job satisfaction and intention to leave, both directly and indirectly through JCM dimensions.

1. AGILE PROJECT MANAGEMENT

Today's business world is changing quite rapidly due to globalization and technological advances. These changes affect not only a certain area but all functions of organizations. Many concepts such as quality, branding, marketing, and customer service have had to create a new roadmap for themselves due to these changes. Many products and services that seemed perfect in the past cannot overlap with current customer needs today and have to make efforts to correct their shortcomings (Ebirim et al., 2024). This fast business environment is one of the main reasons for the emergence of the concept of agility for organizations. Working with agile management that prioritizes iterative development, adaptive planning, and customer collaboration, especially in the field of project management, provides great advantages for organizations (Dybå et al., 2014).

1.1. Definition of Project

According to the Project Management Institute, a project is defined as a temporary endeavor to create a unique product, service, or result (PMI, 2021). From this perspective, it can easily be said that every individual, in every aspect of life, is involved in various projects where various people come together for personal or social purposes. The project concept is one of the essential core concepts in business life. A project, which is the routine activity of business life, is a versatile concept that is important for both managers and employees. Therefore, since it is a multifaceted field, it has been a subject addressed by many different people. Although reaching the same point in essence, it is possible to find multiple definitions of project. Paul and Juran (1999) define project as a planned and programmed problem solution. From the perspective of this definition, a project can be explained as all efforts aimed at eliminating an existing problem. According to another definition made by Archibald (2003), a project is a total process that must be carried out to obtain a new product, a new building, a facility, a new system, or some specific results. Considering Gray and Larson's (2014) broad definition, a project is a non-routine, complex process to meet customer needs, with a limited timeline, budget, and resources. Quite diverse definitions can be found for a project in these and similar ways; however, there are some common expressions in most of the definitions. These can be listed as problem solving focus, time constraint, prioritizing customer needs, and quality focus.

1.2. Project Management

Regardless of the breadth of its scope, project management is present wherever a project occurs. Every project is subject to project management. Especially in large-scale organizations, it is impossible not to

mention project management because of the project to be carried out and the use of resources for them requires coordinated work throughout this process (Watt, 2014). The problem-solving activities, which are the main objectives of the projects, include very detailed and complex processes with time, cost, and other many limitations. In order to successfully overcome these processes, it is of great importance that the activities to be carried out during the process are managed by using methods appropriate for their purpose (Schwalbe, 2009). Given such information, Project management can be defined as the application of knowledge, skills, tools, and techniques to project activities to fulfill the requirements of the projects (PMI, 2021). When considered from this point of view, project management aims to create outputs in line with strategic business goals by improving resource use and, as a result, ensuring budget and cost optimization. As can be seen from a large perspective, projects have several characteristics such as being unique and having a temporary nature with definite beginning and ending dates (Heagney, 2016). As a result of the successful project management process, coordination and adaptation processes are ensured so that the teams participating in the project can work efficiently and effectively within a certain planning framework. Furthermore, by checking to what extent the targeted result has been achieved, necessary improvements are made for the relevant process and it becomes a "know-how" to be used in other similar processes (Tonnquist, 2009).

Scope, time, and cost management, which are three important basic success criteria for project management, create added value for companies. Burke (2003) explained the importance that project management has gained and the reasons for the need for project management as follows; dynamic business environments created by jobs that are expected to be completed quickly and in a short time, complex organizational structures that require worldwide coordination that have emerged due to globalization, increasing information resources and amount of information and, on the other hand, limited business resources.

A well-managed project management process will help ensure predictable steps towards the to-do list. Project management process that aims to contribute to systematic and rational decision-making processes also aims to contribute to taking safer steps toward problems that have not been encountered before or projects that have not been thought about before. Effective project management implemented by the goals and objectives of the project prepares the ground for making clear and achievable decisions. At the same time, it facilitates progress by time management and limited resource utilization criteria. In addition to all these, taking a proactive attitude helps to be prepared for problems that may occur or are likely to occur later in similar projects, to easily access solutions, and to create the necessary knowledge to prevent these same problems (Jovanovic & Beric, 2018).

1.2.1. Project Management Life Cycle

According to PMI, the Project Management Life Cycle (PMLC) is defined as phases that help project managers to manage successfully any complicated project from start to finish (PMI, 2021). Planning, organization, coordination, and control activities are carried out in order to ensure that the projects achieve their goals within the framework of the determined plan and program constitute the main phases of PMLC. In the Project Management Body of Knowledge Guide, the elements of the Project Life Cycle stages should be defined according to the following questions: What is the aim of the Project? What will be the deliverables that the project will produce? Who will be the team members involved in each project activity and how will it be organized? How will the Project Manager oversee and approve each project phase? (PMI, 2021).

The PMLC consists of five stages. Each of these phases represents a group of interrelated processes that must take place for the successful completion of a project. Each stage has different priorities that are focused on each other and in the Project Lifecycle, connections are usually sequential and each stage ends with the completion of one or more project delivers. These five phases are the initiating phase, planning phase, executing phase, monitoring and controlling phase, and project closing phase (Adams & Barndt, 1978).

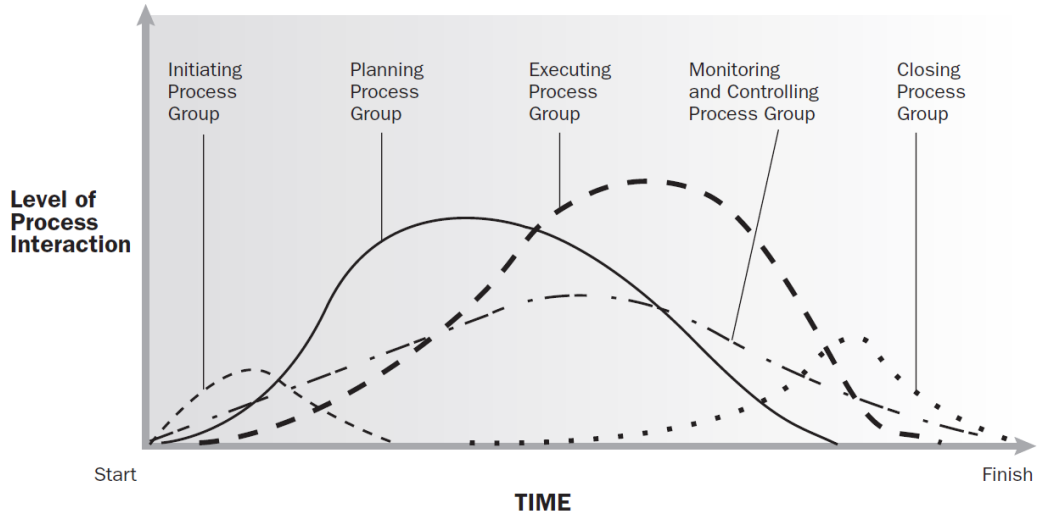

Figure 1.1. Project Management Life Cycle Phases
Source: John, R. Adams & Stephen E. Barndt (1978)

Initiating Phase

In the most general sense initiating phase is the phase that consists of starting activities for a project. It involves the project's aim, and scope; the determination of stakeholders also involves requirements like

the projects' time plan, milestones, and budget. This phase is a critical step in order to ensure that the project reaches the desired organizational goals (Westland, 2006). The following questions are attempted to be answered at this phase: What is the primary objective of this phase? Who is involved in it? How does the project manager contribute to this phase?

The main task performed in this phase will be the introduction of the project idea and the authorization of the relevant team members. In line with the negotiations conducted for this purpose, the project draft is evaluated by the project sponsor, and the project is officially launched if the necessary permits are obtained. Then the documentation activities begin, which is handled by the project manager. At this stage, the project manager creates a Project Initiation Document (PID). PID is a document that contains all possible risks related to the project like cost estimates, resources to be used in the project, success criteria of the project, and more (Wiegers, 2007). The stakeholder register is another document that was created by the project manager during the initiating phase. This document contains information about stakeholders that participate in the project. The importance of this document from the point of view of stakeholders is quite important because this document not just contains stakeholder information, in addition to this it helps to understand communication needs in various points (Zwikael & Smyrk, 2019). Taking these needs into consideration is also very important in terms of creating a solid communication environment and carrying out a reliable project in the relevant project and subsequent projects. One of the most common reasons why projects fail is that the initial phase cannot be managed well. For this reason, it is of vital importance for the project that the initial phase of the project is carried out in such a way as to clearly determine the scope of the project and the expectations from the project. It can be said that identifying all stakeholders at the project initiation stage and having information about the project is a decisive factor for project success (Dinçer & Garousi, 2015).

Planning Phase

The planning phase is the stage where the activities that will constitute the project are determined, time planning for the project activities, and resource and cost analyzes to be used in the project are made. In the most general sense, it can be said that the planning phase is the phase in which the actions required to achieve the goals of the project are determined according to time, resource, and cost analyses. As a result of the analyses performed during this phase, a model of the project plan is created and made ready for implementation (Westland, 2006).

The most important output of the planning phase is the Project Management Plan. A Project Management Plan is a set of documents that outline how, when, and in what way a project will be executed. It consists of execution steps, possible risks about these steps, stakeholders and team members,

and their responsibilities in detail. To summarize a project management plan serves as a blueprint or roadmap to the ultimate success of the project (McAlister, 2006).

Planning is a process based on repetition and elaboration is done gradually. An important aspect that the project management team should pay attention to at this stage is the human factor. The project management team should ensure that all people assigned to the project are qualified to meet the project needs. The creation of strong teams is of critical importance for the project to reach the desired goals. The high ability of the team members involved in the project to work both individually and as a team is also considered one of the most important factors in terms of the progress of the project. The more accurately the planning phase is done, the execution phase becomes easier and more manageable (Bruce & Langdon, 2000).

There are certain reasons why projects fail within the planning stage. These are; the fact that the planning was carried out in a way that is far from realism. For example, the expectation of achieving too many results in a very short period from the planning phase. Planning the project based on inaccurate or insufficient data or proceeding with planning processes that are not set to a certain standard (Barutçugil, 2008).

Executing Phase

The execution phase is the phase where the project begins to be implemented as planned. At this phase, all the plans made during the planning phase are put into action, the physical products or services of the project are produced and the tasks of the project are performed. Project activities are implemented by responsible team members within the planned time and resources (Kanda, 2010). During every stage of the execution phase, determining the situations that create risks according to the realized goals, checking customer satisfaction and quality, therefore, checking the quality and time relationship over and over again is of great importance for the realization of execution processes in accordance with the plan (PMI, 2021).

Monitoring and Controlling Phase

The process after planning and executing is the monitoring and controlling phase. The monitoring and controlling phase is the phase where all the work done during the project is monitored. In general, the activities of the monitoring and controlling phase can be listed as collecting indicators and data related to the progress of the project, comparing these data with the taken decisions, making the necessary decisions to correct these deviations, if there are any, and documenting this decisions (Westland, 2006). This process can also be carried out simultaneously with the execution stage. Changes or bugs that occur

at this phase can be implemented again during the execution phase. At this stage, the project manager checks whether the resources are compatible with the original project plan by tracking where, when, and how they are used. Documentation is also an important activity of this phase. Documents like spending records, QA checklists (Sharanyasreenivas, 2017), and change management documents (Trzeciak, 2024) created in monitoring and controlling phase. With the help of these documents and the general project document, how the workforce and resources spent throughout the PMLC are used is measured. Another method used for measuring performance at this phase is Key Performance Indicators. Requests for changes may arise at this phase. Approved requests can be implemented again at the execution stage. From another point of view, it can be called the change management phase of the monitoring and control phase (Westland, 2006).

Project Closing Phase

During the project closing process, which is the last phase of PMLC, the lessons learned from the project are extracted, and the project records are collected and archived in appropriate ways. This phase begins with informing the relevant parties about the final status of the project. At this phase, all activities related to the completion of the relevant project have been completed. The completion of the relevant project may include situations such as completion, cancellation, or termination of the project (Westland, 2006). A project closure report appropriate to the relevant situation is created by the project manager (Hagebakken et al, 2024). Another activity that the project manager should do at this stage is to share the project's deliverables and status with all stakeholders. In addition to that, necessary information is provided about the following activities or the product life cycle. Regardless of the outcome of the project lifecycle, it would be good for the team to carry out the project retrospectively. During the project closing phase, documentation is quite an important activity because through documentation the lessons learned during the project are noted and become an important resource for the next projects (PMI, 2021).

1.3. Software Project Management

In today's dynamic business world, digitalization is of vital importance in order to realize the goals of organizations such as not losing their positions, making more profit, and firmly maintaining their place in the competitive market. For this purpose, the next important step in front of digitalizing companies is the ability to successfully manage complex software processes (Manole & Avramescu, 2017). For organizations that want to maintain their current positions or reach higher places in this competitive environment, it is becoming an indispensable requirement to launch innovative products continuously

and in the shortest possible time. Therefore, the importance of software project management in particular is included as a concept that is its importance increasing day by day (Abrahamsson, 2008).

Effective project management methods to be used in the field of software development are of critical importance to ensure the success and timely delivery of projects. Software development projects are complex projects that require detailed planning and coordination. Today, understanding the effectiveness of software project management systems is vital for organizations trying to stay competitive. Choosing, implementing, and optimizing software development project management systems and having the knowledge to guide decision makers is one of the ways for organizations to stay ahead of the competition (Butsianto et al., 2024).

1.3.1. Software Development Life Cycle

In the broadest sense software development life cycle can be defined as a software process that turns software requirements into products or services; and transforms software needs into products or services. SDLC is not only about the development of the software but also covers the start of the use of this software, maintenance, and support processes, configuration, and quality management stages (Shyles, 2017). To summarize, SDLC is the process of developing a software solution consisting of different steps to bring the software from the idea to the creation, deployment, and maintenance steps (Bourque & Fairley, 2004). The SDLC includes the following steps: requirement gathering & analysis, planning, design, software development, testing, deployment, and maintenance.

Requirement Gathering & Analysis

Requirement gathering & analysis, the first step of the SDLC, consists of the initiation of the project and the definition of the scope. As the basic processes of this phase, it can be said that starting a software project, making a decision, effectively identifying requirements using various methods, and analyzing feasibility studies (Shen et al., 2004). Among the activities carried out at this phase are the discussion and determination of requirements, the determination of tasks to be performed, and the drawing of boundaries. At this phase, the scope of the software development process will be revealed in a significant way. As a result of meetings or interviews regarding various techniques, the requirements obtained from the stakeholders are analyzed and the necessary definitions are made. The scope of the project is revealed as a result of the goals and constraints with the help of these activities. Another activity carried out at this stage, the feasibility study, includes the activities of analyzing the solutions to be implemented taking into account the existing technology, available resources, and socio-cultural framework (Seker, 2015). Continuous requirement gathering & analysis is the key goal of this phase. During the SDLC there can be some changes in project conditions. It is of great importance to conduct a continuous

requirement analysis in order to adapt to possible changes as quickly as possible. By accepting the changes that occurred during the project, determining the new requirements that the change will create and what the effects of these changes will be, and conducting traceability and risk analyses place in this process as an important activity.

Planning

Planning is the second phase of SDLC. This phase consists of choosing appropriate software development methods, risk assessments, etc. Discussing whether the method to be used during software development will be the most optimal solution, and determining possible alternative flows according to the conditions is a very important step for the healthy SDLC. Process planning may show various differences according to the applied software development model (Shyles, 2017). However, since changes are likely to occur in each software project regardless of the selected software development model, the plans and processes selected for software development should be constantly monitored, reviewed, reported, and renewed if necessary. A document called a Software Design Document for monitoring these changes is a fairly widely used document. SDD, which is a detailed plan on how to develop each part of the software, sheds light on both the functionality of the product and the team's goal. SDD is also an auxiliary document for reusing products from past projects or evaluating products (Mentor & Prys-Jones, 2021). Another important document created in the planning phase is the estimation report. To briefly define estimation report is a report/document about the timeline of the development. It consists of which steps of development at what stages and how many man days will be spent. This estimation is made by consulting documents from old projects or the knowledge of experts working on projects. In addition, the allocation of resources is also made at this phase. The main action mentioned by resource allocation is to make the necessary equipment, personnel facility, and responsibility distribution for the tasks. Resource allocation is a critical issue, especially for the use of people in appropriate tasks according to their abilities and the optimization of resources. Risk and quality management is another important issue that is focused on during the planning phase. Risk management includes activities such as identifying risk factors, calculating the probability of occurrence of these factors and analyzing their potential effects, prioritizing risk factors, and developing risk reduction strategies. An SDLC with proper risk management will proceed relatively smoothly (Wilson et al, 2024).

Design

The stage at which all the components and the overall structure of the software development process are designed is called the system design stage. At this phase, decisions are made about software features and some technical dimensions with the help of analysis and planning phase outputs. For SDLC, the design phase is a critical phase in the development the conceptual blueprint of a software project

(Scroggins, 2014). The most important goal of this phase is to make the development/application stages as complete and error-free as possible. For this purpose, logical and physical designs are made. Logical design tries to ensure harmony between the goals of the system and the subcomponents it interacts with. In logical design, the structure of the proposed system is described instead of the existing system. On the other hand, the physical design includes the components containing the software and the details of these components. This design includes activities such as database designs, user screens, and creating data flow paths (Seker, 2015).

Software Development

The next phase for the SDLC, whose logical and physical design is completed, is the software development phase. This phase is the phase where product programming begins. This phase is the phase at which all the transactions made on paper so far have become software. At this phase, production will be clearly started. It is important that the code written here is an understandable, easy-to-maintain "clean code" because clean code is also a very important factor in terms of making teamwork more sustainable and ensuring continuity. All the components of the software are implemented in this phase (Scroggins, 2014).

Testing

After the application development phase is completed, the product testing phase begins. At this phase, it is tested whether the development is working in accordance with the requests. If there are errors in the possible operation, these errors are tried to be detected. At this stage, the developed software undergoes a comprehensive test from start to finish, and the detected defects are notified to the developer team members for correction. The software enters into a cycle of redevelopment and testing until it meets the customer's requirements. Testers can use the Software Requirement Specification (SRS) document to determine whether the software meets the customer's requirements. SRS, which is a complete document of the requirements of the software, provides a huge benefit for developers, testers, and analysts because it minimizes the time and effort during the software development phase for developers (Belfo, 2012).

Deployment

After the software testing phase is completed, the relevant software is put into operation in the production environment. And the User Acceptance Test (UAT) starts. UAT is a type of test performed by the customer to approve the product created according to the requirements. Depending on the client's requirements, the product might undergo UAT where it is tested in a real business environment with a limited segment. A replica of the production environment is created for the UAT, and the customer and developer conduct a test together. When the UAT tests are completed and it is seen that there are no

errors, the process of going live also begins (Leung & Wong, 1997). It's called "go live". And finally, based on the feedback given by the project manager, the latest software started to be used in real life.

Maintenance

The last SDLC phase, the maintenance and support phase, includes product-related maintenance work and realize transition activities. This phase has three main objectives;

Bug Fixing: Scenarios that were overlooked during the test can be encountered through user actions. Errors that occur due to such scenarios that have never been tested are corrected by the relevant development team.

Upgrade: Depending on the request and time for the product, it may be necessary to upgrade the version at certain periods. These version upgrade requests are also evaluated within the scope of this phase.

Enhancement: Some new features may be requested to be added to the existing product by customers according to current conditions. This situation is also the responsibility of the software development team as one of the main activities of the maintenance phase (Khanna et al., 2017).

Taking care of any problems with the delivered product is the main responsibility of the software team. In fact, the main responsibility of the software team during the maintenance phase is to take corrective actions for problems that occur during the use of the software at this stage, the project team basically tries to stabilize the product. At the same time, the project manager also tries to determine the most cost-effective approach to achieving a stable product. At this stage, one of the responsibilities of the project manager is to archive the documents related to the project and create a document in which notes are kept about the actions during the SDLC. This document, in which the lessons learned during the project are recorded, is also a very important document in order to be an important guide for similar projects in the future (Pressman, 2005).

1.4. Traditional Methods

The software development began to be discussed in the 1950s. At those times, "Ad hoc programming" based on the principle of coding requirements directly and correcting errors encountered during the process or after product delivery, without any planning or design steps, was widely used. This form of programming, which is based on code and fixed logic, needed to change over time. The main reasons for this need for change can be listed as the need for project management methods by growing projects over time, the gradually decreasing fault tolerance of the created systems, and the rapid increase in

computer capacities by improving technology. Due to these situations, various actions have started to be taken in order to improve the quality of the software. Especially as a result of the software crises experienced in 1968, the Software Engineering Conference organized by the NATO Science Congress can be considered an important starting point in this regard (Naur, 1969). This conference takes an important place in terms of a detailed examination of the software engineering and determining the standards that should be applied in software development processes. The field of software development, which has gained popularity in the following years with the rapid development of various models and methods, still stands as an area that retains its importance and relevance with advancing technological moves (Awad, 2005).

1.4.1. Waterfall Model

One of the first outputs of the work on setting standards for the software development process, which gained momentum after the Software Engineering Conference held in 1968, can be considered the Waterfall model. The model published by Dr. Royce Winston in 1987 is a study that can be considered the basis of the software development methods we know today (Royce, 1987).

The Waterfall method is built on a model based on SDLC phases. The main feature of this method is based on step-by-step progress. In other words, no phase in the software development process begins before the previous phase is completed. Requirements gathering, analyzing this requirement and the processes, designing a system, implementation, testing, and maintenance phases are carried out within itself and every phase waits for the end of the previous phase (Nizam, 2015). In addition, there is a long documentation process at the end of each phase in this method. The reason for this can be given as the structure of the method that does not allow the transition to the previous phase. Therefore, the error/bug tolerance is low in the transition between phases. At the end of each phase, teams and stakeholders must be informed about the current situation. Because there are strict approval processes in the transitions between phases. Although having an approval process at the end of each phase puts things in a bureaucratic structure and prolongs the process, the cost of possible changes to the project will be much higher. For this reason, the documentation and approval process play a vital role at the end of each stage to avoid large-scale returns (Wilson et al, 2024). This situation also leads to the implementation of projects in which the waterfall model is applied under intense and strict supervision. Therefore, the implementation of the waterfall model requires strict discipline.

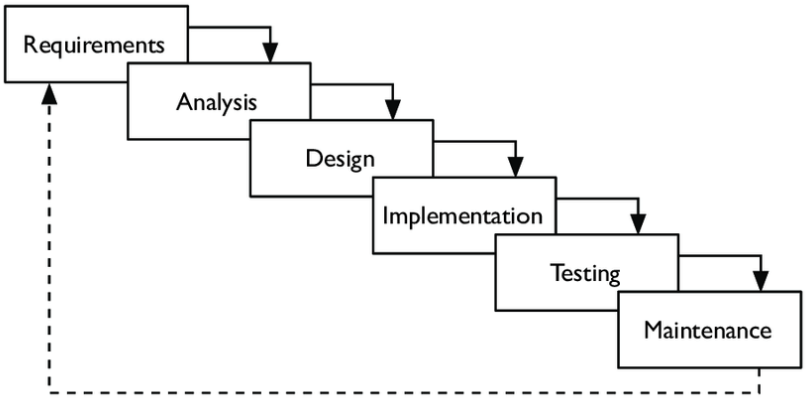

Figure 1.2. Waterfall Model

Source: S. Balaji & Sundararajan Murugaiyan (2012)

The most important stage in the waterfall model is the planning phase. In this phase, the system and software requirements are determined at the very beginning by accepting that everything necessary is known from the beginning and there will be no changes (Palmquist, 2013). It is of great importance to determine all the risks and scope in this phase. For this reason, it can be said that the waterfall method is more suitable for projects that do not contain uncertainty, are fully understood, and are not likely to change (Sommerville, 2011). In this method, the stakeholders are involved in the process at the planning phase when the requirements are defined. Apart from this, they are seen to be in a non-process position, except for the testing and integration stages. For this reason, the waterfall model focuses most on planning, timelines, target dates, budget, and the use of the entire system at one time.

Basically, the main purpose of this model is to keep factors such as scope, time, and resources constant by not allowing changes in the duration of the project and to eliminate the risk factor. Considering the time and conditions in which the waterfall model emerged, it seems that there is not as great a dependence on business processes and information systems as there is today. Therefore, it can be said that the pace of projects is relatively lower (Petersen et al., 2009). Considering the conditions of the period, it is seen that the main goal of software is to use hardware resources such as storage capacity, and processor power in the most optimal way since the use of information systems is more hardware-based due to technology and resource constraints. For this reason, the waterfall model was originally considered as a risk management method (Endres, 1996). The fact that the speed of technology change was slower than today when this method was first used, the resulting software was relatively less complex, and the need for integration between systems was less, was not an obstacle to complying with these restrictions. However, the increase in uncertainty due to various situations that have developed over time has started to create some disadvantages in the waterfall method. Some of the disadvantages

created by the waterfall method can be listed as follows; the time and workforce losses due to the need for documentation and approval process at the end of each phase are quite high since an error that cannot be detected at any phase affects all other phases, the time and effort losses are quite high, starting to become a software development method that shows resistance to change, the fact that the integration test is performed after all the phases have been completed causes to be late to detect problems in the system performance, since the product will be tested at a single phase, this test will take a long time and therefore it will be too long time testing and delivery date, due to the fact that each phase has to be carried out according to certain procedures, the project team becomes closed to innovative thinking (Alshamrani & Bahattab, 2015).

1.4.2. V-Model

Another traditional software development method is the V-model, which is basically an extended version of the Waterfall model. The V-Model, introduced by Paul Rook in 1980, demonstrates the relationships between each phase of the development life cycle and their association with the testing phase (Rook, 1986). The name of this model comes from the fact that it bends upward in a V-shape after the coding stage, and not in the form of a linear progression (Mathur & Malik, 2010). Just like the waterfall model, each phase begins only after finishing the previous phase. But the difference is that test activities like planning, and test designing happen before coding. This function helps with time management and to understand the project plan and steps at the very beginning. The fact that each phase is connected to a test phase helps to find errors in the basic lines and an effective way to correct errors early (Regulwar et al., 2010). The advantages of using the V-Model can be listed as follows: to find defects at early phases with the help of the proactive approach in defect tracking, at each project start, the V-Model can be tailored into a specific project V-Model, this being possible because the V-Model is organization and project independent. The disadvantages of using V-Model can be listed as follows: The V-Model is a life cycle process model that addresses software development within a project rather than an entire organization. It is addressed to the relevant unit/team, not to the entire organization, and is used only once during the project. The completion phase of the projects carried out with the V-model is ambiguous because the completion of the v-model requires the completion of all the sub-models belonging to the model and these sub-model activities. This includes a number of activities that remain in a very abstract dimension in real life. At the same time, the QA processes in the v-model are not clearly defined (Johansson & Bucanac, 1999).

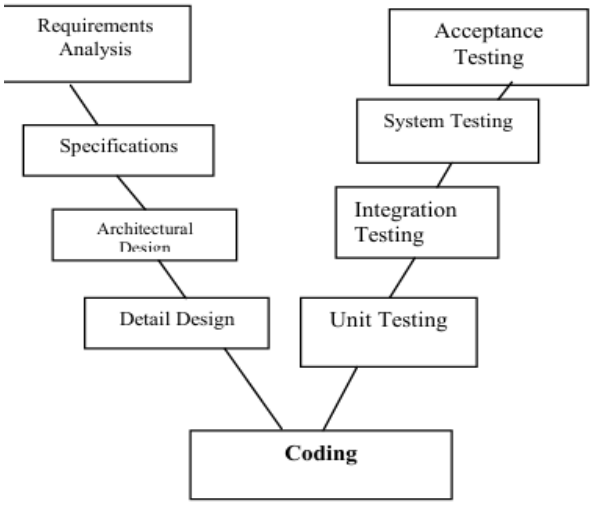

Figure 1.3. V-Model

Source: Sonali Mathur & Shaily Malik (2010)

1.5. Agile Methods

Due to technological developments and the disadvantages of traditional methods, agile approaches began to emerge in software development projects towards the end of the 1990s. Agile software development is a cost-effective software development method used by collaborative and self-organizing teams. It is an iterative and incremental software development approach that aims to produce high-quality solutions to adapt to the changing needs of stakeholders at any time (Cunningham, 2001). Agile project management exhibits a revolutionary stance in the field of project management with its dynamic and flexible structure compared to rigid traditional methods (Daraojimba et al, 2024). Seventeen software engineers, creators, and leading practitioners of agile methods, came together in 2001 to create an alternative to traditional software development methods based on documentation. This software team, who call themselves the “Agile Alliance”, published an “Agile Manifesto” as a result of their work and they explained the principles and values of agile methods. The Agile Manifesto began to be known to much wider circles after its publication. This method, which has a great resonance in today's software world, still remains popular (Whiteley et al., 2021). The motivation for the creation of agile methods is to create alternative methods to the points where traditional methods are inadequate and inefficient. As a result of the spread of the agile manifesto and the increasing awareness of agile methods, organizations have also started to turn to agile methods (Daraojimba et al, 2024). According to the agile manifesto, the main features of agile methods can be listed as follows: It gives priority to individuals and the interaction of individuals more than processes and tools, it puts effort into working software rather than comprehensive documentation, focuses on cooperation with the customer rather than wasting time on

contracts and approval processes, it consists of business processes that aim to keep up with possible changes at the highest possible rate rather than adhering to a set plan (Cunningham, 2001).

The fact that agile methods are based on iteration and have a structure that allows feedback is a feature that helps increase the mobility of the members in the project. The project team, which determines how to do the work best by revealing all the requirements and competencies, takes its place as the main responsibility for the realization of the project. The team is responsible for completing certain tasks within certain iteration periods. For this reason, strong intra-team communication and cooperation is a criterion that can be considered a sine qua non of agile methods (Fair, 2012). The main benefits of agile methods can be listed as follows: Having a tolerant approach to the changes that will occur throughout the project, or even accepting this change as a positive phenomenon and encouraging change, it allows flexibility with its iterative process structure, prioritizing face-to-face communication with daily meetings helps to increase the motivation of the project team through human and communication-centered processes, with the help of communication based environment member can share their personal know-hows and ideas at a high level, iterative process structure increases project transparency (Shamim, 2024). This is a very important factor that helps to reduce the project risk, thanks to the transparent environment brought by the iterative process structure, possible errors in the project are detected earlier, thus increasing the delivery accuracy and significantly shortening the time to deliver of the product, there is also a transparent communication between the stakeholder and the project members and this transparent communication greatly increases the level of integration of business processes and software development processes, thanks to open communication, possible changes or desired requirements are expressed directly without documentation or long approval processes, which increases both the quality of the software and customer satisfaction, since it is a method that allows transitions between the applied stages and returns between these stages, bugs can be easily corrected, in general, since only the product features of the software are the subject of the documentation process, the time and workforce allocated to documentation is reduced (Daraojimba, 2024).

Agile methods also have various downsides as well as benefits. Some of these can be listed as follows: since communication and interaction will be less in crowded projects, the effectiveness of agile methods will decrease as the number of members in the projects increases, agile methods will not be applied for large and complex projects that require functional integrity, because such projects are not suitable for splitting for iterations, although its open-to-change structure provides flexibility of action, it also makes resource and scope planning of the project more difficult to plan compared to traditional methods, although the documentation preparation processes are less compared to traditional methods, documents may have a complex structure due to changing environments and requirements, teams are self-

organizing. Therefore, team members must be skilled, and experienced in their work and master agile processes (Meckenstock, 2024).

The main reasons for the preference of agile methods by organizations can be listed as the following: agile methods provide more opportunities to increase the targeted quality level than other methods, agile methods approach change more positively than traditional methods such as the waterfall method, and respond to these changes quite quickly, delivery times are relatively much shorter (Kettunen & Laanti, 2008).

1.5.1. Scrum Method

Scrum is an agile software development method developed by Ken Schwaber and Jeff Sutherland in the early 1990s. Scrum is essentially a framework used to manage complex software development processes. Scrum is based on the use of an iterative and incremental approach to maximize predictability and minimize possible risks. In fact, it can be said that scrum is a business model that aims to bring together groups of people with all skills and expertise to do the job and share or acquire the necessary skills (Schwaber & Sutherland, 2020).

1.5.1.1. A Brief History of Scrum

Scrum has emerged as a result of a process in line with successive developments. This process began in 1986 when Hirotaka Takeuchi and Ikuhiro Nonaka introduced a new approach that aimed at increasing speed and flexibility in product development. According to this approach, the motivations of software development teams look like American football (rugby), for example making numbers by going a certain distance as a team with forward and backward passes. With the inspiration received from here, the idea that the software development stages overlap and that the entire process should be carried out by a cross-functional team during different stages has been put forward (Takeuchi & Nonaka, 1986). Later, DeGrace and Stahl (1990) described this approach as Scrum in their book published in 1990. In the early 1990s, computer programmer Ken Schwabber started using Scrum-like approaches under the title of "Advanced Development Methods" at his company. On the same date, Jeff Sutherland developed a similar approach at Easel and became the first person to apply this term in practice by giving the name Scrum to this approach. In 1995, Sutherland and Schwaber presented a paper that described the Scrum approach in the most detailed way. They have worked together to create all kinds of written documents that we accept as Scrum, to accumulate sufficient experience in this field, and implement best practices (Sassa et al., 2023).

1.5.1.2. Three Pillars of Scrum

The three pillars of scrum are fundamentals on which the scrum framework relies. These three fundamentals are transparency, inspection, and adaptation (Schwaber & Sutherland, 2020). Teams working with Scrum act based on these three basic facts in all their processes and activities. Also, most management teams believe that all three pillars of scrum must be integrated into the management style for the most effective results.

Transparency

According to the Scrum Guide, transparency is the sharing of the progress of the process, the obstacles encountered during the process, solutions, and improvement suggestions about the obstacles, in brief, to share every detail related to the product in a transparent environment. According to Scrum's transparency fundamental, the resulting process and work should be carried out in a visible way to those who do the work (project team) and those who benefit from the work (stakeholders, customers). The high transparency of Scrum activities helps to increase the value of the product and reduce the possible risks.

Transparency makes inspection possible. In scenarios where there is relatively less transparency, the inspection can be misleading and this can create an undesirable situation that can lead to a waste of time/money/workforce (Schwaber & Sutherland, 2020).

Inspection

According to the Scrum Guide, inspection means regularly checking the progress of the Project. It can also be defined as the observation of scrum artifacts and goal-oriented progress within certain periods. In this way, in case of deviations from the target, it is aimed to facilitate early detection and control of the condition. The inspection in question is provided through scrum rituals (Daily scrum, sprint planning etc.). Inspection makes adaptation possible. Adaptation and inspection are processes that feed each other. Observation without adaptation will be considered meaningless because scrum activities are designed to support change (Schwaber & Sutherland, 2020).

Adaptation

According to the Scrum guide, adaptation is defined in the simplest sense as the ability to adapt to changes that will be made in the project. Adaptation includes the activities of implementing actions aimed at the findings obtained as a result of the inspection. If any aspect of a process falls outside acceptable limits or the resulting product is not accepted, the applied process or product must be corrected. And this correction should be made as soon as possible. Therefore, the most critical of the expected features in a scrum team is that as soon as new information is learned through observation, it can be adapted to that new information. Because adaptation becomes quite difficult when the relevant

people are not able to manage themselves according to their new conditions. This creates an undesirable situation for the Scrum approach, which supports possible changes in projects (Schwaber & Sutherland, 2020).

1.5.1.3. Scrum Team and Roles

Scrum is a process modeling that includes a set of defined roles and applications. Teamwork plays a very important role in the scrum and each individual in the team has their own responsibilities. How to do a job and the possibility of implementing innovations are the responsibility of the Scrum team. It usually consists of a team with different skills needed to carry out the project (Mundra et al., 2013). The responsibilities of members in a scrum team generally proceed in three main branches: the software developers who do the work, the product owner who manages the product, and the scrum master who manages compliance with the scrum framework in the operation of the business.

The main feature of scrum teams that stands out is that they have a *cross-functional* and *self-organized* structure. What is meant to be explained with cross-functional is to be in a structure that can decide how to do the work without depending on a leader. Self-organized describes a group of people who have different abilities and work for a common goal, without depending on non-team members (Hoda et al., 2012). Thanks to this, intra-team communication increases and external dependence decreases. Another important feature of the scrum team is a non-hierarchical structure. The main reason why scrum teams are open to flexibility is that scrum is designed to make the best use of creativity and productivity.

Developers

The product development team is a team of professionals responsible for developing the product and making it conform to the Definition of Done (DoD). The DoD is a set of high-level criteria for determining if a product increment is complete (Silva et al, 2017). These teams are responsible for organizing and managing their own work. The development team, its own decisions does not take directives from anyone. Only the developer team decides how the work will be done. The general duties and responsibilities of the developer team are basically as follows: Planning the work to be done within the selected work period, keeping the quality at the desired level by adhering to DoD, adapting their plans according to the sprint goal, being aware that they are professionals who are open to continuous innovation and development (Schwabber & Sutherland, 2020).

Product Owner

The product owner (PO) is the person responsible for maximizing the value of the product from the work done by the development team. The PO is the position that ensures that the scrum team is doing

the right things from a business perspective (Bass et al., 2018). The person responsible for the best management of the business list called product backlog is the PO. The PO has various obligations related to the product, but he can transfer these obligations to others as well as he can do it himself. But, nevertheless, the only responsibility for the product backlog always belongs to the product owner (Sverrisdottir et al, 2014). The general duties and responsibilities of the PO team are basically as follows: to create the product goal and to communicate it to the team members and stakeholders in an open communication environment, to create product backlog items and to show this to team members and stakeholders in an open communication environment, prioritize product backlog items, ensuring that the product backlog is visible, transparent and understandable (Schwabber & Sutherland, 2020).

Scrum Master

Scrum master helps scrum teams operate in accordance with the principles and goals of scrum. The Scrum master has the responsibility for the adoptation of the Scrum. In the shortest definition, the scrum master is the person who ensures that the scrum process occurs as expected (Sassa, 2023). The scrum master is in a position in the role of a leader who serves the scrum team and the entire organization because Scrum master is responsible for the effectiveness of the scrum team. This is achieved by keeping the Scrum team's practices within the scrum framework or making improvements within this framework.

There are three main target groups with which the scrum master interacts within the scope of his responsibilities: Scrum team, product owner, and organization. The scrum master's responsibilities to the scrum team are as follows: Coaches the scrum team members on the main features of the scrum, such as self-management and cross-functionality, helps to create high-value iterations that are suitable for the DoD determined by the Scrum team and to focus on these iterations, helps to carry out the activities included in the scrum and to make these activities have a positive impact, to productive and to comply with time constraints (Noll et al., 2017).

The scrum master's responsibilities to the PO are as follows: Helps the product owner to find new and effective offers on product goals and product backlog management, provides assistance to facilitate stakeholder collaboration when needed helps the Product owner in cases where the Scrum team needs clear and short product blog items (Noll et al., 2017).

The scrum master's responsibilities to organization are as follows: Leads the organization to adopt Scrum principles and goals, performs scrum coaching and trains the organization on scrum, provides integration of Scrum applications within the organization, tries to make the perspectives of team members and stakeholders more experimental and helps to put into practice the ideas that will emerge from this experimental perspective, tries to eliminate the distances between scrum teams and stakeholders throughout the organization as much as possible (Noll et al., 2017).

1.5.1.4. Scrum Events

In general, the basis of software project management is to produce the best quality work in accordance with the determined time and cost constraints. Time constraints can often be interrupted due to planning problems, and ineffective meetings. Scrum adopts the principle of putting the execution of business into a system with 4 basic meetings. These are called spring planning, Daily scrum, sprint review, and sprint retrospective. These meetings are very helpful activities for the team to minimize uncertainties and achieve high levels of transparency within the team (Fowler, 2019).

Sprint & Sprint Planning

Sprints are the stage of putting ideas into practice for the scrum and one of the most important scrum activities for the Scrum. Sprints are scrum events where work is completed at the beginning and end within certain time periods (Asproni, 2006). Sprint planning, on the other hand, is a business planning meeting held by the development team, taking into account the requirements and specified needs. In sprint planning, answers are sought to the questions of what deliveries can be made regarding the relevant part of the product that is running in the current sprint and how this delivery will occur (Pomar et al., 2014). The sprint planning meeting, which was held with the participation of the product owner, scrum master, and the development team, includes the following steps: PO explains the tasks that are prioritized in the product backlog and the information about how to add value to the product when the job is completed to the entire scrum team. The development team selects these tasks according to their current capacity. Sprint planning is moderated by the Scrum Master (Liu et al., 2019)

According to the Scrum Guide, the ideal sprint time is about a month or less than a month. However, this period may vary depending on the internal dynamics of the teams. The important thing is not to make any changes after this period has been determined and to stick to the specified period. Another important point for the sprint is that each sprint should start with the previous sprint. The Sprint logic is essentially about optimizing the functioning of the business. Therefore, it is undesirable to create confusion. Completion of the current sprint occurs when all planned work within the given time limit complies with DoD. Sprints make it possible to observe the progress towards the product goal with certain periods according to the selected length and to be predictable about changes in possible situations by prioritizing adaptation (Ekechi et al., 2024).

Daily Scrum

The daily scrum is a 10 or 15-minute meeting held at the same time every day. Only the development team participates in the daily scrum. However, there may be scenarios in which stakeholders also participate in line with the demand. The goal of the daily scrum is to create an environment where the current state of tasks included in Sprint within the development team is discussed transparently. Team members share their personnel work plan for the next twenty-four hours in this meeting (Ekechi et al., 2024). The main goal of the Daily scrum is to review the progress towards the Sprint goal and make the relevant adaptations in the Sprint Backlog by arranging the planned tasks as necessary (Schwabber & Sutherland, 2020). In these meetings, development team members answer questions about what they did yesterday to achieve the sprint goal, what they will do today, and what are the possible obstacles if they are on the way to achieving the sprint goal. Thanks to the daily scrum, communication, and interaction between team members improves, obstacles are identified, and the ability to make quick decisions increases (Uriawan, 2024).

Sprint Review

The sprint review, held at the end of each sprint, is a meeting where what is being done about the product developed during the sprint is discussed. Sprint review is moderated by the PO. The PO invites the scrum team and stakeholders to this meeting in order to discuss the finished and unfinished tasks within the current sprint goal and product backlog. The main goal of the Sprint review is to present the working product part, share feedback, and ensure cooperation and synergy. The main position of the development team at this meeting is to convey each of the tasks being worked on in detail and to respond to questions. In addition to these people, directors, executives, CEO, and similar participants may also be present at the meeting (Chukwurah & Aderemi, 2024).

Sprint Retrospective

A Sprint Retrospective meeting is a meeting where an evaluation is made by prioritizing criteria such as communication, planning, and teamwork within the team during the completed sprint. At this meeting, whether the work done during the sprint has reached the goal quality is analyzed with a retrospective look at whether the work was done correctly (Hundhausen et al., 2024). In fact, the sprint retrospective is a mirror that shows the scrum team the situations they need to consider for the next sprint. This meeting provides an improvement environment for the next sprint and is held after the sprint review. At this meeting, it is discussed what went well in the previous sprint and what can be done better. Thus, better teamwork and work planning are aimed (Ekechi et al., 2024).

1.5.1.5. Scrum Artifacts

A scrum artifact can be defined as a collection of information used by a scrum team to define the product, the stages necessary to generate it, and the actions required during development. In other words, Scrum artifacts are outputs that represent the work done or the value produced (Lawong & Akanfe, 2024). The main goal of Scrum works is to help ensure the highest level of transparency, supervision, and adaptation from the 3 pillars on which scrum is based (Schwabber & Sutherland, 2020).

Product Backlog

The product backlog is a list of requirements that includes all the features desired to be included in the product. By another definition, a product list is a document that covers the entire project, in which all the requirements, such as wish list items, are listed in detail. The main responsible for the product backlog is the PO. PO helps to determine the time periods and priorities that the tasks will be allocated by making estimates on a day-by-day basis. This list can be expanded by adding new items or its scope can be narrowed by removing some existing features or items. Thanks to the product backlog, tracking the project will also become quite easy (Sedano et al., 2019).

Sprint Backlog

A Sprint Backlog can be defined as a list of tasks selected from the product backlog list and performed within sprint. With the creation of this list, the Sprint Goal is determined. The sprint goal is an action plan to reveal the selected product backlog items and increments within the sprint (Dixit & Bhushan, 2019). It can also be called a draft plan of what the sprint will be like. The sprint goal creates an environment of cohesion and focus for the scrum team, and increases synergy among the team by encouraging them to work together. In fact, it is the developer team that does the work. Therefore, the sprint backlog is a business plan prepared by developers for developers (Schwabber & Sutherland, 2020). The status of the sprint backlog, which has the flexibility to be updated throughout the sprint depending on the situation, becomes open to inspection with the daily scrum event.

Increment

Scrum increment is the result of the product development process. This process consists of multiple sprints over a specific time period and occurs as a result of each sprint. In short, it can be said that increment is a concrete step towards the product goal. Increments, which are aimed to be revealed at the end of each sprint, are functional parts of the product that can be used by customers or stakeholders. A product backlog item is considered to be incremented as soon as it meets the DoD. Otherwise, the work performed cannot be considered part of the increase unless it complies with the DoD (Dixit & Bhushan, 2019).

1.5.2. Kanban Method

The Kanban method, introduced by the Toyota Company at the end of the 1940s, is an agile method based on production, scheduling, and inventory control (Alaidaros et al., 2021). It takes its name from the Japanese word Kanban, which means "signboard" or "visual card". The main function of this method is based on organizing tasks on a graph with certain cards. The general starting point of the Kanban method is the organization of production processes. The Kanban method was created as a solution to situations such as the absence of various materials and parts needed during production on the production line at the required time and in the required quantity and the inability to ensure efficient production. It is a systematic method introduced to carry out full-time production and ensure production efficiency.

1.5.2.1. A Brief History of Kanban

The inspiration for this method, was developed by Taiichi Ohno, who is an industrial engineer working at Toyota. Ohno visited America after World War II and made various observations in the supermarkets, made the following inferences as a result of his observations: In the supermarket, customers buy the products they want from the shelves in the desired amount and put these products in their market baskets and pay at the checkout. When the products on the shelves fall below a certain amount, the products are renewed. Customers determine the number of products they will buy when shopping according to the number of people who will consume, the number of households, the capacity of refrigerators, and the number of days on which products will be consumed. Ohno thought that this way of functioning could also be integrated into the production system and developed the Kanban (Kirovska & Koceski, 2015)

1.5.2.2. Main Principles of Kanban

There are three basic facts that Kanban is based on: visibility, production, and inventory (Huang & Kusiak, 1996). In order to create visibility while processing within the team, various tools are used that help to use tabular charts to create visibility. Visualization is one of the main principles of the Kanban method. Visuality is achieved by presenting the work packages called 'Board' with these various tools. What the columns to be displayed on the board will be is determined according to the decision of the team and the scope of the Project (Henderson, 1986).

1.5.2.3. Kanban Approaches

When looking at software development projects specifically, there are 6 types of uses of the Kanban methodology: Basic Kanban, personal Kanban, team Kanban, enterprise Kanban, Scrumban, and Lean Kanban (Ikonen, 2011).

In basic Kanban usage, a visualization is used to represent the stages of the workflow. This is the most basic and simple form of Kanban methodology in software development projects. This method is recommended for relatively smaller software development teams and less complex projects (Huang & Kusiak, 1996).

Personal Kanban, as its name signifies, is a type of Kanban that the employee uses to manage his/her workflow. Its main purpose is to manage employees' tasks and workflows. In other words, it can be said that it is a basic Kanban adapted to the needs of the individual. Its main difference compared to basic Kanban is that it helps employees customize it according to their specific needs and it is quite high flexibility (Burrows, 2014).

Team Kanban is a type of Kanban used by teams to manage medium size projects and workflows. Thanks to the flexible structure it provides, it not only makes it easier to manage workflows but also allows for various adaptations when necessary. Team Kanban is recommended for medium-sized teams and relatively fewer complex tasks (Shamshurin & Saltz, 2019).

Enterprise Kanban is a type of Kanban that is mostly used in cases where large teams and complex projects are involved. It is the ideal Kanban type to be used for processes that require a high level of customization and continuous improvement. The advantages of enterprise Kanban are that it is highly flexible and scalable. Enterprise Kanban is the preferred type of Kanban for managing complex projects and workflows in large software development teams (Hui, 2013).

Basically, Scrumban, as its name suggests, is a combined version of the Scrum and Kanban methodologies. It can be said that it is a hybrid Kanban type created by Scrum and Kanban methods. Scrumban, which is based on the flexible Kanban method and the planning-based structure of Scrum, helps agile teams to act in accordance with the two methods according to the situations they encounter. It is a Kanban type generally suggested for medium-sized projects and small teams (Banijamali et al., 2017).

Also, the last type of Kanban, lean Kanban is the combined version of the Kanban and lean methodologies. The main point that Lean Kanban focuses on is continuous improvement and minimizing possible waste that will occur during the project. Lean Kanban is generally suitable for relatively small-sized teams and simple projects that require less complexity (Jyothi & Rao, 2012).

1.5.2.4. Benefits of Kanban

What makes the Kanban method stand out among agile methods is visualization. The Kanban board provides all the necessary information about the work. In addition, the number of cards also gives extra information about the work. An increase in cards indicates that production is increasing, decrease in cards indicates that production is slowing down. This allows for a continuous inspection of planning. The fact that Kanban is based on visuality helps to see the work that needs to be done. It helps to see the number of active tasks being done and limit them if necessary (Riaz, 2019).

In addition, the Kanban method is an agile method that is very beneficial in performance management, as it will present the completed work in bulk at the end of the job. The fact that Kanban is based on visuality also makes the process simple and understandable. This simplicity also helps the flow of information to be quite fast, and transparent. Therefore, when there are rapid changes, rapid action and adaptation are provided. At the same time, it is ensured that problems that are experienced or will be experienced are noticed immediately and precautions are taken quickly (Ahmad et al., 2016).

1.6. Kanban vs. Scrum

Kanban and Scrum, two of the main methods of agile software development, differ from each other in various aspects as well as quite similar to each other in various aspects. The maturity of the project, its openness to change, and many similar factors are decisive for the usage areas of kanban and scrum. Similar points of kanban and scrum methods can be listed as follows: one of the main goals in both methods is to set a limit to the number of tasks developed at the same time. Kanban does this by limiting WIP, scrum does it by limiting the amount of work to be developed in sprint. Another main goal of both methods is transparency. The methods and activities carried out are aimed at increasing the transparency of the work and presenting the communication among team members and the current status of the work in a transparent environment. Both methods are based on experimentalism and the delivery plan is open to change according to experimental data (Kniberg & Skarin, 2010).

The different points of Kanban and Scrum methods can be listed as follows: The development planning of the two methods is different from each other. In Scrum development starts and ends within the specified time limit, but there is no specific time planning for development in Kanban. Kanban's development process goes on and on. In Scrum, there are different rituals such as sprint planning, sprint retrospectives, and so on. On the contrary, there are no specific meetings or activities in the Kanban method. According to the development’s experiences, actions are taken throughout the development process. Another difference between Scrum and Kanban is the difference in capacity (Kniberg, 2009).

1.7. Traditional Methods vs. Agile Methods

Traditional software development models and agile methods are approaches that emerged for similar purposes. For this reason, it is quite natural that they have similar goals. The main aim of both methods is to produce the maximum quality product possible with an effective and successful project management process.

In both approaches, planning is a very important phase. However, the understanding of planning in traditional methods is in the form of long-term and detailed planning covering all phases. In agile methods, planning is shorter-term because flexibility to respond to changing conditions is the main key of agile methods. In agile methods, there is an iterative process rather than a holistic approach to the process. In this way, more detailed, pinpoint targets can be determined (Papadopoulos, 2015).

Both approaches carried out detailed examinations during the process. In traditional methods, detailed control activities are carried out during the transition between phases provided by documentation and approval processes. In agile methods, with the active participation of stakeholders in the process, it is possible to examine in detail at every moment of every phase from start to finish (Aitken & Ilando, 2013).

Basic activities like analysis, design, development, testing, and application are similar in both methods. There is a difference in the way these activities are implemented, in traditional methods these activities are seen as activities applied for every need. They are in the position of subcomponents of the main process. However, in agile methods, they appear as activities in which each iteration is applied.

In traditional methods, there is a constant backward glance due to the shaping of the delivery according to the requirements and priorities defined at the beginning of the project. On the other hand, in agile methods, there is a constant forward-looking perspective because the needs and priorities have the potential to constantly evolve. While traditional models offer more engineering approaches because they are based more on structural processes, agile methods offer an approach where the project that creativity is the main thing thanks to its structure based more on people and communication (Palmquist, 2013)

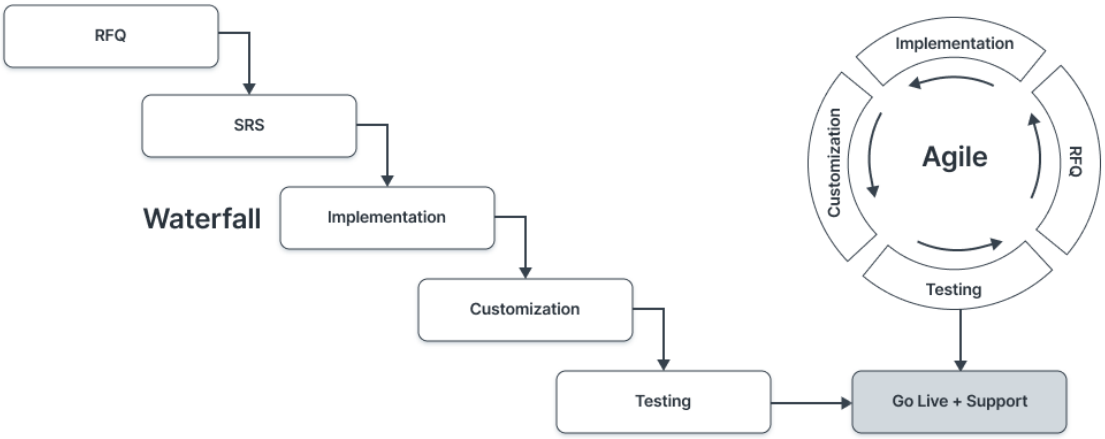

Figure 1.4. Waterfall Method vs. Agile Method Phases

Source: Project Management Institute (2021)

2. JOB SATISFACTION

A large part of the daily life of an individual, whose working life has started consists of the time they spend in the work environment. The job that the employee has and the working environment affect employees psychologically, economically, socially, and culturally. It is quite natural that there should be an expectation on this issue. Satisfaction is defined as ensuring the realization of what is desired/achieving what is desired (Keser, 2009). Job satisfaction is defined as the positive feeling or satisfaction perceived as a result of the evaluation of an employee's job or work experience (Locke, 1976). To explain briefly, job satisfaction can be expressed as the satisfaction that employees get from their jobs. Job satisfaction is a very important concept for both employees and organizations. This chapter includes the concept of job satisfaction and the importance of job satisfaction from various satisfaction and motivation.

2.1. Definition of Job Satisfaction

Satisfaction is a concept that can be defined as ensuring the realization of a desired thing. Based on this definition, satisfaction can be defined as meeting the needs, desires, and expectations of individuals. In other words, it can be formulated as the difference between expectations and what is achieved (Hoppock, 1935). According to this formula, the fewer the expectations or the differences they have, the higher the satisfaction will be.

Satisfaction can be viewed from various perspectives. But from the perspective of working life, job satisfaction is a positive emotional state brought by employees being able to get the values they want to get from their job, manager, colleagues, and the environment in which the job takes place (Zhu, 2013).

In early times, job satisfaction was defined in a one-way like working in a way that minimizes fatigue and stress in the factory. Over time, this concept has gained an important role in business life as a concept related to the level of satisfaction that an individual receives from life, which directly affects his physical and mental health. It is seen that job satisfaction is defined as a phenomenon that occurs when the nature of the work and the goals of the person match each other and allow the person doing the job to be satisfied with the job (Trevor, 2001). Robbin (2009) defines job satisfaction as the general behavior of the employee towards his job. According to Luthans (1995), job satisfaction is a concept that can be defined as the whole of a person's attitude to work and situations in the business environment, as well as perceptions about the benefits he/she receives from his job and his/her emotional reaction to it. Looking at all these definitions from a general point of view, job satisfaction is a set of internal reactions

formed by comparing a person's perceptions, values, norms, and goals related to the work and working environment (Mishra, 2013).

2.2. Importance of Job Satisfaction

Job satisfaction is a very important concept in today's business world. Especially in this rapidly changing business world where competition is increasing, technology is advancing at an extremely fast pace and globalization is extremely high, job satisfaction is a concept that organizations attach great importance to ensuring employee loyalty (Judge et al., 2020). Organizations that do not give enough importance to being innovative, innovation and development constantly may enter into a process that will go as far as crushing under increasing competitive pressure and withdrawing from the field under difficult conditions. The only way to avoid this situation is not to strengthen the technological infrastructure of the organization. The main thing is to be able to act right, to correctly read the requirements of the characteristics of the time (Savery, 1996).

One of the most important phenomena that stands out when talking about today's requirements is the human factor. In order to stand out in the competitive environment, the organization needs to use its factors effectively, thus gaining a competitive advantage over its competitors. Job satisfaction is a direct means of motivation for the success of the employee, as well as being a mandatory condition of organizational commitment. Investments such as making the right ideas and projects at the right time, creating satisfaction from communication in the business environment, return as employees who are satisfied with their jobs, love their jobs, and feel positive feelings about their jobs (Imonikhe, 2024). From this point of view, it can be said that the development and progress of the organization largely depend on the satisfaction of the employees within the structure of working conditions and the satisfaction with their jobs. In the same way, employee satisfaction is considered to be one of the important factors that reduce the turnover rate and absenteeism of the workforce (Demir, 2007). There is a significant relationship between job satisfaction and employee motivation. In cases where the individual is not satisfied with his job, it is observed that the motivation to work also decreases at the same rate (Roos & Van Eeden, 2008).

Job satisfaction is mainly evaluated from three main aspects. These can be listed as employee, manager, and organizational satisfaction. The job dissatisfaction that will be experienced in each of them leads to various effects. For example, from the employee's point of view, negative job satisfaction can be seen as one of the reasons for an increase in the rate of making mistakes, distraction from work, and lack of attention. In the same way, from the manager's point of view, it can cause various problems such as decreased productivity, business slowdown, discipline, and management problems. When examined

from an organizational point of view, a decrease in job satisfaction appears as an element that can lead to economic losses and loss of prestige due to the loss of personnel and customers (Riyanto et al, 2021).

2.2.1. Job Satisfaction from an Employee Perspective

High job satisfaction is a phenomenon that has various positive effects such as increasing the organizational commitment of the employee, reducing the work stress felt by the employee, and increasing the quality of work when examined from the employee's point of view. From the employee's perspective, the positive use of social status effects such as wages, positive relationships with colleagues, and the possibility of promotions are some of the factors that positively affect job satisfaction (Saranya, 2014). The more the employee's needs can be met, the more the employee sees that his wishes and needs are listened to, and job satisfaction is expected to be high at the same rate. Employees who cannot get the satisfaction they want from their jobs can enter into a process that reaches the extent of walking away from work and even leaving work. After a while, feelings of indifference and hopelessness towards jobs also cause physical problems and status dissatisfaction leads to problems from different perspectives, up to problems in social relations (Eade, 1993). From this point of view, it can be said job satisfaction takes its place as a very important and critical concept for the employee, both from psychological and physiological health.

2.2.2. Job Satisfaction from a Manager Perspective

Job satisfaction from the manager's perspective can be examined under two separate headings. These can be divided into the job satisfaction of the employees who depend on him and the job satisfaction experienced by the manager himself. From the manager-employee point of view, the high job satisfaction of employees working under a manager due to their position is a phenomenon that increases trust, loyalty, and quality. The fact that these things happen is a factor that has returned the success of the team and thereby the manager (Judge et al., 2020). Managers should pay attention to creating a positive business environment in order to increase staff productivity and prevent layoffs. According to the findings obtained in a study conducted by Durak and Serinkan (2007), the main problems caused by the situation of job dissatisfaction experienced due to business management are listed as follows: low productivity, increase in complaints about jobs, increase in absenteeism and delay rates and increase in employee turnover rate.

On the other hand, all the factors that affect job satisfaction for employees are also valid for managers. The more managers feel successful, the higher the level of satisfaction with their work, and this directly affects the employee's job satisfaction. At the same time, managers with a high level of job satisfaction

contribute to the organization's efficiency and competitive advantage with their innovative attitudes and behaviors (George & Jones, 2005).

2.2.3. Job Satisfaction from an Organizational Perspective

Employee job satisfaction for an organization helps to find employees easily, and increases employees' and organizations success rates thanks to their continuity to the organization for many years and maintaining productivity. It has been seen that business goals are easier and more achievable in organizations where job satisfaction is provided. The following can be listed as activities that organizations can pay attention to in order to provide job satisfaction: job enrichment, rotation, career and talent planning for employees, performance improvements, and motivation enhancement (Bashir & Gani, 2020).

Job satisfaction is a determinant and guiding phenomenon in various respects, such as job performance in an organizational sense and the desire to quit work. It is observed that the dependence of employees with high job satisfaction on the organization is equally high. It can be said that job satisfaction is a very important determinant in order to prevent undesirable situations such as financial loss, and disruption of production and service that will occur in the event of possible employee losses. Dinham and Scott (1998) found that employees who were satisfied with their jobs felt positive emotions towards their jobs, did less absenteeism, made maximum contribution to the organization, and worked longer. To summarize, it can be said that in an organization where employees have high job satisfaction, positive feedback will occur, such as the ability of the organization to effectively achieve its goals, use fewer resources and employees make more efforts for the success of the organization.

2.3. Relationship Between Job Satisfaction and Motivation

The word motivation, which comes from the root "to move", can be defined as something that inspires individuals to act with their own will to achieve their desired goal. In other words, the concept of motivation refers to exposing the individual to certain effects and causing him/her to act in a different way than the behavior he/she would show before these effects occurred. Thus, an observable change in an individual's behavior indicates that he/she is motivated (Tietjen & Myers, 1998).

From an organizational perspective, motivation can be defined as all the forces that enable employees to be motivated and do their jobs willingly. Motivation and job satisfaction have a mutually interactive relationship. In this context, the necessary ground is provided for a satisfied individual to be motivated, or it would not be wrong to say that a motivated individual can also feel satisfied as a result of all her/his efforts and actions (Kian et al., 2014). However, when it comes to people with variable characteristics,

this relationship cannot always be said to be of a single type. From this perspective, the relationship between motivation and job satisfaction can be positive, neutral, or negative in different aspects depending on the conditions and situations (Jalagat, 2016).

2.4. Major Approaches to Motivation and Job Satisfaction

Job satisfaction has been an area of constant research along with the developments in management science. Job satisfaction theories are various theories that emerged as a result of studies aimed at determining whether job factors affect job satisfaction and what can be done to increase employees' job satisfaction. Mayo's (1949) work at the Hawthorne factory of the Western Electric Company in the 1930s is shown as the first official work on this subject. Job satisfaction theories largely overlap with theories that explain motivation.

By examining the literature, it can be seen that the studies aimed at explaining job satisfaction are examined under two main headings. These are content and process theories.

2.4.1. Content Theories

Employees are in an environment within the organization where there is a certain situation and mobility among factors related to work and the organization in general. This environmental structure in which the employee is working is one of the important elements that ensure the formation of his/her inner point of view. The personal life and behavioral characteristics of the employee are within the scope of content theories (Park, 1976). Content theories weigh and examine these inner factors. In general, scope (content) theories are all theories aimed at determining the situation that a person is in and the factors that lead a person to behave in certain directions (Acquah et al, 2021). In this section, two content theories, Maslow's hierarchy of needs and Herzberg's two-factor (Hygiene – Motivation) theory, will be discussed.

2.4.1.1. Maslow’s Hierarchy of Needs

One of the most well-known theories about satisfaction is Abraham Harold Maslow's hierarchy of needs theory. This theory, which was put forward in a study published in 1943, is one of the first theories to examine the important contributions to job satisfaction. Using his clinical studies, psychologist Maslow tried to identify the basic needs in individuals’ lives. As a result of these studies, he explained these basic needs in five different categories: physiological, safety, love/ belonging, esteem, and self-actualization needs (Maslow & Lewis, 1987).

Physiological needs can be defined as the needs at the lowest and most basic level in the Maslow hierarchy. Needs such as nutrition, sleep, and shelter that an individual needs to continue her/his life are included in this category. These are needs that must be met frequently and at short intervals for an individual's life satisfaction. It is quite difficult to move to another category without meeting the needs in this category (Boston, 2009).

The need for security at the second level of the hierarchy can be interpreted from a wide variety of perspectives. For example, it can be varied such as physical security (accident, disease, etc.), economic security, and a peaceful and clean-living space. The need for security will arise if the physiological needs of the individual are met at a good level (Boston, 2009).

When physiological and security needs are mainly satisfied, social needs such as love and belonging arise. Being accepted, belonging, and being embraced with love and respect is an instinct that every individual needs. An individual's desire to integrate with society and to establish social relations is important. These needs are among the needs that an individual attaches importance to in his/her daily life as well as in his business life. However, failure to meet the needs in this category has a more psychological impact on human life compared to the needs in the other two categories. Individuals who cannot feel belonging to society or any group and who cannot taste love, have to cope with feelings such as loneliness and social anxiety (Gorman, 2010).

As the upper levels of the hierarchy are reached, it is seen that the dimension of needs shifts from physical to psychological needs. The need for esteem in the fourth category is also an example of these psychological needs. When basic physiological needs, security, and social needs are met, the need for respect begins to arise (Boston, 2009). The need for esteem can be addressed in two ways: The respect that an individual feels for himself/herself, the importance that he/she gives to himself/herself, and the respect and importance that he/she sees from others (Lönnqvist et al., 2009). The first one is directed towards the individual's needs to be strong, mature, develop, achieve success, and become a free individual. The second is directed towards the individual’s needs such as gaining the respect of others, having prestige, and recognition. When it comes to business life and career choices, the prestige factor is becoming one of the important factors.

The need for self-actualization, which is at the highest level in the hierarchy, is the relatively most abstract category related to the realization of an individual's abilities and potential (Maslow, 1971). This need arises in individuals whose needs in all other categories are satisfied. Even if the needs at the lower level are met, it is an effort for individuals to be in a self-appropriate job/life path that serves their potential. It can be said that this need is relatively the most personal because it will differ from individual

to individual. The need for self-actualization is a lifelong effort and it is one of the needs that are difficult to achieve satisfaction (Benson, 2003).

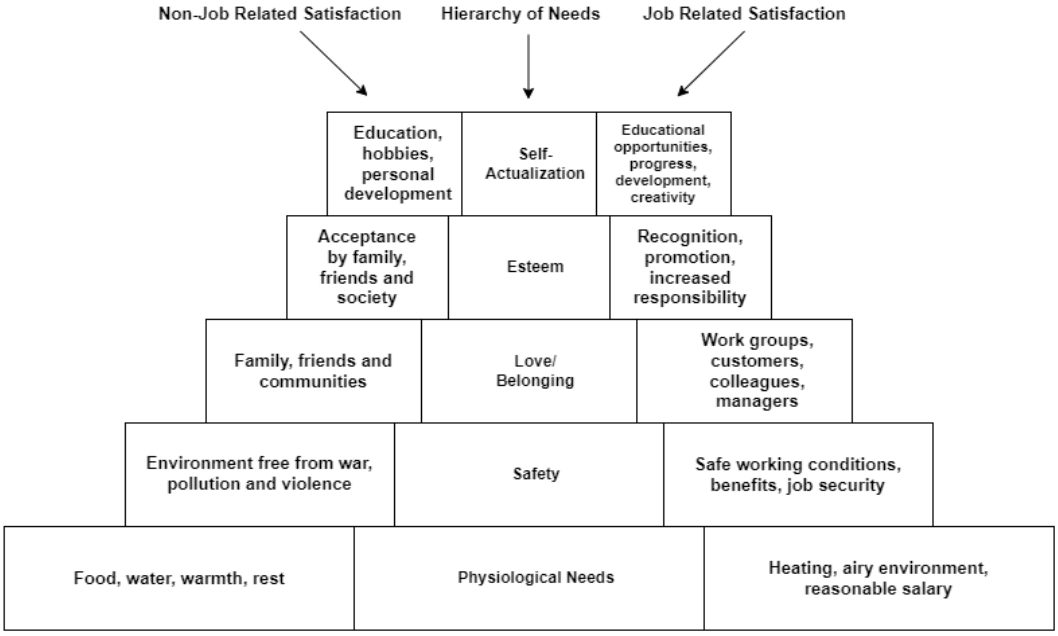

Figure 2.1. Maslow's Hierarchy of Needs

Source: Richard Daft (1991)

The hierarchy of needs described in these five different categories aims to show that the desires, expectations, and needs of individuals exist in order to achieve their goals and that they can be classified in different ways (Lester, 1990). According to this theory, the needs in the five categories determined are in a step-by-step structure. The theory is based on the fact that the individual's need at a certain level will not be in an effort to achieve the need at a higher level without reaching satisfaction, so the individual is constantly in an effort to achieve each step. The needs at the upper level do not lead an individual to any behavior until the needs at the lower levels are addressed. As the lowest need is met, the individual is motivated to meet the next need that is next in the hierarchy. Therefore, higher level needs become active only when lower needs are met (King-Hill, 2015).

The overlap of this hierarchy in business life can be shown by the following example: If employees are paid a reasonable salary and their job security is ensured, inquiries can be made about social needs and work conditions. On the contrary, in a profession where employees earn so low that they cannot even meet their nutritional needs, it is not the turn to question social needs, work conditions, or the employee's discovery of their true potential at work (Torrington & Hall, 1991).

Uysal and his team based their research (2017) on the Maslow hierarchy of needs with 519 employees from different sectors. In this study, they aimed to determine the needs of employees in different professional groups. According to the results of the study, it has been seen that the need for esteem outweighs modern working conditions. Reasons such as the decrease in the rate of seeking sociality at work due to the internet and technological developments and the transition of Generation Y to business life have been suggested as possible reasons for these results.

2.4.1.2. Herzberg's Two Factor Theory

The two-factor theory, also known as the Motivation-Hygiene theory, was developed by the American psychologist Frederick Irving Herzberg in the late 1950s. Herzberg and his colleagues selected a sample group of approximately 200 engineers and accountants in Pittsburg. By interviewing this group, he asked them to recall the moments when they felt particularly satisfied and motivated by their jobs and working times in the past. Afterward, the feelings in these memories were described by people. As the main purpose of this study, the following question can be shown: "What do people want in their jobs?" This theory aims to clarify the employee's expectations from the organization and what motivates them more, unsatisfied working conditions, and why these conditions create dissatisfaction with work (Herzberg et al., 1966).

According to the findings obtained in the study, two dimensions related to employee job satisfaction and dissatisfaction were observed: Hygiene factors and motivators. Hygiene factors should be fully satisfied as a priority in ensuring the job satisfaction of employees. After that, the motivators should be arranged in such a way as to satisfy the employee. A change in a single factor will not be sufficient for employee satisfaction. Motivators are related to the nature of the work but hygiene factors are related to preventing employee dissatisfaction. For this reason, it is also called protection factor as another name for hygiene factors (Alshmemri, 2017). Motivators will not be very effective for the employee whose dissatisfaction cannot be prevented. Because the main goal of the hygiene factor is to prepare a positive motivating environment that motivators will create by preventing the employee's dissatisfaction. That is why the name of the theory is two-factor theories. This theory defines employee job satisfaction with two factors that link to each other.

Hygiene Factors

The factors in this category were obtained as a result of the answers to the employee questions about the causes of dissatisfaction and lack of motivation (Herzberg, 2014). It can be said that hygiene effects are mostly needs related to the work environment. Examples of hygiene factors are wages, physical conditions of work, organization policy, management's attitude and quality, etc. According to this theory, organizations whose hygiene factors are not at the desired level create dissatisfaction among employees. However, although providing these factors reduces dissatisfaction, they may not be successful on their own in increasing a person's satisfaction and internal motivation. At this point, motivator factors, which are a second dimension, are required (Poulston, 2009).

Motivators

Motivating factors are the findings obtained from the answers of employees to questions about individual satisfaction and motivation. In the most general sense, it can be said that motivators are the factors that employees indicate as the main reasons for motivation and satisfaction. Examples of motivators are the job itself, responsibility, promotion opportunities, status, success, recognition, and prestige (Herzberg, 2014).

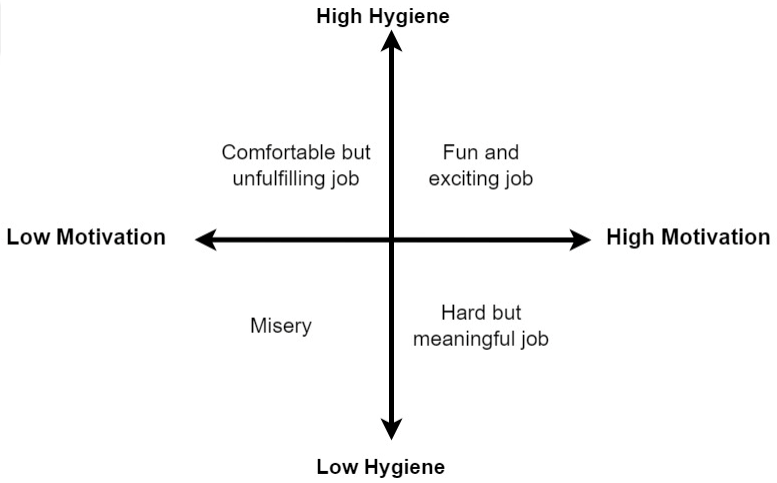

Figure 2.2. Herzberg's Two Factor Theory

Source: Herzberg (2014)

2.4.2. Process Theories

In contrast to the content theories, process theories aim to explain the internal motivations of individuals and examine the external sources of motivation. In other words, process theories explain how thought turns into action and examine the relationships of the variables that create the motivation process with

each other (Park, 1976) Process theories investigate the variables in activities from the start of behavior to finish. At the same time, the importance of individual differences in motivation instead of general judgments in these theories has also been examined. In short, process theories seek answers to the questions in which situations individuals exhibiting certain behaviors repeat or how to ensure that these behaviors are repeated (McSweeney & Swindell, 1999). If considered from the point of view of employee job satisfaction, process theories aim to explain the actions that cannot be seen at first glance when employees are satisfied with their jobs. In this section, three process theories, Vroom's expectancy theory, Adam's equity theory, and Hackman& Oldham's job characteristics theory will be discussed.

2.4.2.1. Vroom's Expectancy (VIE) Theory

Canadian psychologist Victor Harold Vroom, with his theory published in 1964, examined how individual expectations are formed. According to Vroom's definition, the concept of expectation is the perception that behavior will be rewarded with a certain reward. According to this model, job and task success is a function of rewarded behavior. If individuals think that a reward will come in return for the effort they make, they tend to make more effort. Otherwise, the perception of expectation will not occur and the effort to be made in this regard will be kept to a minimum (Vroom, 1964).

This theory consists of three concepts: For this reason, the name of this theory is also known as VIE Theory. VIE stands for Valence, Instrumentality, and Expectancy. Accompanied by these concepts, Vroom's theory can be formulated as follows:

Motivation = Expectancy x Instrumentality x Valence

Expectancy is defined as the probability that work-related effort will lead to an individual's level of performance. Instrumentality is defined as the probability that level of performance will lead to a various work outcome (Chiang et al., 2005). The mentioned outcomes can be positive and negative. For example, pay, security, fatigue, boredom, etc. Valent is how the obtained outcomes are perceived by the employee. For example, rewards and incentives can be called valence because they are associated with employee's needs (Oliver, 1974).

2.4.2.2. Adam's Equity Theory

The theory of equality is another theory developed in the 1960s. John Stacey Adams, on the basis of equality theory, argues that the most important phenomenon that increases individuals' work motivation is equality (Adams & Freedman, 1976). According to the equity theory, the employee's job performance

and satisfaction are related to the equality or inequality he/she thinks about the workplace environment. The individual compares the individual effort he/she has spent and the reward he/she has received as a result of this effort with the effort others have made and the result they have achieved. If a large amount of inequality is seen in this comparison, the job satisfaction rate and commitment to the workplace will decrease (Adams, 1963). The situations evaluated within the equity theory are as follows: results obtained for the effort spent, dignity, position, and social rights. In equity theory, organizations as well as individuals have a lot of work to do. However, the idea of equity varies a lot and therefore it is difficult to establish an impartial balance of equality within an organization. Therefore, it is relatively difficult to prevent conflicts caused by equality within the organization (Cooper, 1990).

2.4.2.3. Hackman & Oldham's Job Characteristic Theory

Job characteristic theory is a theory developed by Greg R. Oldham and Richard Hackman in 1974. Originally, the job characteristic model emerged from the job redesign theory called Job Characteristics Theory put forward by Hackman and Lawler (1971). This theory was revised by Hackman and Oldham (1974, 1980) and, called the Job Characteristic Model (JCM) after various adjustments and improvements. It can be said that JCM is one of the most influential models guiding research on job satisfaction (Boonzaier et al., 2001). Basically, this model aims to investigate how job characteristics affect employees' job satisfaction. According to Hackman and Oldham, the theory of job characteristics describes the relationship between job characteristics and individual responsibilities toward work (Hackman & Oldham, 1974). In this theory, the nature and content of the job defined as work are meant by the job characteristics. According to this theory, jobs consist of five core dimensions. And these five core job dimensions have a meaningful effect on employee and work-related outcomes, especially job satisfaction (Ali et al., 2014). When the literature is examined, it is seen that JCM is frequently included in job satisfaction studies (Haque & Taher, 2008; Judge et al., 2000; Metin & Demirer, 2021). In addition to job satisfaction, JCM also comes to the fore in research topics such as job performance (Matilu & K'Obonyo, 2018) and organizational commitment (Al-Tit & Suifan, 2015; Ali, 2015).

The five core dimensions of the model are named as follows: Skill variety, task identity, task significance, job autonomy, and feedback (Hackman & Oldham, 1974). These five dimensions contribute to both the responsibility and meaningfulness of the work. These dimensions affect three important psychological states which are; the job has meaning for the individual, the employee takes responsibility for the outcome of the job, and the employee is informed about the real results of the job (Ali et al., 2014). According to the theory, in the absence of one of these three psychological conditions, the employee will have difficulty being intrinsically motivated. According to the model, there is a relationship between the five dimensions of work and these three psychological states. Five

characteristics contribute to the responsibility of the job, and this contribution is a factor that helps to make the job feel more meaningful for the employee. In addition to these, there will be an increase in the inner motivation, general satisfaction, and productivity of the employee (Hackman & Oldham, 1974). The job characteristics model is a framework that should be carefully considered not only for employees but also for organizations. It can be said that considering the strong effect of the job characteristic model on job satisfaction, the employee's positive attitude towards her/his job will also contribute to organizational effectiveness (Ali et al., 2014). Below, these five dimensions are explained in detail.

Skill Variety

The first core job characteristic dimension skill variety refers to how many different skills and abilities are used for the successful completion of a job (Hackman & Oldham, 1974). The main focus of this dimension of job diversity is how much the job/task challenges the incumbent to use different types of skills and abilities (Adedire, 2023). According to the model, the more different skills and abilities a job requires, the more satisfying it will be for the employee. From this point of view, organizations can resort to ways such as job enrichment, job rotation, or job expansion with a variety of skills to increase employee satisfaction (Farh et al, 1990; Derek & Laura, 2000). The use of a single skill while performing tasks is likely to lead to feelings of boredom and monotony among employees. The importance of skill variety comes to the fore more clearly when comparing routine work environments and dynamic work environments where different skills and abilities are used (Kumar et al., 2023). Bratton (2007) emphasizes that the more diverse talents and skills required to complete a task, the more meaningful the work becomes for employees and the greater their motivation to do it.

In addition to that, although less covered in studies, there is also a part of job variety that is associated with perceived job stress. Because the variety in question will create a more interesting and less monotonous work environment for the employee (Oliveira & Scherbaum, 2017). According to Tarris, the level of skill in a job is directly proportional to the employees' psychological well-being. In a longitudinal study by Hakanen et al. (2011), it was found that skill diversity had an inversely proportional effect on employees' job burnout.

Task Identity

Task identity is a feature that expresses that the job should be clear and identifiable in all aspects from the beginning to the end. In other words, task identity is the ability of employees to do the job from start to finish with visible and tangible results (Pramesthi, 2018). Task identity can also be defined as the ability to accomplish tasks at the best time with the best results (Österberg et al., 2017). According to Choudhary (2016), the knowledge and experience levels of employees are an important antecedent in

the implementation of task identity ability. According to this hypothesis, the possible positive or negative consequences of the concept of task identity depend on the employee's level of knowledge and experience at work. According to the model, the relationship between task identity and job satisfaction is that the employee's ability to master his/her job from beginning to end increases job satisfaction (Hackman & Oldham, 1974). When the literature is examined, supportive studies are seen regarding the relationship between task identity and job satisfaction (Ibrahim et al, 2021; Hauff et al, 2015; Yuen et al, 2018).

Task Significance

Another job characteristic dimension, task significance, is a relatively more abstract point of view than the others. Task significance can be most simply defined as how important or unimportant the work done in the organization is in the lives of other people. The extent to which the job affects others, including the whole society is beyond the organization (Hackman & Oldham, 1974). To put it another way, task significance is a concept that expresses the degree to which the doing of a job touches the lives of others. According to the model, task significance has a positive impact on outcomes such as job satisfaction, organizational commitment, and intrinsic motivation (Allan et al, 2018). When the literature is examined, many studies can be seen that examine the relationship between task significance and job satisfaction and the results supporting the model (Thatcher et al, 2002; Li & Bagger, 2012) It seems normal that the relationship between task significance and job satisfaction is directly proportional. The sense of meaning and importance that the job makes the employee feel, and the person adding value to people's lives through their job will contribute to the employee feeling more positive emotions towards their job. These positive feelings will therefore directly affect job satisfaction (Allan et al, 2018).

Job Autonomy

Job autonomy, another job characteristic dimension, is a concept related to the extent to which the work is planned and controlled by the employee doing the job. The fundamental feature of this dimension is that it provides the ability to plan how and in what way employees should perform their tasks (Hackman & Oldham, 1974). Autonomy as a concept is defined by Stamps and Piedmonte (1986) as the freedom of movement provided to the employee to carry out the daily, operational activities of the job. With increased job autonomy, the employee is given responsibility for outputs that can be categorized as work-related outcomes such as work efficiency and intrinsic motivation (Langfred & Moye, 2004). According to JCM, the more autonomy increases, the more personal responsibility and commitment an employee feels towards his/her job. At the same time, increasing autonomy also helps to work enrichment. According to Saragih (2011), job autonomy positively contributes to employees' belief that they have the skills and competencies needed to perform their tasks, which in turn indirectly positively

affects their job performance. Also, the fact that the performance-related results of the job depend on the employees' efforts creates a sense of responsibility and job satisfaction (Spector, 1997; Judge et al., 2000). When looking at the studies examining the relationship between job autonomy and job satisfaction, it can be seen that there is a positive relationship between job autonomy and job satisfaction (Fried & Ferris, 1987; Lee, 1998; Pousette & Hansen, 2002). Based on these studies, it can be said that as employees gain job autonomy and the freedom to make their own decisions, their sense of satisfaction with their jobs can be increased.

Feedback

The final job characteristic dimension, feedback, can simply be defined as providing information to employees about the work they have completed. According to Besen et al. (2013), feedback is the degree to which an employee receives information about job performance-related evaluations. This dimension is related to the extent to which the employee is aware of the consequences of his/her work (Blanz, 2017). Feedback helps employees see their job performance as it provides detailed information about employees' job performance. Thus, it can be said that it is a critical need that paves the way for employees to improve themselves in periods or situations where they show ineffective or undesirable performance (Hackman & Oldham, 1974).

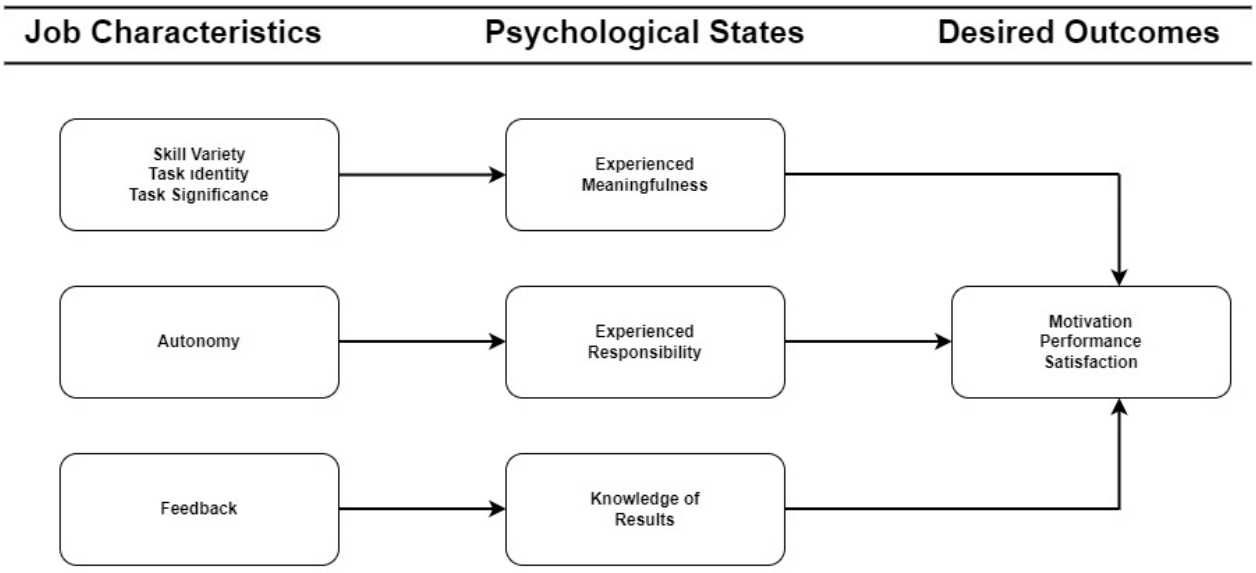

Figure 2.3. Job Characteristic Model

Source: Hackman &Oldham, 1974

2.5. Determinants of Job Satisfaction

When the literature is examined, it is seen that job satisfaction is an important research topic in human resource management and organizational behavior and a lot of work has been done on this topic. It seems that the common point of these studies is to find factors that affect job satisfaction. In these studies, which focus on the factors affecting job satisfaction in general, it is seen that basically two main factors are focused on: Personal factors as factors related to employees and environmental factors as factors related to the organization (Spector, 1997). When personal factors are examined, side factors such as personal characteristics of individuals, job expectations, and requirements are included. When the factors related to the environment are examined, many factors such as physical conditions of work, psychological effects, and opportunities to skip seniority at work can be listed in general (Harputlu, 2014). When the related studies are examined, it is seen that in addition to this grouping, personal factors can also be divided into two groups, internal and external. Internal factors are related to individual behaviors, and personal characteristics, external behaviors are more related to how an individual interprets the work environment. While studies and theories about external factors are mostly put forward by economists, external factors are mostly put forward by social scientists (Petrescu & Simmons, 2008).

2.5.1. Personal Factors

The factors related to the employee that provide job satisfaction can be age, gender, education, etc. Personal factors that play a major role in job satisfaction. They are related to the achievements and experiences that an individual continues to achieve throughout his life and many qualities that exist in himself/herself. The employee's frame of mind, work experience, and the social environment in which he lives are important factors that cannot be ignored for job satisfaction. According to whether these personal factors meet the employee's expectations or not, the job is affected positively or negatively. Personal factors can be listed as follows: Physical and mental, gender, marital status, education level, personality, organizational tenure, and title (Robbins et al., 2004).

Physical and Mental Condition

Previous research revealed that there is a significant relationship between job satisfaction and employee's physical & mental condition. Hoppock (1935), a researcher who conducted one of the first studies conducted for job satisfaction, stated that the definition of job satisfaction is influenced by the mental and physical condition of the employee at least as much as the job itself. According to this study, employees' job satisfaction is influenced by the physical characteristics of the job and other working

conditions, as well as by employees' characteristics and the spiritual, psychological, and social state of the employee to a fairly large extent.

The employee creates the main body of job satisfaction with his intrinsic values and expectations. Although job satisfaction may seem like a phenomenon that affects business balances, performance, and productivity at first glance, however when viewed in depth, increasing an employee's happiness and job satisfaction is one of the main priorities (Robbins et al., 2004). According to Hom and Kinicki (2001), the inner conflicts of employees, and the inability to ensure their mental stability increase job dissatisfaction and affect the quality of social life. In addition, when different studies are examined, it can be seen that the conflict between social life and work life is an important factor in reducing the quality of life, and it was found that the most effective factor for the causes of this condition is to spending intense time to work life (Higgings & Duxbury, 1992).

Gender

It is a common situation that there are gender-based differences in perspective on life. It is an inevitable fact that this situation is similar in business life. For this reason, there are multiple studies in which the gender relationship of job satisfaction is examined.

In their study, Andrade, Westover, and Peterson (2019) observed that based on gender-role differences, men behave toward success and promotion but women behave towards work and social environment oriented. For this reason, they deduce that the rates of commitment to work and motivation levels gender-based differ. This study also revealed once again the fact that gender-based salary differences still exist today. According to Chiu (1998), there is a relationship between job satisfaction and the professional position. However, she observed that women working in higher positions have less job satisfaction than their male colleagues in similar positions due to poor promotion opportunities. In another study on this subject, Yazıcıoğlu (2010) compared whether the gender factor affects the formation of job satisfaction among teachers in Turkey and Kazakhstan. As a result of this study, it has been seen that the job satisfaction averages of Turkish and Kazakh teachers differ significantly in terms of gender. Beşiktaş (2009) claimed in his study that the difference in expectations between men and women is the main reason affecting job satisfaction. Mosadeghrad and Yarmohammadian (2006) obtained important findings regarding the relationship between job satisfaction and gender factors.

Marital Status

According to the studies conducted, one of the personal factors affecting job satisfaction is marital status. In their study with doctors, Sevimli and İşçan (2005) found that employees whose marital status was stated as married had higher job satisfaction than those who were single. The reasons for the high job satisfaction of married employees can be listed as the reflection of the feeling of satisfaction in family life at work and the fact that marriage changes job-related expectations (Knerr, 2006). However, according to some studies conducted on this subject, there is no significant relationship between marital status and job satisfaction. In Soyer's (2009) research based on Turkey in general and conducted with teachers, it was determined that the marital status of the employees did not show a significant difference according to job satisfaction. According to the results of the research, there was no difference in job satisfaction when married and single teachers were compared.

Age

The current age and the decisions this age brings are important factors in individuals' lives. Therefore, individuals' behaviors and thoughts may differ depending on age, depending on the organization and job they work in. For this reason, the age factor is one of the important personal factors affecting job satisfaction.

In the studies conducted on this subject, the relationship between age and job satisfaction was found mostly positive. This means that as employees age and get older, their job satisfaction increases. It was observed that experienced employees who gained experience over time compared to young employees, expectations were more consistent in working life, and most of the expected and realized overlapped, so job satisfaction level is relatively high (Morrhead & Griffin, 1998). Andres and Grayson (2003) found a similar result in their study. In their studies, they found that older employees get more satisfaction from their jobs compared to younger ones. The researchers explain this situation in the following ways: older employees have a higher consciousness of prioritizing themselves in job selection, and therefore these employees make a choice in favor of the job they want. So, this brings higher job satisfaction, naturally. In addition, with a similar motivation, employees at older ages can leave it easier that they cannot get satisfaction. Williams and McDaniel (2007) put forward a different view on this issue. According to this study, as an individual's age increases, the salary expectation that he/she receives increases more and if this expectation is not met, the level of satisfaction naturally decreases. According to another study conducted by Demir (2007), young employees who start a new job have high job satisfaction due to their high excitement. It has been observed that this satisfaction rate decreases after

the first few years. However, what is seen is that the job satisfaction of employees who have continuity in their jobs has increased again.

Education Level

Previous research revealed that education had a direct impact on job satisfaction. In general, a negative relationship was observed between education level and job satisfaction. It has been found that employees with a high level of education are less satisfied with their jobs than those with a low level of education. One of the most important reasons for this can be shown as follows; as the level of education increases, different meanings begin to be attached to work (Kuzulugil, 2012). Another study conducted by Fauzi and Ubaidillah (2022) has shown a different result. It has been found that the level of education has a positive and significant effect on job satisfaction. According to Levitan and Johnston's (1973) study, employees with high educational status also have low levels of job satisfaction when they are forced to work with low income. Highly educated employees would increase their desire and efforts in order to get out of the position they think they don't deserve and to be able to work in the position they want and their career goals another study supporting this result was conducted by Eren (2008). In the study with nurses, Eren found that the job satisfaction rates of nurses at the master's education level are higher compared to nurses at the undergraduate and lower education levels. According to another study conducted by Tirak (2015), employees with a high level of education have higher job satisfaction than employees with a low level of education. As a reason for this, it has been presented that job opportunities and wages increase as the level of education increases.

Personality

Personality is the individual's way of life. Personality characteristics of employees and the suitability of these characteristics to the jobs they work in are important factors affecting job satisfaction. When the literature was examined, it was seen that there is a significant relationship between job satisfaction and personality traits. It has been observed that job satisfaction is lower in socially unsuccessful individuals who have difficulty adapting to society. On the contrary, it has been observed that job satisfaction levels are higher in individuals who are self-confident and have strong self-awareness (Çalışkan, 2005). Job satisfaction seems easier to achieve for employees who find harmony between the work they do and their personality traits and abilities. Therefore, employees who demonstrate this harmony also provide positive returns to the organization as good performance.

In addition, stress is one of the important factors affecting job satisfaction. The ability of the employee to make strategic decisions during stressful moments is an indispensable personality trait in today's

intense stressful working environment. Some individuals can successfully manage the stressful environment around them thanks to their personality traits and act correctly, while some individuals may feel boredom and away from work due to this stressful environment. This causes job satisfaction to decrease (Gemmil & Heisler, 1972).

Tenure and Seniority

Tenure or length of service can be defined as how long an employee has been at their job. Working in the same job for many years is thought to increase job commitment and therefore increase job satisfaction levels. In Pearson and Moomaw's (2005) study on teachers working in the USA, it was observed that there is a significant relationship between job satisfaction and length of service. Volkwein and Zhou (2003) also emphasize that there is a direct relationship between length of service and job satisfaction. According to Cano and Miller (1992), seniority has a significant impact on an individual's job satisfaction. Individuals with higher levels of work experience can perceive their expectations from work and what the job expects of them more reasonably and rationally than inexperienced employees. However, there is a different approach in Güven's (2005) study. According to Güven's study, it is expected that there will be no or an inverse relationship between tenure and job satisfaction in periods when there are no other alternatives or there are economic problems that make it difficult for the individual to leave the job. When these and similar studies are examined, the factors that increase the length of service and job satisfaction can be listed as follows: As the employee's length of service and therefore seniority increases, the sense of achievement may increase the rate of job satisfaction. As the employee's length of service increases, their wishes and needs can be met better. This also helps to increase job satisfaction. As the length of service increases, the bond with the job increases. Therefore, the work is more embraced. This bond can help increase job satisfaction. An employee with increasing length of service and seniority may have wider job opportunities. This is a factor that will increase job satisfaction.

2.5.2. Environmental Factors

Other factors that affect job satisfaction are environmental factors, that is, factors related to the organization. Factors related to work and organization affect the employee's job satisfaction quite significantly. As examples of environmental factors, the following can be listed: conditions of work, level of work, wage policy, promotion opportunities, and various similar factors. Failure to meet the employee's expectations towards the organization, working conditions, and colleagues also affects job satisfaction (Locke, 1976). Therefore, an employee who does business in an unsatisfied way where these

expectations are not realized may also experience a negative return to work both in terms of performance and social relations. That is why this issue is a very important issue for organizations. Employees develop a perspective by considering to physical and managerial elements of the job when evaluating the jobs, they have (Spector, 1986). Environmental factors can be listed as follows: physical conditions of work, nature of work, wage and other economic factors, promotion, colleagues, managers, and management styles.

Physical Condition of Work

The working environment in which the employee is located, physical characteristics, and visual details significantly affect work efficiency. All kinds of physical, economic, and psycho-social conditions and opportunities are offered to the employee due to his/her job (Beşiktaş, 2009). Working environments that meet employees' expectations will create a more productive and work-oriented environment for employees and make it easier for employees to integrate with work. It can be said that employee satisfaction will be positively affected by the choice of decoration of the environment where employees are located, the correct use of lighting, the adequacy of heating systems, and similar features (Cribbin, 1972). Also, the fact that the organization has common areas in the workplace is an important factor affecting job satisfaction both in terms of employees being active and being social. In the research conducted by Michaelowa (2002) on teachers, the availability of sufficient and high-quality equipment in the classroom is seen as a factor that has a positive effect on teachers' job satisfaction. Another study conducted by Adıgüzel and Keklik (2011) in the health sector shows that the working environment is one of the factors affecting job satisfaction.

Nature of Work

One of the most important factors determining job satisfaction is the quality of the job, in other words nature of the work. As a result of their studies, Hackman and Oldham (1974) listed the following as important qualities of the job that affect: the ability of employees to use the skills and abilities they have in the work they do, the ability to perform the work from the beginning to the end within their responsibilities and the fact that the work they do is considered important and valuable for them and the people around them. It is observed that people who work in jobs that require special knowledge, skills, and experience provide more job satisfaction (Özgen & Öztürk, 1998). In addition, it can be said that the diversity of the work, the level of creativity of the work, and the job structure away from routine are among the job qualities that positively affect job satisfaction. Independence is also an important factor in employee satisfaction. In his study, Sabuncuoğlu (1982) showed that employees don't prefer to work

under excessive pressure and they don't like to be involved in their work in every subject or they don't like to be given orders. According to the results of the study, it has been seen that the vast majority of employees attach importance to working independently and using initiative in order to increase their personal development powers. So that it can be said stress is one of the factors that affect job satisfaction. In an increasingly competitive environment, employees face factors such as disinterest and boredom while working under intense stress. Some employees tend to perceive stressors in their environment more due to their personality traits. This causes them to be exposed to more stress and have lower job satisfaction (Gemmil & Heisler, 1972).

Wage and Other Economic Factors

The wage, which is an important factor in employee and job satisfaction, can be defined as the price for the services and efforts that employees provide to the organization they work for. This effort, whether mental or physical, has a certain amount of wage in both cases (Akalp, 2003). Wage is shown as one of the main elements affecting job satisfaction and dissatisfaction. It is seen that the job satisfaction rate of the employee may vary depending on the wage the organization pays to the employee.

If one takes a look at the literature, when the relationship between the wage policy of organizations and the job satisfaction of employees is examined, a generally meaningful relationship stands out. It can be said that the perception of sufficient wages is a sub-dimension that affects this relationship. Job satisfaction and positive emotions are relatively higher for employees who feel that they are working with a fair and sufficient wage policy in the work they are doing (Folger & Konovsky, 1989). It is seen that equal pay within the organization is also an important sub-dimension for employee job satisfaction. Fair wage distribution is important for employee job satisfaction. When employees compare their own wages with the wages of those who do similar work with them, the more positive this comparison is, the job satisfaction levels increase in direct proportion (Davis, 2004). In a study conducted by Feldman and Arnold (1985) with blue-collar employees in 21 different job fields, it was found that there is a strong relationship between the average job satisfaction of employees and their annual income. A study conducted by Pfeffer (1994) in various business departments of some large companies in the USA has shown that there is a positive relationship between the change in wages and the change in employee productivity. In a study conducted by Lawler and Porter (1976) on over 2000 managers, it was determined that the amount of salary received had a positive effect on job satisfaction, including senior managers.

Promotion

One of the factors that affects job satisfaction is promotion opportunities. Promotion can be defined as the appointment of an employee to a higher position due to a job or position in the organization where he/she is located (Kosteas, 2011). It can be said that there is a significant relationship between promotion and job satisfaction. Because promotion for an employee usually means a certain amount of wage increase, respect, and better working conditions. The promotion of the employee to a higher position is an important factor. Thus, it increases the satisfaction and motivation of employees. However, it has been seen in the studies that the factor of whether promotions are fair plays an important role in employees' approaches to promotion opportunities. It should be the priority of organizations that employees do not feel unfair when comparing different organizations or different employees in the same organization (Nasar et al, 2024). At the same time, promotion also has a psychological dimension. In addition to increasing the financial income obtained from the work through promotion, the social status of the employee also increases, and her/his place in society changes positively (Eren, 2008).

Colleagues

It can be said that social factors are also an important element for job satisfaction from the employee's point of view. Work's social environment in which an employee spends the vast majority of his day, and his/her communication and relationships with colleagues are also important factors affecting job satisfaction. Because unity and solidarity are very important for humans. Employees do not expect only money or success from their work. They want to make friends in the organization where they work and establish supportive business friendships (Lloyd & Leslie, 2004). With their study, Rokka and Kostanski (2001) have revealed that one of the goals of employees is the urge to interact socially with people. According to this study, employees with a high sense of friendship also contribute positively to the job satisfaction of other employees. People who work in an organization that is focused on success and united in a common vision and mission have higher job satisfaction and happiness rates compared to others (Erdoğan, 1994).

Research shows that, in addition to economic expectations, different social and psychological expectations for managers and employees are also important factors for organizations. To summarize, employees prefer to take part in organizations that will satisfy them socially as well as economically.

Managers and Management Style

Management style, management's attitude towards employees, and the way the rules are implemented affect the job satisfaction of employees. In the studies conducted, it has been found that the management style has the following effect on employees' job satisfaction: employee participation in the decision-making process. It has been seen that employee satisfaction is higher in organizations where the participation of employees in decision-making processes is high. Another factor is the employee-centered management structure. In organizations, that adopt employee-centered management it is seen that it is a priority to be employee-oriented and develop supportive relationships with them. It has been found that employees achieve a high level of job satisfaction when they participate effectively in decision-making mechanisms within the organization (Lloyd & Leslie 2004). Regardless of the management style, employees should feel that they are given the necessary importance by taking part in the organization and should have at least a minimum level of information about their future at work. It is observed that when these and similar management environments are created, the satisfaction rate that employees get from their work increases. In the same way, it is envisaged that employees who can have a voice in internal organizational decisions and participate in decisions will form positive bonds with their work, colleagues, and management, which will increase job satisfaction. The relationship with managers is also an effective factor in job satisfaction. It is observed that employees who have a high-quality relationship with their managers undertake more tasks that require responsibility compared to other employees, and their organizational commitment and job satisfaction are higher (Hackman & Oldham, 1974).

2.6. Potential Effects of Job Satisfaction

There are multiple factors, personal and environmental, that affect job satisfaction as mentioned in previous sections. By looking at the literature, it is seen that employees with high job satisfaction have various positive effects compared to low job satisfaction rates such as better mental and physical health, higher adaptation to work, and performance increase. Emotional attitudes can be shown as one of the most obvious indicators of job satisfaction. It is seen that employees with high job satisfaction rates tend to show positive social citizenship behaviors such as benevolence and collaboration. This is called Organizational Citizenship Behavior (OCB) in the literature (Luthans, 1995). Based on this, the following interpretation can be reached; an employee who feels job satisfaction will have positive thoughts about the organization he/she is in and will support his colleagues. It is also possible that he/she will be motivated to put forth an effort outside of its expectations. Yoon and Suh (2003) stated that employees who are satisfied with their jobs work harder and provide better service than others and they

tend to be more involved in the organizations they work for and devote themselves to providing better quality service. At the same time, employees who are satisfied with their jobs to the extent that they meet their expectations are more committed to their jobs and feel a sense of commitment to their organization (Lloyd & Hamner, 1979). To summarize, it can be said that employees who are satisfied with their jobs might be willing to do more than what is demanded from them (Spector, 1997).

It is seen that employees with high job satisfaction provide maximum benefit to the organization by internalizing the organizational infrastructure and cultural knowledge. Satisfied employees contribute to their organization with ideas that will support the development of the organization and ensure that organizational dynamics are presented flawlessly. At the same time, job satisfaction provides employee stability to the organization, as employees who are satisfied with their jobs will also ensure staff continuity (Mishra, 2013). In addition, the continuous development and innovation needs caused by globalization are indispensable facts for organizations. The development of the employees of the organization in accordance with the organization's expectations generates returns that contribute to this continuous development and innovation (Querstein et al., 1992).

Especially in recent years, due to the increasingly competitive conditions, many organizations are seeking to have employees who are committed to their organization, integrated with the organization, have harmony between individual and organization, and employees who are satisfied with their job (Lloyd & Hamner, 1979). It can be said that the most effective way to achieve this is to provide the necessary organizational and managerial support to employees and to attach sufficient importance to the attitudes and behaviors within the organization. Especially for organizations operating in sectors such as the public sector, where permanent employment is dominant, changing monotonous work styles of employees with more innovative methods, and switching to flexible and experiential working styles can be factors that help employees feel more satisfied with their jobs. (Mishra, 2013). One of the benefits of providing job satisfaction in an organizational sense is ensuring integration and unity in the work environment. From the point of view of organizations, it is important for employees to act in harmony in order to achieve their goals. It is possible for those who work to act in the spirit of unity and adopt business goals primarily by being satisfied with their jobs. An employee who has reached individual satisfaction will love his/her job will act in harmony with his/her colleagues and fulfill his/her duties in order to meet the expectations of the job from him/her (Wijaya & Basit, 2024).

To summarize, employee behaviors affected by job satisfaction are increasing both individually and organizationally. When managers and employees are satisfied with the work they do, it creates high productivity, a healthy and positive life, and behavior in the organizations they work for.

There are multiple influential factors in employees' job dissatisfaction. The nature of work, social environment, financial returns, and similar factors, which have been examined separately in previous sections, can be listed. Job satisfaction is a critical phenomenon for organizations as well as for employees (Locke, 1976). Every organization's goal is to have satisfied employees. However, sometimes employee satisfaction cannot be achieved. When employees begin to feel dissatisfied with their jobs, this creates various long-term consequences. Job dissatisfaction creates many negative consequences for both the individual and the organization. Complaints from employees who are dissatisfied with their jobs have very important consequences for the organization, such as lower commitment, physical and psychological withdrawal, poor performance, and even job changes and quitting. In the following section, the turnover intention, which is the extreme result of job dissatisfaction, will be explained.

3. TURNOVER INTENTION

Humans are beings who interact with all living and non-living entities. This interaction is an important socio-psychological factor for the continuation of human life. Especially for someone who has just stepped into business life, where an important part of daily life consists of the social environment of work. This means that for employees, interaction with other people is largely provided in the work environment. It is a very natural situation that this social environment has many positive/negative effects on the employee's attitude to work. Many material and moral expectations regarding work can show themselves as different positive/negative effects on employees. For example, poor performance, incompatibility within the team, or turnover intention. Especially in terms of the results it creates for organizations, turnover intention is a critical condition for keeping corporate performance at high levels because an employee who intends to leave her job will naturally be less ambitious and less performant than his/her previous attitude regarding her performance in his/her current organization (Mueller & Benlian, 2022). In short, an employee who has entered into an intention to leave work will tend to take fewer positive steps in order to stay in his current position. This section discusses turnover intention, the reasons and consequences of turnover intention, and how organizations prevent employee turnover.

3.1. Definition of Turnover Intention

Employee stability is a crucial goal for organizations. Employees' commitment to the organization, their adoptation of the organization's goals, and their progress in line with these goals are very important for the organization's sustainability and competitiveness in the market. For this reason, the retention of employees has become an important issue along with the understanding of talent management, which has come to the fore in the field of human resources management. Especially with the entry of Generation Z into business life and the work attitudes of this generation have shown that emphasis should be placed on this issue. Because when their behavior is examined, it can be seen that Generation Z tends to change jobs more frequently than other generations (Kirana et al., 2024). The turnover intention, which usually brings with it employee turnover, has become a critical concept in the business world, especially with this generation.

Turnover intention can be defined as the negative reaction that occurs as a result of the negative interaction between employees and their jobs/managers/colleagues within the organization (Rusbult et al., 1988). As a result of the dissatisfaction that occurs when expectations and realities do not coincide, the first thoughts of employees about quitting their jobs begin to form. By taking a look at the literature, it is seen that there are many different definitions of turnover intention. Tett and Meyer (1993)

considered the intention to quit the job as a deliberate and continuous willingness to quit the job and it is associated with a certain period. Moynihan et al. (2000), on the other hand, defined turnover intention as the clearest and most obvious indicator of the act of quitting work. According to another definition by Gibson (2011), it is defined as the employee's perceptions regarding his/her desire to leave the company he/she works for. In the simplest way, turnover intention can be defined as a measure of whether employees have a plan to leave their duties. It is seen that turnover intention has a negative relationship with job satisfaction if it is considered from an employee's point of view (Setor & Joseph, 2019). To summarize, it can be said that the turnover intention is the employee's desire to leave the organization he/she voluntarily. Employees may consider leaving their jobs for both financial and psychological reasons. The turnover intention, which is usually taken action in a long-term way, is a situation that cannot be observed literally until an employee quits the job (Mueller & Benlian, 2022).

When the literature is examined, it is seen that the turnover intention is quite related to some concepts like withdrawal, absenteeism, and turnover. Withdrawal can be defined as the feeling of psychological distance experienced by the employee as a result of the negative feelings the employee feels towards the organization (Spendolini, 1985). Withdrawal is a process and this process can be grouped as an intention to withdraw and withdrawal behaviors. Intention to withdraw can be listed as considering leaving the job, considering looking for another job, and turnover intention. This withdrawal can be grouped under three subheadings: intention to withdraw from work, intention to withdraw from the profession, and intention to withdraw from the organization. Withdrawal intention from work can be defined as evaluations related to leaving the current job in the near future, withdrawal intention from the profession as evaluations related to the employee leaving the profession completely, and withdrawal intention from the organization as evaluations related to leaving the company, he/she works for (Carmeli, 2005). Withdrawal behaviors can be listed as absenteeism and employee turnover (Tett & Meyer, 1993). Withdrawal behaviors can be defined as actions that cause physical and psychological distance between the employee and the organization (Rosse & Hulin, 1985).

Mobley (1977) states that the withdrawal decision process consists of 8 steps. These steps are as follows thoughts and evaluations about the current job, determining job satisfaction or dissatisfaction with the current job, forming the idea of leaving work, conducting a profit/loss analysis of the option of leaving work, having the intention to leave, actively starting the job search process, comparison of new potential jobs with the current job, making a decision to leave the job or stay in the current job.

3.2. The factor that affects turnover Intention

The turnover intention is one of the first steps of a long-term process. This process can often be triggered by different aspects such as work-life conflicts, job dissatisfaction, and organizational disapproval (Matilla, 2006). There are multiple factors that can affect an employee's turnover intention. When the literature is examined, it is seen that the factors affecting turnover intention are addressed in different ways by many researchers. In a study conducted by Fottler et al. (1994), these factors are examined under three main headings: psychological factors, such as job satisfaction, and organizational commitment; personal factors, such as talent, performance, and expectations and organizational factors, such as organizational structure and social conditions. In another study, these factors are examined under three main headings economic factors, such as the general economic situation of the country in which one lives, and its effect on the labor market; internal business factors, such as material and spiritual work conditions and factors related to personal living conditions, such as feelings such as sympathy/envy for another job (Kaynak, 1990). To summarize, although there are differences in each study, three main subheadings that affect the turnover intention in general are examined in the following section.

3.2.1. Personal Factors

When the turnover intention is examined, one of the determining factors in the emergence of this situation is seen as personal factors. Character traits, changes in living standards, demographic characteristics, private and family relationships, and physical or mental problems can be listed as the main personal factors affecting turnover intention. It is possible to gain insight into how various factors affect turnover intention by looking at the literature. Zimmerman (2008) found in his study that as employees' openness to new experiences and emotional instability levels increase, their turnover intention also increases. Emotionally unstable employees tend to leave their jobs more because they perform less or have lower job satisfaction than other employees. Also, it has been observed that employees who are compromising, solution-oriented, and who can easily establish satisfactory relationships with other employees have a relatively lower turnover intention (Barrick et al., 2002). When the relationship between gender and turnover intention is examined, it is seen that male employees are more prone to leave their jobs compared to female employees (Iverson & Derry, 1997). At the same time, studies examining the turnover intention with age show that the turnover intention decreases as age increases (Severt et al., 2007). According to a study conducted among single and married employees, it was seen that single employees were more courageous in leaving their jobs compared to married employees (Ahituv & Lerman, 2011). Another study conducted by Nadiri and Tanova (2010) with

service industry employees revealed that as the education level of employees increases, their turnover intention decreases.

3.2.2. Organizational Factors

Another determining factor that affects turnover intention is organizational factors. The organizational factors that affect the employee's intention to leave the job can be listed as follows: organizational climate, job security, wage-price policies, promotion opportunities, and so on. Tarigan and Ariani (2015) concluded in their study that the turnover intention of employees with high organizational commitment perception differs from employees with low organizational commitment. According to this study, organizational commitment reduces the turnover intention. It is seen that a similar conclusion has been reached in many studies conducted on organizational commitment. It is observed that employees who feel a high level of organizational commitment have a higher tendency to stay in the organization (Van Dick et al, 2004). It is observed that employees who feel a low level of organizational commitment tend to have problems complying with organizational practices and instructions and are more likely to feel closer to leaving their jobs due to not being able to adopt the organization's goals and values (Dechawatanapaisal, 2018).

Turnover intention and career status are two interrelated concepts. Employees in the early years of their careers lean towards alternative career opportunities due to their low organizational commitment levels. During this period, employees are less likely to leave their jobs due to less commitment to the organizations they work for, compared to other periods of their careers. However, in the later years of the career, the material and spiritual bond brought by continuing in the same company reduces the turnover intention. Especially in this period, the expectation of promotions and the expectation of receiving a return on their past investments in the organization significantly reduce the actions of employees to change jobs (Cohen, 1991). In another study supporting this situation, it is seen that employees with high organizational status are more committed to the organization and their turnover intention is lower than other employees (Severt et al., 2007).

Wage/price policies (Ghazali, 2010), promotion opportunities (Jago & Deery, 2004), and incentives (Babakus et al, 2009) are also organizational factors that reduce employees' turnover intentions. In addition, Iverson and Deery (1997) determined that there is a relationship between social relations in the working environment and managers' approaches to employees and their turnover intention. It has been observed that as the support and motivation of employees towards each other and the supportive and motivating attitudes of managers towards employees increase, the turnover intention decreases.

3.2.3. Non-Organizational Factors

Factors that are outside the authority of the organization but affect the organization and employees can be grouped as non-organizational or external factors. Economic fluctuations, changes in government policies, and the state of national income are external factors that can affect the intention to leave a job independent of the employee's interaction with the organization (Iverson & Deery, 1997). Seasonal fluctuations, market volatility, and technological changes are important issues to consider, especially in terms of their impact on employees' turnover intention (Kaynak, 1996). In addition to all these, falling behind the market and employees finding better jobs are situations that may cause employees to intend to leave their jobs and therefore cause possible job losses in organizations (Sandhya, 2024).

3.3. Results of Turnover Intention

The intention to leave work is the beginning of a process that will eventually largely result in the act of quitting work. Regardless of the reasons, the turnover intention is an attitude that largely results in making radical decisions about the future of the job. These possible decisions can be grouped into two ways: staying at work or leaving work (Jago & Derry, 2004). Blake (1997) mentions that employees who have the intention of quitting their jobs and start looking for a job by evaluating different options have some requests that arise during this process. These can be listed as the flexibility of working hours, educational and personal development opportunities, wage policies, and a motivating work environment (Severt et al., 2007). Research shows that employees who have turnover intentions also have a low level of organizational commitment and these intentions are reflected to the outside as absenteeism and withdrawal from work (Hanisch & Hulin, 1991). According to Spendolini (1985), the most important determinant of employees' intention to quit work is dissatisfaction with work. However, employees who continue to stay at work despite the dissatisfaction they experience for various reasons often resort to absenteeism as an escape from work. This is a situation that causes performance loss both personally and organizationally. The resignation of a long-term, high-performing employee in the organization represents a financial and moral loss (Sanderson, 2003). The loss of a valuable employee is also likely to result in disruptions in products and services, ultimately decreasing the profitability of the organization. This is because higher productivity leads to higher profitability (Tett & Meyer, 1993). In addition, another possible consequence of product and service failures is a decrease in customer satisfaction. In addition to all these, the selection and training of new employees also create an extra cost for the organization. The loss of a valuable employee from the organization not only brings financial drawbacks but also has emotional implications. These can be listed as creating an atmosphere of distrust among current employees due to the fast turnover rate, negatively impacting the company's image and

causing a loss of motivation among employees. In addition, since long-term employees are dominant in the culture, vision, and mission of the organization, this moral loss creates various negativities in terms of organizational integrity (Carayon et al., 2006). For an organization, employee loss can be perceived as both negative and positive depending on the circumstances. Of course, the continuity of the employee in the organization is also important. However, if the employee who leaves the job does not contribute to the organization in terms of the work, he/she produces and the added value, if his/her performance is low, and if he/she cannot adapt to the job and the organization, this action creates a positive situation for the organization (Park et al., 2024).

3.4. Prevention of Turnover Intention

Employees' job performance, commitment to the organization, and employee retention play a key role in organizational success. Because of this critical role, it is very important to investigate and try to prevent employees from having a turnover intention and putting this intention into action. Although the act of quitting a job is an individual decision, at least identifying the organizational reasons for quitting a job, if any, is an effective step that can be taken to prevent quitting a job (Hwang & Kou, 2006). The intention to leave the job turns into an act of leaving the job over time if the organization does not give it enough importance and does not intervene. In the case where this point has been reached, it is usually not possible for the employee to return from this decision (Tett & Meyer, 1993).

By examining the research conducted, it is seen that job satisfaction seems to be one of the most important factors preventing the formation of turnover intention in employees. It is seen as a low probability that employees who feel satisfied with their work tend to quit their jobs (Korunka et al., 2008). To make the job attractive, to implement fair wage-sharing policies, and to attach importance to person-job harmony may be the steps that organizations will take in order to increase the job satisfaction of employees and therefore to prevent employee turnover (Greenberg & Baron, 2000).

Organizational commitment is another key concept that prevents turnover intention and employee turnover. According to the studies conducted, it is observed that employees who have a high organizational commitment and a spiritual closeness to the organization they work for have a lower turnover intention (Sabuncuoğlu, 2007). Organizations can carry out activities to increase the organizational commitment of employees, but it is seen that the factor that increases organizational commitment the most is also job satisfaction. As long as employees are satisfied with their job, their organizational commitment increases at the same rate (Cho et al., 2009).

Another key concept for organizations to prevent turnover intention is to give sufficient importance to human resources management practices and try to do it as professionally as possible (Guchait & Cho,

2010). The human resources management practices mentioned here can be grouped under three headings: talent management, career development, and internal communication. Talent management can be defined as the selection of employees in a professional manner. Applications such as the selection of qualified and competent personnel suitable for the appropriate job, and providing employees with the option to change teams, when necessary, can be listed (Zimmerman, 2008). Applications such as providing employees with training that will help them develop their careers and providing incentives for employees to pursue a master's or doctorate degree can be listed under the career development category (Chiang et al., 2005). Activities to increase internal communication can be achieved through activities such as increasing social activities outside of work and taking into account possible complaints from employees.

To summarize, preventing employee turnover intention, or leaving their jobs is a process that requires an effort with multiple dimensions. Preventing these situations is a very important issue for the future of the organization and its competitiveness in the market. Various tasks are assigned to organizations in order to prevent this situation. However, first of all, being a dynamic company that adapts to current and changing living conditions should be one of the first goals.

4. RESEARCH DESIGN

Since its first appearance, agile and agile project management has been a subject on which a great deal of research has been conducted, especially with its increasing use today. Job satisfaction and turnover intention have been the subject of many comprehensive studies in the literature, as their history dates back much further than agile project management. In this part of the dissertation, the relationships between agile and agile project management, job satisfaction, and turnover intention are examined under the studies in the literature. Later the conceptual basis of the research is explained, the purpose of the research, and the hypotheses of the research model are discussed.

4.1. Agile Project Management and Job Satisfaction

In their study, Ogundipe et al. (2024) tried to understand the impact of agile methodologies on customer satisfaction. In their study in the banking sector, they examined a case study from ING Bank. According to the data obtained, it has been observed that customer retention rates have increased since the beginning of working with the scrum method. In their study, Yakut and Cerası (2024) tried to explain the effects of scrum methodology on job satisfaction. According to the analysis of 82 data collected through a survey, job satisfaction and perceived job stress values were examined. According to the results, female employees working in Scrum teams are on average more satisfied than male employees, but it is observed that stress rates are higher.

Huck-Freis et al. (2023) examine agile development and job satisfaction relationships from different target groups. Instead of software developers, they tried to understand the stakeholder perspective. Kault et al. (2014) conducted interviews with ADT members in different positions working with the Scrum methodology. In the study, productivity, quality, and employee satisfaction, among the values created by Scrum, were examined. In their study, Tessem and Mauer (2007) try to explain how agility works in large agile teams based on the satisfaction and motivation of team members. In the study they conducted with 70 people working in software development teams in different positions in the oil and gas industry, it was found that relatively larger software development teams working in accordance with the Scrum methodology had motivation sources similar to smaller teams; These were found to be common factors in the project, such as autonomy, variety, feedback and ability to complete the task, and so on.

Whitworth and Biddle (2007) tried to examine the effects of agile teamwork on ADT members' satisfaction, due to agile teamwork initiatives related to positive socio-psychological phenomena that focus on phenomena outside the scope of traditional management. In another study about agile team members' satisfaction. The results of this study, which investigates which characteristics of agile teams

are related to team harmony, show that the flexible interactive environment in agile software teams, clear job descriptions, and planned workflow with the help of successful business planning strategies have a significant positive impact on work motivation.

Melnik and Maurer (2006) tried to explain the job satisfaction comparison between agile teams and non-agile teams. The results obtained in the survey study were conducted with nearly 900 IT employees. According to the analysis of the survey results, it was found that there is a significant relationship between business development process and job satisfaction, there is a positive directional relationship between agile work and job satisfaction, and as a result of comparative analyses conducted between agile teams and general IT sector employees, the satisfaction of agile team members is higher compared to non-agile employees.

4.2. Agile Project Management and Turnover Intention

When the literature is examined, relatively fewer studies on agile project management/software development and turnover intention are seen compared to studies on agile project management/software development and job satisfaction topics.

In their study, Wiesche and Nguyen (2023) examined the effects of turnover on dynamic agile software development teams. For that purpose, they conducted 25 semi-structured interviews in seven cases. As a result of the study, they found that agile teams that experienced turnover of team members have some consequences to the team, such as changes in the group dynamics caused by interpersonal voids and rebalancing problems because of this reason.

Mueller and Benlian (2022) tried to explain how impact usage of agile information system developments, which this is refers to agile project management and agile software development, on developers' turnover intention. In this study, where the motivational and consumer effects of using agile in software teams were investigated, a survey was conducted with the participation of 363 software developers and also, they made semi-structured interviews. As a result of the study, they found agile software development practices have a meaningful and strong impact on developers' turnover intention. Huck-Fries et al. (2022) asked in their study how agile information system development practices influence employees' work engagements and turnover intentions. In the results of the study, they saw agile ISD practices increase interaction among the team members and organization, thus it helps to increase employees' work and organizational engagement and reduce turnover intentions. In another work about agile practices and turnover intention, Araújo et al. (2022) looked into leadership styles in agile teams and the effects of team members' turnover intentions. As a result of the data collected

through a 65-question survey created with the help of the Full Range Leadership Model (FRLM), it was seen that no leadership style has significantly correlated with employee turnover intention.

In their study, Setor and Joseph (2019) examined how agile software development methodologies impact individual information technology professionals' outcomes. In this study it can be seen core values of agile software developments such as skill variety, job autonomy, and customer participation, give meaningfulness to employees' jobs. Thus, it decreases to turnover intention of employees. Harden et al. (2018) tried to explain turnover intention, not specifically from an agile practice perspective. They focused on which indicators influence general information technology employees' turnover intentions.

4.3. Mediating Role of Job Characteristics on Job Satisfaction

JCM has been included in multiple studies in the literature since its first day of emergence. There are studies examining the mediation effect, especially in research topics such as agile project management/ ERP systems, and job satisfaction relationships. In their study, Tripp et al. (2016) examined the effect of agile project management and agile software development methods on job satisfaction through JCM. They created a preliminary list of agile project management and software development practices from the literature and then grouped these factors into 10 constructs: Burndown, iterative delivery, stand-up, retrospective, and for agile software development unit testing, continuous integration, automated build, coding standards, refactoring, pair programming. The effects of agile usage on job satisfaction were analyzed with data collected from 252 agile software development professionals. Kanwal and Khurram (2022) used the agile project management and agile software development practice framework presented by Tripp and analyzed the effects of agile usage on job satisfaction with the mediator effect of JCM. Bhatnagar and Grosse (2019) tried to explain the satisfaction of employees in a digitized agile workplace through JCM. In this research conducted with IT department employees of a marketing consultancy firm, two new dimensions were added, namely, location-independent access and workplace communication, to help directly measure the impact of digitalization on future agile working practices. In their study, Moris and Venkatesh (2010) examined the effect of ERP-system applications on job satisfaction through JCM dimensions. Chavan et al. (2012) in their study examined the impact of agile methodology on job complexity and the impact of job complexity on individual motivation and creativity. Although the constructs are named differently than in other studies, in this study job characteristic model dimensions expressed as job complexity.

4.4. Purpose of the Study

The main purpose of this study is to examine the employee-based effects of agile project management practices. There are two possible effects considered as employee-based effects in the study: job satisfaction and turnover intention. Based on the studies in the literature (Kanwal & Khurram, 2022; Tripp et al, 2016), the relationship between agile project management and job satisfaction was examined through the Job Characteristics Model of Hackman and Oldham (1974).

In this study, the impact of agile project management practices on employee job satisfaction has been examined through the five dimensions of the JCM: feedback, skill variety, job autonomy, task identity, and task significance. In addition, the relationship between job satisfaction and turnover intention was also examined. Also, the effect of using agile project management practices on employees' turnover intention was examined. Therefore, information technology department employees who work/have experience working with all versions of agile methodologies (such as scrum, kanban, extreme programming, etc.), regardless of their positions, were selected as the target population.

4.5. Theoretical Model and Hypothesis of the Study

When the literature is examined, it is seen that the number of studies examining the relationship between agile methods and job satisfaction has increased in the last ten years. There are also a considerable number of studies examining the relationship between job satisfaction and turnover intention. In this study, it was aimed to contribute to the existing studies by adding dimension to the relationship between agile methods and job satisfaction by adding turnover intention.

Job satisfaction is defined as the positive emotional states of employees towards their jobs (Igbaria & Cidambaram, 1997). There are many studies in the literature that aim to establish a relationship between job satisfaction and turnover intention. Generally, when these studies are examined, it is seen that it is suggested that job satisfaction can have a direct effect on turnover intention (Thatcher et al., 2002; William & Hazer, 1986). In addition, considering the studies conducted specifically on information technology systems, it is seen that job satisfaction and organizational commitment are modeled as a precursor to turnover intention (Igbaria & Greenhaus, 1992; Joseph et al., 2007). In light of all this information, this study suggests that as IT employees express greater job satisfaction, they will report less turnover intention. As such, it hypothesized;

H1: Job satisfaction has a negative impact on turnover intention

According to agile manifesto (2001), agile project management practices are mainly focused on short iterations and a variety of meetings during these iterations, for instance, daily meetings, iteration planning meetings, and retrospective meetings. When the studies are examined, it is seen that the general features of agile methods can be gathered under four basic headings (Tripp et al., 2016; Maruping et al., 2009).

Table 4.1. Definitions of Agile Practices Described in the Study

Agile PM Practices	Definition	Reference
Retrospective	Retrospective for agile PM is defined as the meeting held at the end of each iteration where the team critically evaluates the last iteration and identifies and implements opportunities for continuous improvement.	(Schwaber & Beedle, 2002)
Stand Up	Agile PM organizes daily meeting events attended by all project members in order to keep intra-team communication at a high level. In daily meetings lasting a maximum of 15 minutes, team members share with the team what they did the previous day and what they will do during the current day.	(Schwaber & Beedle, 2002)
Iterative Delivery • Iteration planning • Iteration review	Agile PM is based on the process of planning and delivering incrementally. By making deliveries in small pieces and providing flexibility of movement in each iteration, the ability to generate code takes place in a more flexible process and in an environment that is more open to feedback.	(Tripp et al., 2016)
Burndown	Agile PM prioritizes, in order to highlight transparency, providing information to the team about the completed work and the work that needs to be completed in the current iterations with the help of visual presentation.	(Tripp et al., 2016)

Since its first appearance, agile methodologies have been a subject on which a great deal of studies have been conducted, especially with its increasing use today. Especially, some of these studies focus on agile project management & agile software development practices and job satisfaction relationships with mediators of job characteristics (Kanwal & Khurram, 2022; Morris & Venkatesh, 2010; Tripp et al., 2016). Studies conducted in the literature have shown that projects that run with agile methods are perceived, according to the agile development team (ADT) members, as less fragmented, more

autonomous, and more important (Tripp et al., 2016). This study is based on the argument that agile practices are related to job characteristic structures in different ways.

As Hackman and Oldham (1980) claim, job characteristics feedback, and job autonomy are primarily related to business management. The use of agile PM applications increases feedback channels and allows the entire ADT to interact with the customer. These forces are primarily reflected in feedback and job autonomy, two important job characteristics. Therefore, the use of these business design principles should increase positive perceptions of feedback and job autonomy. In light of all this information, this study suggests that ADT members express greater job satisfaction with the help of a higher perception of feedback and job autonomy. As such, it hypothesized;

H2*:* The use of agile PM practice positively impacts job satisfaction through perceived feedback.

H3: The use of agile PM practice positively impacts job satisfaction through perceived job autonomy.

The job characteristics such as task significance and task identity specifically refer to the daily tasks that employees perform as part of the nature of the job and their overall responsibilities (Fried & Ferris, 1987). According to the structure of ADT, it requires that all team members have an equal and adequate level of knowledge about the job. This indicates that the team members have personal interchangeability. But at the same time, it also leads to clear and clear intra-team task definitions (Tessem & Maurer, 2007). Various meetings within the team and with customers, giving everyone a say in these meetings and allowing not only the stakeholders/customers but also the developer team to have a say in the versions are seen as important factors that increase task clarity and significance in projects carried out with the agile method. In light of all this information, this study suggests that ADT members express greater job satisfaction with the help of a higher perception of task identity and significance. As such, it hypothesized;

H4: The use of agile PM practice positively impacts job satisfaction through perceived task identity.

H5: The use of agile PM practice positively impacts job satisfaction through perceived task significance.

According the Hackman and Oldham (1974), skill variety refers to the extent to which a job requires the use of different talents. The importance of skill variety comes to the fore more clearly when comparing routine work environments and dynamic work environments where different skills and abilities are used. According to the theory, the more different skills and abilities a job requires, the more satisfying it will be for the employees. ADT members, especially developers, are mostly involved in completely non-technical processes through various meeting routines mentioned above, such as estimating user stories

due to the nature of the methodology, rather than a routine work cycle such as making a new development or fixing received bugs. This adds variety to the work and keeps it from being monotonous (Tessem & Maurer, 2007). In light of all this information, this study suggests that ADT members express greater job satisfaction with the help of a higher perception of skill variety. As such, it hypothesized;

H6**:** The use of agile PM practice positively impacts job satisfaction through perceived skill variety.

In addition, this study aimed to examine the direct effects of agile practices on turnover intention. One of the foundations of the agile methodology is the emphasis on people rather than processes (Fowler & Highsmith, 2001). This approach is a factor that helps employees feel a higher level of commitment to their work and the team they are in and contributes to them becoming more committed to their work (Huck-Fries et al., 2022). Various studies have shown that employees' commitment to their organization and their job satisfaction levels affect their turnover intention (Cho et al., 2009; Sabuncuoğlu, 2007). In light of all this information, this study suggests that ADT members express less turnover intention. As such, it hypothesized:

H7: The use of agile PM practice negatively impacts employees' turnover intention.

Finally, in this study also try to examine the direct effect of usage of agile PM practice on employees' job satisfaction. When it looks at the literature it can be seen there is multiple studies that on the subject of agile methodologies- ADT members' job satisfaction relationship (Tripp et al, 2016; Kault et al, 2014, Whitworh & Biddle, 2007). Additionally, the relationship between agile methodologies and job satisfaction was examined from different perspectives. Such as customer satisfaction (Ogundipe et al, 2024), stakeholders' satisfaction (Huck-Freis et al, 2023). According to the agile manifesto (2001), Agile teams support higher interaction with customers and higher developer motivation due to their structure. In light of all this information, this study suggests that ADT members express greater job satisfaction. As such, it hypothesized;

H8: The use of agile PM practice positively impacts employees' job satisfaction.

Figure 4.1 depicts of theoretical model of the research, where the mediation impact of Hackman and Oldham's (1974) job characteristics on the relationship between agile practices and job satisfaction, as well as the direct effect of agile practices and job satisfaction on turnover intention can be seen.

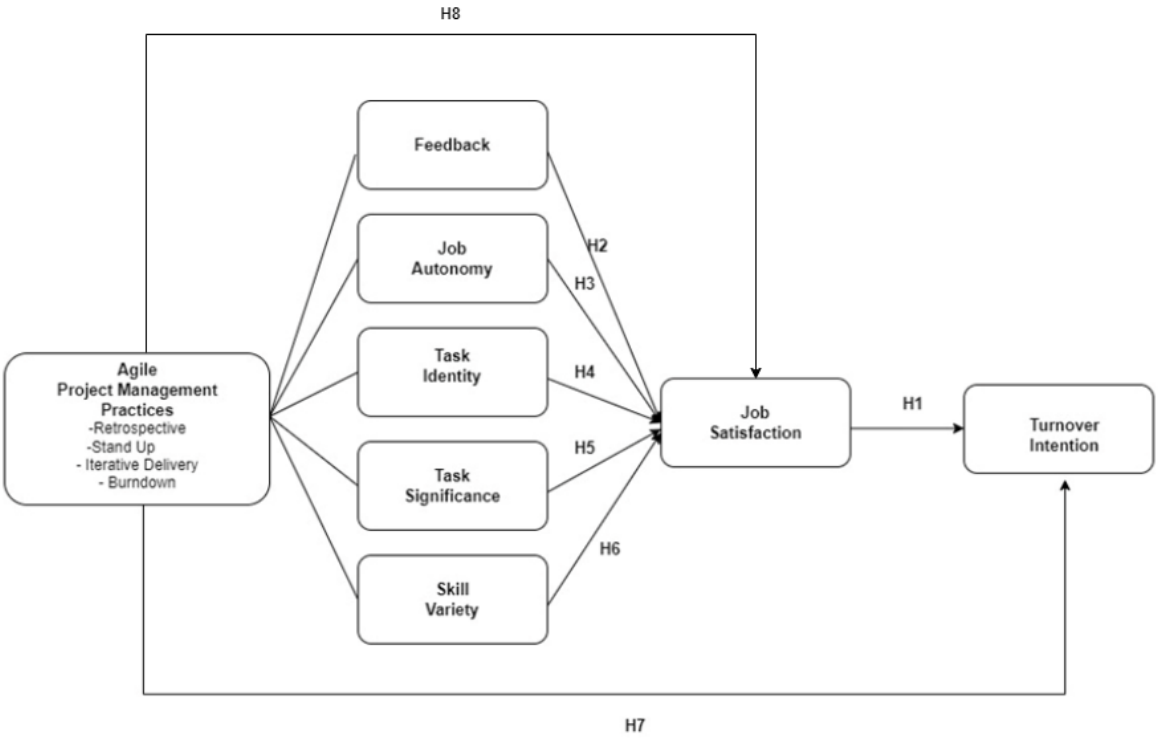

Figure 4.1. Theoretical Model of the Study

5. METHODOLOGY

In this part, the variables in the research model, the scales used for the measurement, and information about the sample and the data are presented.

5.1. The Measurement Scale

Since there were no secondary data available and other research techniques did not fit the purpose of the study, in this thesis, survey method was preferred due to its anonymity and it is seen as a faster and more reliable source of data than the data that can be obtained through an interview. Hence a multi-item questionnaire was used as a measurement scale.

5.1.1. The Agile Project Management Practices

In order to measure the agile practices usage, the agile project management practices scale developed by Tripp et al. (2016) was used. Tripp et al.'s (2016) original scale was created to measure both agile project management and agile software development practices. In this study, because the target audience does not consist only of software developers, only the agile project management items were used. For this purpose, 13 items under 4 dimensions, which are burndown, stand up, iterative delivery, and retrospective, in Tripp et al.'s study were translated into Turkish and adapted (See Appendix I)

5.1.2. Job Characteristic Scale

In order to measure perceived job characteristics, the job characteristics scale developed by Morris and Venkatesh (2010), based on Hackman and Oldham's Job Characteristic Model (1974), was used. In the original scale, there are 5 dimensions feedback, task identity, task significance, skill variety, and job autonomy (See Appendix II).

5.1.3. Job Satisfaction Scale

Job satisfaction has been an important subject examined in the literature for many years. Therefore, when the literature is examined, it is possible to find multiple sources regarding job satisfaction scales (Porter et al, 1974; Spector, 1994). In this study, a unidimensional 4 item job satisfaction scale from Spector's study was used to measure employees' job satisfaction. The items are "I feel satisfied with my work in general.", "It makes me very satisfied with the work I do at the company I work for.", "I think

my job is enjoyable.", "I would like to continue doing the job I am doing now in the coming year as well." (See Appendix III).

5.1.4. Turnover Intention Scale

Finally turnover intention, the extent of employees' feelings about leaving their jobs was measured with a unidimensional 4-item scale adapted from Moore's study (2000). The items are "Five years from now, I see myself in this company.", "I am planning to look for a new job.", "Next year, I am planning to be in a different company than the company I am now.", "I notice that I often think about changing jobs." (See Appendix III).

5.2. Target Population and Sample of the Survey

Agile methodologies are frequently used in software development teams. However, it is not mandatory for every software development team to work by agile methodologies; it is a preference directly related to the teams' and the organizations' up-to-dateness and openness to innovation. Therefore, when examining the impact of agile practices on job satisfaction and turnover intention, the target audience we selected was IT department employees working with agile methodologies. Also, since information technologies have an important position in many sectors such as banking, finance, and similar, today most companies in different sectors attach importance to information technology or research & development departments to have a strong position in terms of information technologies. Especially with the developments in the fintech area, the finance and banking sector has become one of the sectors that heavily invest in information technologies and R&D departments (Albastaki, 2021). Therefore, the target population of the study includes not only the employees of companies in the IT/Information Technologies sector but also the employees of IT departments in companies operating in banking, finance, and telecommunication.

For this purpose, survey data were distributed to 272 information technology department employees working in various positions through an online survey administration. The reason why the online survey is chosen as the data collection method is the ease of access to more people because it is free and in a virtual environment. In order to see whether the information technology employees to whom the survey was distributed fit the selected target population, control questions were asked. One whether the employee had agile working experience and two whether the employees had knowledge about whether their organization worked agile. In addition, another control question was asked in the middle of the survey to confirm whether the questions were read or not. The control question was: "This is a test question. Mark this question as slightly agree." When looking at the results, there is no survey eliminated

due to the control question. However, among the information technology employees who were expected to work in agile methodologies, 55 respondents, stated that they did not have any agile work experience or they have no idea whether they work agile or not, hence these were eliminated. Finally, the usable 217 questionnaires were used for the analyses (See Table 5.1)

5.3. Demographics

When we examined the sample of the survey, it was seen that; 39.6% of the participants had 3 to 10 years of work experience and 37.3% of the participants had 10+ years of work experience. Therefore, we can say around 77% of the respondents consist of medium to long term employees. At the same time, when the participants' experience of working with agile methodologies is examined, it is seen that 52% of them have experienced agile practices for a period of 3-10 years. This period shows that the sample population consists of employees who have experience with agile practices. Additionally, 56% of employees have 3-10 years of working experience in their current position.

Sector distribution has been examined and it is seen that nearly half of the employees working in the information technologies sector. 79% of the participants chose information technologies as the sector they work in. The banking sector was also seen as the sector where 9 % of the participants worked. Particularly due to current requirements such as digital transformation and mobile banking in the banking field, it is seen that some of the information technology department employees in the study chose banking as the sector they work in. 7.4% work in Finance sector.

It is seen that the IT department was selected by 95.8 % of the working departments due to the fact that the target group of the study is employees of IT departments. The other 4.1 % choice is also information technology department employees, but due to organizational-specific name differences given to employees' departments, such as digital transformation, they grouped as other. It is seen that 42% of the participants work as software developers and approximately 20% work as business analysts.

Table 5.1. Percentage and Frequency Distributions of Participant's Work Experience

Job Related Properties		f	%
Total Work Experience (Years)			
0-1		12	5.5
1-3		38	17.5
3-10		86	39.6
10+		81	37.3
	Total	**217**	**100**
Sector			
Banking		19	9
Information Technology		172	79
Telecommunication		10	4.6
Finance		16	7.4
	Total	**217**	**100**
Department			
Information Technology		208	95.8
Other		9	4.1
	Total	**217**	**100**
Position			
Business Analyst		40	18.4
Software Engineer		93	42.8
Information Technology Director		15	6.9
Product Owner		22	10.1
Project Manager		21	9.6
Scrum Master		11	5
SAP Consultant		15	6.9
	Total	**217**	**100**
Work Experience in the Current Position (Years)			
0-1		6	2.8
1-3		51	23.5
3-10		122	56.2
10+		35	16.1
	Total	**217**	**100**
Work Experience with Agile Projects (Years)			
0-1		6	2.7
1-3		60	27.6
3-10		114	52.5
10+		37	17.2
	Total	**217**	**100**

5.4. Statistical Analysis

The data collected through the scales were first explored and tested for normality. There was no need for cleansing and the data were approximately normal. Hence factor analyses were performed. According to the results of confirmatory and exploratory factor analyses, the dimensions of the scales that were to be used in the structural equation model were determined (Musil et al, 1998). In this section, the statistical methods used in the study are explained.

5.4.1. Factor Analysis

Factor analysis, the best-known and oldest method for investigating the relationships between observed and latent variables, is a method used to test the structural validity of developed scales. According to Stapleton (1997), factor analysis is a technique designed to examine the covariance structure of a group of variables and to explain the relationships between these variables in terms of a much smaller number of unobservable latent variables called factors. The main purpose of factor analysis is to obtain fewer new variables by identifying common dimensions by taking advantage of the existing relationships between many variables. The widespread use of factor analysis, first developed by Spearman in the early 20th century, was made possible by the rapid development of computer technology in the 1970s (Kline, 1994). Factor analysis consists of two types of analysis: Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). In this study, both factor analysis methods were applied in order to confirm the validity of the scales and to make scale selection of the most acceptable scale for SEM.

Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) is a type of factor analysis that aims to reveal and discover the underlying factor structure of expressions representing variables of newly created scales or translated from one language to another. EFA is used to obtain information about the structure of common dimensions. It is a multivariate statistical method that allows data to be presented in a conceptually meaningful way based on the relationships among many variables (Reymont & Jöreskog, 1993). Exploratory factor analysis is included in many statistical package programs. In general use, factors provided from the original data set; provide benefits for regression, correlation, discriminant analysis, difference tests, and many similar analyses. EFA reduces the variables in the dataset to a smaller number of factors, making the dataset more easily interpretable. When the literature is examined, many studies are using EFA, especially in the field of social sciences.

In this study, EFA was used to determine the scales and dimensions to be used in the structural equation model. EFA was performed separately for the 4 scales used in the study and confirmatory factor analysis was performed with the dimensions that emerged according to the EFA results.

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA), is an EFA extension that assesses the underlying structure of the data. CFA is a factor analysis model used to check whether a previously used scale fits the original factor structure when used in the current research, and if so, to what extent fits. While EFA tries to determine underlying factors based on observed data for establishing hypotheses, CFA is used to test whether there is a sufficient level of relationship between these predetermined factors, which variables are related to which factors, whether the factors are independent of each other, and whether the factors are sufficient to explain the model (Brown, 2015). With this analysis, the efficacy of measurement models where the number of factors obtained and their direct relationship are specified. In CFA, the researcher has a predetermined theoretical model, while in EFA, the researcher does not have such a model. In EFA, latent variables emerge from observed variables, while in CFA, previously discovered scales are confirmed again with the collected data (Civelek, 2018). Also, in this study, CFA was performed to examine the accuracy of the original scales.

5.4.2. Structural Equation Modeling

As the last step of the study, hypothesis testing was performed with structural equation modeling. Structural equation model, also known as SEM, is an analysis methodology that emerges from the combination of various multivariate statistical analyses. It is a modeling method that includes models based on various statistical dependencies, contains multiple hypotheses and aims to explain the cause-effect relationship between the variables created by these hypotheses. It can also be said that it is a model-testing tool that makes it possible to be tested as a single whole based on the model created for the theoretical framework. Although it is a preferred technique of researchers in different disciplines, Structural Equation Modeling (SEM) has become a sine qua non for researchers, especially in the field of social sciences. The reason for this is that it overcomes the difficulty of sharpening the validity and reliability of complex models in social science studies and can reveal relationships within the context that are quite difficult to notice at the first stage.

When the literature is examined, many studies are using the structural equation model. The four most commonly used model methods are as follows (Raykov & Marcoulides, 2006). Path analytic Model (PA) is used for examining and testing relationships among a set of observed variables. PA allows simultaneously with multiple direct and indirect relationship variables. Confirmatory factor analysis

(CFA), as mentioned previous section. The structural regression model (SRM) is a model that allows to integrate measurement model and structural model and latent change score model (LCS) as known as latent difference score modeling. LCS is a dynamic latent variable model for the analysis of processes.

There are several fit indices that need to be examined for the accuracy of the model established in the structural equation model. The most common are the comparative fit index (CFI), Incremental Fit Index (IFI), Normed Fit Index (NFI), Tucker-Lewis Index (TLI). Their minimum acceptable value is .90. Root mean square of approximation (RMSEA), which has recommended value less than .08. Chi-square divided by degrees of freedom (CMIN/DF) ratio value less than ≤ 3 it indicates an acceptable fit or ≤ 5 it indicates a reasonable fit (Hooper et al., 2007).

6. FINDINGS

Before testing the hypothesized model, the validity and reliability of the scales were tested. Since the scales were used on information technology employees in Turkey for the first time and given the fact six-point interval scale were used to avoid neutral answers, explanatory factor analyses (EFA) were performed along with confirmatory factor analyses (CFA).

EFA is a data-driven technique and is preferred when a scale is newly developed, adapted, or applied in a new environment, whereas the CFA is used to confirm the structure of the scale, which is already developed and model-driven. Following this, both Cronbach's Alpha reliability test which is used with EFA, and Composite Reliability (CR) tests, which is used with CFA were also employed.

After ensuring the validity and reliability of the scales hypothesized model was tested using Structural Equation Modelling (SEM). SEM allows testing the model with its indicators and latent variables and mediating the effect of variables with their direct and indirect effects.

6.1. Validity and Reliability of the Scales

In order to measure the validity and reliability of the scales, each scale was examined separately.

6.1.1. Agile Project Management Practices Scale

To test the factor structure of agile PM practices scale first the EFA was conducted. (See Table 6.1.) The KMO value was calculated as 0.87 accordingly, the sample size is suitable for factor analysis. As a result of the Bartlett test, the Chi-Square value was found to be 2735.30 and statistically significant, providing the necessary conditions for conducting the relevant factor analysis.

According to EFA all 14 items were retained and total variance explained rate of the scale was calculated as 76.67%. However, the results indicated a three-factor model, whereas the original scale had four dimensions. 'Iterative delivery' and 'stand up' dimensions of Tripp et al. (2016) were same, but 'retrospective' and 'burndown' dimensions were grouped tighter. The new factor was named as 'Inspection'. The Cronbach alpha reliabilities of the three dimensions were all above .70 threshold with values ranging from .90 to .94.

Table 6.1. Factor Analysis Result of Agile PM Practices Scale

Factor Name	Item (*In each project cycle...)*	Factor Loading	VE (%)	α
Iterative Delivery	…there is a structure that allows to stakeholders to make business decisions about releases.	.86	48.75	.93
	…my team has a structure that allows us to make technical decisions about releases	.85		
	…my team provides a flow of information about how much work can be completed.	.83		
	…my team and stakeholders make decisions together about what will be delivered at the end of the project.	.82		
	…my team makes a job forecast to complete each of the job's requirements.	.80		
Inspection	…my team organizes meetings on what can be improved in the next project.	.86	15.25	.90
	…my team organizes meetings related to the previous work cycle.	.85		
	…my team regularly reviews their previous work and looks for ways to improve performance.	.82		
	…my team uses indicators (tables, graphs, etc.) that report the status of the team.	.72		
	…my team uses tools that allow me to understand whether team members are completing their work on time.	.65		
	…the team displays the completed tasks on a graph in response to the tasks they have planned.	.63		
Stand Up	My team is informed about what they are working on with short meetings every day.	.94	12.67	.94
	My team holds a short meeting every day to discuss the latest developments on current projects.	.94		
	My team discusses things on a daily basis and together in a way.	.85		

Note. KMO=.87; Barlett's test of sphericity χ^2 (101) = 2735.301 *p*=.00; VE = variance explained; α= Cronbach' alpha reliability

After EFA, CFA were performed both to the new three factor model and to the original four factor model. The results can be found in Table 6.2 and 6.3.

Based on the CFA of the new three factor model, we can see that all the factor loadings were above .50 threshold and statistically significant. The Composite reliability values of the three dimensions were all above .70 threshold with values ranging from .90 to .94. However, when we look at the average variance extracted values, it can be seen that for 'Iterative delivery' and 'Stand up' dimensions results are acceptable with values .72 and .84 but for the new dimension that was named 'Inspection' average extracted variance value is relatively low .60. It can consider as acceptable but not very good rate (see Table 6.2.).

When we look at the CFA of the original 4-factor model, we can see that all the factor loading were above .50 threshold and statistically significant. In additional composite reliability values are above the threshold with values ranging from .90 to .94 and average extracted variance values are also above the threshold with values ranging from .72 to .84 (see Table 6.3.)

Table 6.2. The CFA Analysis Result of 3 Factor Agile PM Practices Scale

Factor Name	**Item (***In each project cycle...)*	***L***	***t***	**CR**	**AVE**
Iterative Delivery	…there is a structure that allows to stakeholders to make business decisions about releases.	.87	15.49	.93	.72
	…my team has a structure that allows us to make technical decisions about releases	.84	14.68		
	…my team provides a flow of information about how much work can be completed.	.87	15.34		
	…my team and stakeholders make decisions together about what will be delivered at the end of the project.	.82	*a*		
	…my team makes a job forecast to complete each of the job's requirements.	.85	14.98		
Inspection	…my team organizes meetings on what can be improved in the next project.	.76	*a*	.90	.60
	…my team organizes meetings related to the previous work cycle.	.76	11.33		
	…my team regularly reviews their previous work and looks for ways to improve performance.	.70	10.35		
	…my team uses indicators (tables, graphs, etc.) that report the status of the team.	.84	12.71		
	…my team uses tools that allow me to understand whether team members are completing their work on time.	.80	12.05		
	…the team displays the completed tasks on a graph in response to the tasks they have planned.	.78	11.69		
Stand Up	My team is informed about what they are working on with short meetings every day.	.95	18.26	.94	.84
	My team holds a short meeting every day to discuss the latest developments on current projects.	.98	18.74		
	My team discusses things on a daily basis and together in a way.	.82	*a*		

Note. L=Factor loadings; CR= Construct Reliability; AVE=Average variance extracted; *a*= items fixed to one

Table 6.3. The CFA Analysis Result of 4 Factor (Original) Agile PM Practices Scale

Factor Name	Item (*In each project cycle...)*	*L*	*t*	CR	AVE
Iterative Delivery	…there is a structure that allows my team and stakeholders to make business decisions about releases.	.88	16.64		
	…my team has a structure that allows us to make technical decisions about releases	.85	*a*		
	…my team provides a flow of information about how much work can be completed.	.87	16.26	.93	.72
	…my team and stakeholders make decisions together about what will be delivered at the end of the project.	.82	14.83		
	…my team makes a job forecast to complete each of the job's requirements.	.85	15.79		
Retrospective	…my team organizes meetings on what can be improved in the next project.	.90	*a*		
	…my team organizes meetings related to the previous work cycle.	.87	17.30	.91	.76
	…my team regularly reviews their previous work and looks for ways to improve performance.	.84	16.49		
Burndown	…my team uses indicators (tables, graphs, etc.) that report the status of the team.	.90	15.89		
	…my team uses tools that allow me to understand whether team members are completing their work on time.	.85	14.89	.90	.74
	…the team displays the completed tasks on a graph in response to the tasks they have planned.	.83	*a*		
Stand Up	My team is informed about what they are working on with short meetings every day.	.95	18.30		
	My team holds a short meeting every day to discuss the latest developments on current projects.	.97	18.75	.94	.84
	My team discusses things on a daily basis and together in a way.	.82	*a*		

Note. L=Factor loadings; CR= Construct Reliability; AVE=Average variance extracted; *a*= items fixed to one

After the EFA and CFA for original 4-dimension and new 3-dimension agile PM practice scale, we evaluate the model fit values with many different indicators. In Table 6.4 the indicators of both models and the thresholds for each indicator can be found.

Table 6.4. Comparative Results of Agile PM Practices Scale

Goodness of Fit Indicators	Acceptance Criteria	3 Factor		Original	
		Measured Value	Fit Rating	Measured Value	Fit Rating
χ^2/df	<5	6.34	No fit	3.45	Good fit
RMR	≤ .1	.08	Good fit	.05	Good fit
RMSEA	≤ .08	.16	No fit	.11	No fit
CFI	≥ .90	.85	No fit	.94	Good fit
IFI	≥.90	.85	No fit	.94	Good fit
NFI	≥.90	.83	No fit	.91	Good fit
TLI	≥.90	.81	No fit	.92	Good fit

Note. χ^2/df =Chi-square/degrees of freedom; RMR= Root Mean Residual; RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; IFI=Incremental Fit Index; NFI= Normed Fit Index; TLI=Tucker-Lewis Index

When we compare the fit indices, we see that the original 4-dimension model is better than the 3-dimension model. It can be seen that for original scale, almost all fit values are above threshold for each. Therefore, as a result of the detailed survey, it was decided to proceed with the original agile PM scale to be used in the SEM.

6.1.2. Job Characteristic Scale

To test the factor structure of Job Characteristic Scale first the EFA was conducted. (See Table 6.5.) The KMO value was calculated as 0.91 accordingly, sample size is suitable for factor analysis. As a result of the Bartlett test, the Chi-Square value was found to be 3198.26 and statistically significant, providing the necessary conditions for conducting the relevant factor analysis.

According to EFA all the 23 items were retained and total variance explained rate of the scale was calculated as 78%. However, the results indicated a three-factor model, whereas the original scale had five dimensions. ‘Skill variety’ dimension of Hackman and Oldham (1974) were same, but ‘Feedback’ and ‘task identity’ dimensions were grouped together. The new factor was named as ‘Task performance’. And also, ‘Task significance’ and ‘Job autonomy’ dimensions were grouped together. The new factor was named as ‘Task goal’. The Cronbach alpha reliabilities of the three dimensions were all above .70 with values ranging from .88 to .93.

Table 6.5. Factor Analysis Result of Job Characteristic Scale

Factor Name	Item	Factor Loading	VE (%)	α
Task Goal	I have the freedom to plan how to do the work I do myself.	.84	31.59	.88
	I have the freedom to choose which methods I will perform tasks related to my job	.83		
	I have the opportunity to take initiative and use my reasoning ability while performing the tasks required by my job.	.78		
	The work I do makes me feel personally important and meaningful.	.73		
	The work I do feels very important and meaningful in general.	.73		
	I think the results of the work I do significantly affect the lives and well-being of other people.	.73		
Task Performance	The work I do provides me with information about my work performance.	.88	27.61	.93
	The work I do is enough for me to do the activities required by the job, to understand how well I am doing the job or not.	.86		
	After completing my work, I know whether I performed well or not.	.84		
	The work I do is arranged in such a way that I can do it from the beginning to the end.	.70		
	The tasks I undertake throughout my work give me the chance to completely finish the work I started.	.68		
	The whole and parts of the work I do are arranged in such a way that I can complete it.	.60		
Skill Variety	The work I do requires taking part in many different projects using various skills and abilities.	.89	18.49	.91
	I feel that the work I do involves diversity.	.84		
	The work I do requires the use of a number of complex or high-level skills.	.84		

Note. KMO=.91; Barlett's test of sphericity χ^2 (105) = 3198.26 p=.00; VE = variance explained; α= Cronbach' alpha reliability

After EFA, CFA were performed both to the new three factor model and to the original four factor model. The results can be found in Table 6.6 and 6.7.

Based on the CFA of the new three factor model, we can see that all the factor loadings were above .50 threshold and statistically significant. The Composite reliability values of the three dimensions were all above .70 threshold with values ranging from .93 to .94. However, when it looks at the average variance extracted values it can be seen that for 'Task goal' and 'Skill variety' dimensions results are acceptable with values .70 and .74 but for the 'Task performance' average extracted variance value is relatively low .68. It can consider as acceptable but not very good rate (see Table 6.6.).

When we look at the CFA of the original 5-factor model, we can see that all the factor loading were above .50 threshold and statistically significant. In additionally to that composite reliability values are

above the threshold with values ranging from .94 to .95 and average extracted variance values are also above the threshold with values ranging from .74 to .76 (see table 6.7.)

Table 6.6. The CFA Analysis Result of 3 Factor Job Characteristic Scale

Factor Name	Item	*L*	*t*	CR	AVE
Task Goal	I have the freedom to plan how to do the work I do myself.	.85	16.21	.93	.70
	I have the freedom to choose which methods I will perform tasks related to my job	.81	14.90		
	I have the opportunity to take initiative and use my reasoning ability while performing the tasks required by my job.	.83	15.85		
	The work I do makes me feel personally important and meaningful.	.86	*a*		
	The work I do feels very important and meaningful in general.	.82	16.71		
	I think the results of the work I do significantly affect the lives and well-being of other people.	.86	15.20		
Task Performance	The work I do provides me with information about my work performance.	.81	13.81	.93	.68
	The work I do is enough for me to do the activities required by the job, to understand how well I am doing the job or not.	.83	13.68		
	After completing my work, I know whether I performed well or not.	.82	13.33		
	The work I do is arranged in such a way that I can do it from the beginning to the end.	.84	14.12		
	The tasks I undertake throughout my work give me the chance to completely finish the work I started.	.87	14.72		
	The whole and parts of the work I do are arranged in such a way that I can complete it.	.79	*a*		
Skill Variety	The work I do requires taking part in many different projects using various skills and abilities.	.80	21.13	.94	.74
	I feel that the work I do involves diversity.	.94	*a*		
	The work I do requires the use of a number of complex or high-level skills.	91	15.71		

Note. L=Factor loadings; CR= Construct Reliability; AVE=Average variance extracted; *a*= items fixed to one

Table 6.7. The CFA Analysis Result of 5 Factor (Original) Job Characteristic Scale

Factor Name	Item	*L*	*t*	CR	AVE
Feedback	The work I do provides me with information about my work performance.	.93	18.55	.95	.76
	The work I do is enough me to do the activities required by the job, to understand how well I am doing the job or not.	.96	*a*		
	After completing my work, I know whether I performed well or not.	.82	17.86		
Task Identity	The work I do is arranged in such a way that I can do it from the beginning to the end.	.86	16.69	.94	.74
	The tasks I undertake throughout my work give me the chance to completely finish the work I started.	.93	18.95		
	The whole and parts of the work I do are arranged in such a way that I can complete it.	.86	*a*		
Task Significance	The work I do makes me feel personally important and meaningful.	.93	*a*	.95	.75
	I think the results of the work I do significantly affect the lives and well-being of other people.	.85	18.19		
	The work I do feels very important and meaningful in general.	.91	22.63		
Skill Variety	The work I do requires taking part in many different projects using various skills and abilities.	.80	15.70	.94	.74
	I feel that the work I do involves diversity.	.94	*a*		
	The work I do requires the use of a number of complex or high-level skills.	.91	21.14		
Job Autonomy	I have the freedom to plan how to do the work I do myself.	.89	19.93	.95	.76
	I have the freedom to choose which metdods I will perform tasks related to my job.	.92	21.38		
	I have the oppourtunitiy to take initiative and use my reasoning ability while performing the tasks required by my job.	.91	*a*		

Note. L=Factor loadings; CR= Construct Reliability; AVE=Average variance extracted; *a*= items fixed to one

After the EFA and CFA for original 5-dimension and new 3-dimension Job Characteristic scale, we evaluate the model fit values with many different indicatiors. In Table 6.8 the indicators of both models and the thresholds for each indicator can be found.

Table 6.8. Comparative Results of Job Characteristic Scale

Goodness of Fit Indicators	Acceptance Criteria	3 Factor		Original	
		Measured Value	Fit Rating	Measured Value	Fit Rating
χ^2/df	<5	7.46	No fit	2.91	Good fit
RMR	≤ .1	.06	Good fit	.04	Good fit
RMSEA	≤ .08	.17	No fit	.07	Good fit
CFI	≥ .90	.82	No fit	.97	Good fit
IFI	≥.90	.82	No fit	.97	Good fit
NFI	≥.90	.80	No fit	.95	Good fit
TLI	≥.90	.79	No fit	.96	Good fit

Note. χ^2/df =Chi-square/degrees of freedom; RMR=Root Mean Residual; RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; IFI=Incremental Fit Index; NFI= Normed Fit Index; TLI=Tucker-Lewis Index

When the fit values of these two scales are examined, it is seen that the original model has much higher fit values. When we compare the fit indices, we see that the original 5-dimension model is better than the 3-dimension model. It can be seen that for original scale structure, all of the fit values are above threshold. Therefore, as a result of the detailed survey, it was decided to proceed with the original job characteristic scale dimensions to be used in the SEM.

6.1.3. Job Satisfaction Scale

To test the factor structure of Job Satisfaction Scale first the EFA was conducted. (See Table 6.9.) The KMO value was calculated as 0.83 accordingly, sample size is suitable for factor analysis. As a result of the Bartlett test, the chi-square value was found to be 777.610 and statistically significant, providing the necessary conditions for conducting the relevant factor analysis.

According to EFA all the 4 items were retained and total variance explained rate of the scale was calculated as 84.376%. Since this scale has one dimension, it's called also 'Job satisfaction'. The Cronbach alpha reliability was above .70 threshold with value .93. Since the job satisfaction scale is unidimensional, no significant dimensional difference is observed according to the EFA (see Table 6.9) and CFA (see Table 6.10) results.

Tablo 6.9. Factor Analysis Result of Job Satisfaction Scale

Factor Name	Item	Factor Loading	VE (%)	α
Job Satisfaction	I feel satisfied with my work in general.	.93	84.376%	.93
	It makes me very satisfied with the work I do at the company I work for.	.93		
	I think my job is enjoyable.	.91		
	I would like to continue doing the job I am doing now in the coming year as well.	.90		

Note. KMO=.833; Barlett's test of sphericity χ^2 (6) = 777.610 *p*=.00; VE = variance explained; α= Cronbach' alpha reliability

Table 6.10. CFA Analysis Result of Job Characteristic Scale

Factor Name	Item	*L*	*t*	CR	AVE
Job Satifaction	I feel satisfied with my work in general.	.92	*a*	.94	.80
	It makes me very satisfied with the work I do at the company I work for.	.92	*22.31*		
	I think my job is enjoyable.	.85	*18.67*		
	I would like to continue doing the job I am doing now in coming years as well.	.87	*19.69*		

Note. L=Factor loadings; CR= Construct Reliability; AVE=Average variance extracted; *a*= items fixed to one

After the EFA and CFA for job satisfaction scale, we evaluate the model fit values with many different indicatiors. In Table 6.11 the indicators of both models and the thresholds for each indicator can be found.

Table 6.11. Model fit Result of Job Satisfaction Scale

Goodness of Fit Indicators	Acceptance Criteria	Job Satisfaction Scale	
		Measured Value	Fit Rating
χ^2/df	<5	8.94	No fit
RMR	≤ .1	0.01	Good fit
RMSEA	≤ .08	.19	No fit
CFI	≥ .90	.98	Good fit
IFI	≥.90	.98	Good fit
NFI	≥.90	.98	Good fit
TLI	≥.90	.94	Good fit

Note. χ^2/df =Chi-square/degrees of freedom; RMR= Root Mean Residual; RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; IFI=Incremental Fit Index; NFI= Normed Fit Index; TLI=Tucker-Lewis Index

When the fit values of job satisfaction model is examined, it is seen that the model has acceptable fit values. It can be seen that for each item, all of the fit values are above threshold. Therefore, as a result of the detailed survey, it was decided to proceed with the one-factor job satisfaction scale to be used in the SEM

6.1.4. Turnover Intention Scale

To test the factor structure of turnover intention scale first the EFA was conducted. (See Table 6.12.) The KMO value was calculated as 0.76 accordingly, sample size is suitable for factor analysis. As a result of the Bartlett test, the chi-square value was found to be 512.210 and statistically significant, providing the necessary conditions for conducting the relevant factor analysis.

According to EFA all the 4 items were retained and total variance explained rate of the scale was calculated as 71.676%. Since this scale has one dimension, it's called also 'turnover intention'. The Cronbach alpha reliability was above .70 threshold with value .86. Since the job satisfactionc scale is one-dimensional, no significant dimensional difference is observed according to the EFA (see Table 6.12) and CFA (see Table 6.13) results.

Table 6.12. Factor Analysis Result of Turnover Intention Scale

Factor Name	Item	Factor Loading	VE (%)	α
Turnover Intention	Five years from now, I see myself in this company.	.70	84.376%	.86
	I am planning to look for a new job.	.92		
	Next year, I am planing to be in a different company than the company I am now.	.91		
	I notice that I often think about changing jobs.	.84		

Note. KMO=.764; Barlett's test of sphericity χ^2 (6) = 515.210 *p*=.00; VE = variance explained; α= Cronbach' alpha reliability

Table 6.13. CFA Analysis Result of Turnover Intention Scale

Factor Name	Item	*L*	*t*	CR	AVE
Turnover Intention	Five years from now, I see myself in this company.	.57	*a*	.88	.65
	I am planning to look for a new job.	.95	*9.45*		
	Next year, I am planing to be in a different company than the company I am now.	.90	*9.31*		
	I notice that I ofthen think about changing jobs.	.74	*8.34*		

Note. L=Factor loadings; CR= Construct Reliability; AVE=Average variance extracted; *a*= items fixed to one

After the EFA and CFA for Job Satisfaction scale, we evaluate the model fit values with many different indicatiors. In Table 6.14 the indicators of both models and the thresholds for each indicator can be found.

Table 6.14. Model fit Result of Job Turnover Scale

Goodness of Fit Indicators	Acceptance Criteria	Turnover Intention Scale	
		Measured Value	Fit Rating
χ^2/df	<5	4.28	Good fit
RMR	≤ .1	.02	Good fit
RMSEA	≤ .08	.12	No fit
CFI	≥ .90	.99	Good fit
IFI	≥.90	.99	Good fit
NFI	≥.90	.98	Good fit
TLI	≥.90	.96	Good fit

Note. χ^2/df =Chi-square/degrees of freedom; RMR=Root Mean Residual; RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; IFI=Incremental Fit Index; NFI= Normed Fit Index; TLI=Tucker-Lewis Index

When the fit values of turnover intention model is examined, it is seen that the model has acceptable fit values. It can be seen that for each item, all of the fit values are above threshold. Therefore, as a result of the detailed survey, it was decided to proceed with the one factor turnover intention scale to be used in the SEM

6.2. Structural Equation Model and Hypothesis Test Results

In the next section of the study, we established a structural equation model using the scales that were examined separately in the previous sections and selected based on the most appropriate goodness of fit indices. This section presents the theoretical model with the structural equation modeling and presents the results of the hypotheses tests. Prior to the theoretical model, we will examine a model without JCM dimensions in order to observe the direct relationship between agile and job satisfaction, as well as agile and turnover intention. Subsequently, we will analyze the theoretical model of the study, including the JCM. It is expected that due to the mediation effect the prior direct effects will not be significant in the theoretical model. Finally, we will examine the effect of agile sub-dimensions on job satisfaction through job characteristics employing first order model to capture more information.

6.2.1. Direct Effect of Agile PM Practice on Job Satisfaction and Turnover Intention

To understand the mediating effect of JCM, a model shown in Figure 6.1 was first established to examine the direct effect of agile PM practices on job satisfaction and turnover intention.

First, the statistical validity of the structural model was examined. For this purpose, fit indices that test the compatibility of the research model and data were used (see Table 6.15). When goodness of fit indices related to the measurement model (RMSEA = 0.092; RMR = 0.089; CFI = 0.91; IFI = .91; NFI = 0.87; TLI = 0.90 are examined, it can be seen that the model provides an acceptable level of fit. When the values of the fit indexes in Table 6.18 are examined, they indicate a sufficient level of fit, except for the NFI value. When the NFI value is evaluated together with the CFI value, it gives more accurate results (Mueller, 1996: 90).

Table 6.15. Model fit Result of Direct Agile Effect Model

Goodness of Fit Indicators	Acceptance Criteria	Agile PM Practice Job Satisfaction Model Measured Value	Fit Rating
χ^2/df	<5	2.81	Good fit
RMR	≤ .1	.09	Good fit
RMSEA	≤ .08	.09	Good fit
CFI	≥ .90	.91	Good fit
IFI	≥.90	.91	Good fit
NFI	≥.90	.87	Acceptable fit
TLI	≥.90	.90	Good fit

Note. X^2/df =Chi-square/degrees of freedom; RMR=Root Mean Residual; RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; IFI=Incremental Fit Index; NFI= Normed Fit Index; TLI=Tucker-Lewis Index

When Figure 6.1 is studied, according to the results, it can be said the effect of agile PM practices on job satisfaction there is positive (β= .61) and statistically significant (p= .001) relation. Also when we look at the direct effect of agile PM practice on turnover intention it can be said, there is statistically significant (p=.004) but positive relationship (β = .27) In addition, when the relationship between job satisfaction and intention to leave is examined, it is found that this relationship is negative (β = -.86) and statistically significant (p= .0001).

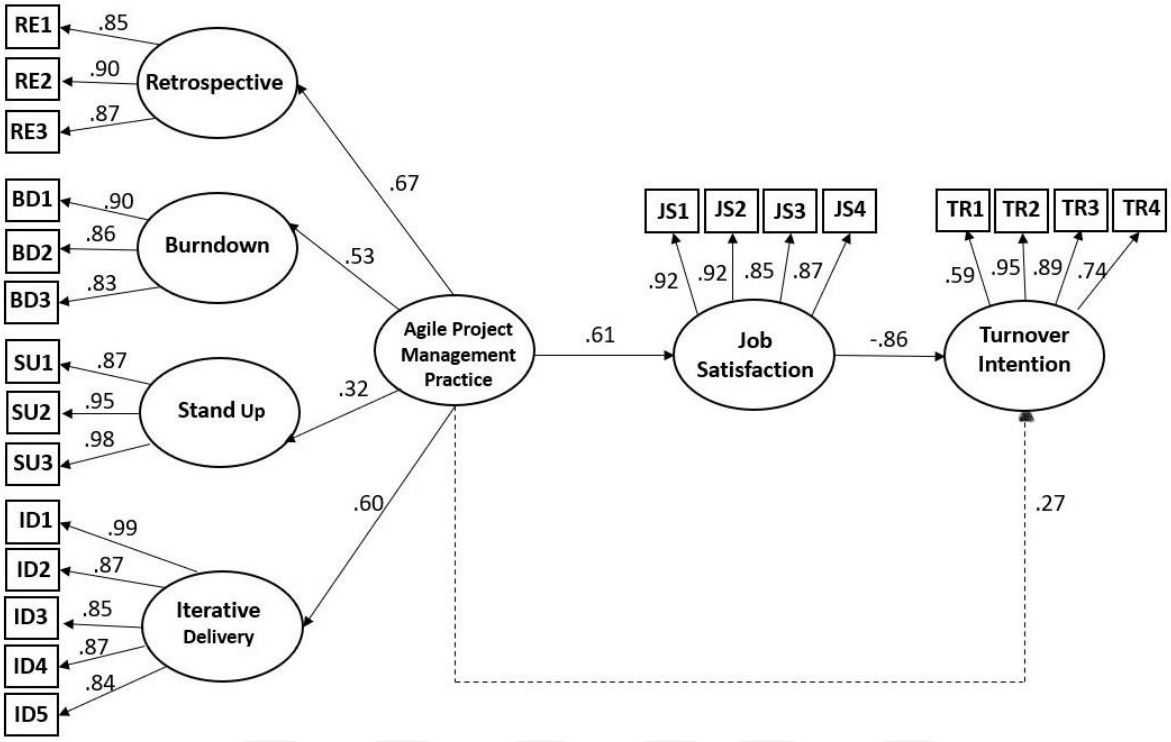

Figure 6.1. Structural Equation Model of the Agile Effect Model with Standardized Regression Weights

6.2.2. Structural Equation Model of the Research Model

After seeing the direct effect of agile PM practice, a structural equation model based on the theoretical model was established in order to see the mediating effect of the JCM dimensions. This model is created by defining the relationships between all variables in the research model. The structural model and the findings obtained from the analysis of the model are presented in Figure 6.2.

First, the statistical validity of the structural model was examined. For this purpose, fit indices that test the compatibility of the research model and data were used (see Table 6.16). When goodness of fit indices related to the measurement model (RMSEA = 0.78; RMR = 0.094; CFI = 0.90; IFI = .90; NFI = 0.88; TLI = 0.89) are examined, it can be seen that the model provides an acceptable level of fit. When the values of the fit indexes in Table 6.15 are examined, they indicate a sufficient level of fit, except for the NFI value. When the NFI value is evaluated together with the CFI value, it gives accurate results (Mueller, 1996: 90).

Table 6.16. Model fit Result of Theoretical Model

Goodness of Fit Indicators	Acceptance Criteria	Agile PM Practice Job Satisfaction Model Measured Value	Fit Rating
χ^2/df	<5	2.32	Good fit
RMR	≤ .1	.09	Good fit
RMSEA	≤ .08	.08	Good fit
CFI	≥ .90	.90	Good fit
IFI	≥.90	.90	Good fit
NFI	≥.90	.88	Acceptable fit
TLI	≥.90	.89	Acceptable fit

Note. χ^2/df =Chi-square/degrees of freedom; RMR=Root Mean Residual; RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; IFI=Incremental Fit Index; NFI= Normed Fit Index; TLI=Tucker-Lewis Index

The examined values demonstrate adequate level of fit, indicating that the measurement model-data fit is acceptable and the measurement model is a valid statistical model. Therefore, the hypothesis testing stage is initiated. For this purpose, the paths between variables in Figure 6.2. and the relationships defined in the research model in Table 6.17 are analyzed to investigate the effects between latent variables and the validity of hypotheses.

Table 6.17. Hypothesis Testing Results

Hypothesis	Relationship	CR	β	*p*	Decision
H1	Job Satisfaction → Turnover Intention	-6.12	-.54	.001	Accepted
H2	Agile PM → Feedback	2.84	.20	.004	Accepted
H3	Agile PM →Job Autonomy	1.85	.15	.06	Rejected
H4	Agile PM →Task Identity	-.04	-.33	.66	Rejected
H5	Agile PM → Task Significance	.50	.59	.001	Accepted
H6	Agile PM → Skill Variety	-6.74	-.18	.17	Rejected
H7	Agile → Turnover Intention	2.01	.13	.22	Rejected
H8	Agile → Job Satisfaction	1.75	.73	.08	Rejected

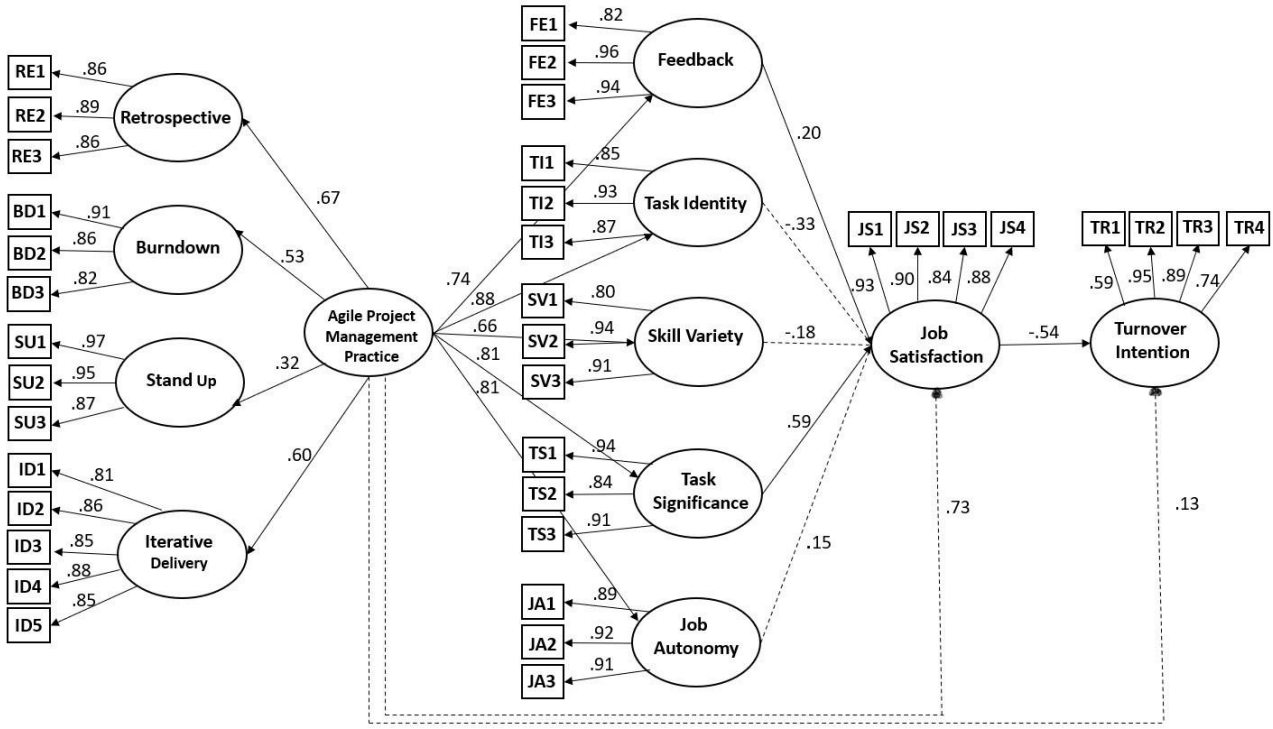

Figure 6.2. Structural Equation Model of the Research Model with Standardized Regression Weight

When the findings in Figure 6.2. and Table 6.17 are examined, it is seen that the coefficient between agile PM practice usage and job satisfaction with the mediator effect of feedback is at the level of -0.54. It can be said that the effect level of job satisfaction on turnover intention is medium-sized and negative. In addition, the t value is statistically significant at the $p<0.01$ significance level. In this case, the hypothesis that puts forward the statement "Job satisfaction has a negative impact on turnover intention" is accepted.

When the findings in Figure 6.2 and Table 6.17 are examined, it is seen that the coefficient between agile PM practice usage and job satisfaction with the mediator effect of feedback is at the level of .20. It can be said that this effect is positive. In addition, the t value is statistically significant ($p = 0.004$). In this case, the hypothesis that puts forward the statement "The use of agile PM practice positively impacts job satisfaction through perceived feedback." is accepted. Likewise, it is seen that the coefficient between agile PM practice usage and job satisfaction with the mediator effect of task significance is at the level of .59. It can be said this effect is positive. In addition, the t value is statistically significant ($p = 0.001$). In this case, the hypothesis that puts forward the statement "The use of agile PM practice positively impacts job satisfaction through perceived task significance" is accepted.

When the findings in Figure 6.2 and Table 6.17 are examined, it is seen that the coefficient between agile PM practice usage and job satisfaction with the mediator effect of skill variety, job autonomy and task identity is at the level of -.18, .15 and -.33. Also, the t values are not statistically significant at the

0.17, 0.06 and 0.66 significance level, respectively. In this case, the hypothesis that puts forward the statement “The use of agile PM practice positively impacts job satisfaction through perceived skill variety.”, “The use of agile PM practice positively impacts job satisfaction through perceived job autonomy.” and “The use of agile PM practice positively impacts job satisfaction through perceived task identity.” are rejected.

When the findings in Figure 6.2 and Table 6.17 are examined, it is seen that the coefficient between agile PM practice usage and job satisfaction is at the level of 0.73. It can be said that the effect level of agile PM practice usage on job satisfaction is positive. However, the t value is not statistically significant at the $p = 0.080$ significance level. In this case, the hypothesis that puts forward the statement “The use of agile PM practice positively impacts employees' job satisfaction.” is rejected. Also it indicates that there is partial mediation effect of JCM on agile PM practices and job satisfaction. Because when it look at the direct effect of agile PM practices and job satisfaction relationship, it can be seen there is positive and statistically significant results (See Table 6.1).

When the findings in Figure 6.2 and Table 6.17 are examined, it is seen that the coefficient between agile PM practice usage and turnover intention’s t value is not statistically significant at the $p = 0.22$ significance level. Also, this relationship has positive coeffiecient level with .13 standardized estimation value. In this case, the hypothesis that puts forward the statement “The use of agile PM practice negatively impacts employees' turnover intention.” is rejected. In addition to that, when it look at the direct effect of agile PM practice on turnover intention there is statistically significance but positive coefficient in the level of .16 and 0.004 t- value (see Figure 6.3.)

6.2.3. Agile PM Practice Sub-Dimension Analysis

In the last part of the study, the effects of agile PM practice dimensions on job satisfaction through job characteristics were examined. For this purpose, another model created to see the relationship between the sub-dimensions of agile PM usage and job characteristics with a first order model (see Figure 6.3.)

The statistical validity of the structural model was examined. For this purpose, fit indices that test the compatibility of the research model and data were used (see Table 6.18). When goodness of fit indices related to the measurement model are examined, it can be seen that the model did not provide an acceptable level of fit. The only acceptable index was $\chi 2/df$ ratio. Which is not enough to comment on the model in detail.

Table 6.18. Model fit Result of Agile Sub-Dimension Model

Goodness of Fit Indicators	Acceptance Criteria	Agile PM Practice Job Satisfaction Model Measured Value	Fit Rating
χ^2/df	<5	2.83	Good fit
RMR	≤ .1	.22	No fit
RMSEA	≤ .08	.09	No fit
CFI	≥ .90	.86	No fit
IFI	≥.90	.86	No fit
NFI	≥.90	.80	No fit
TLI	≥.90	.85	No fit

Note. χ^2/df =Chi-square/degrees of freedom; RMR=Root Mean Residual; RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; IFI=Incremental Fit Index; NFI= Normed Fit Index; TLI=Tucker-Lewis Index

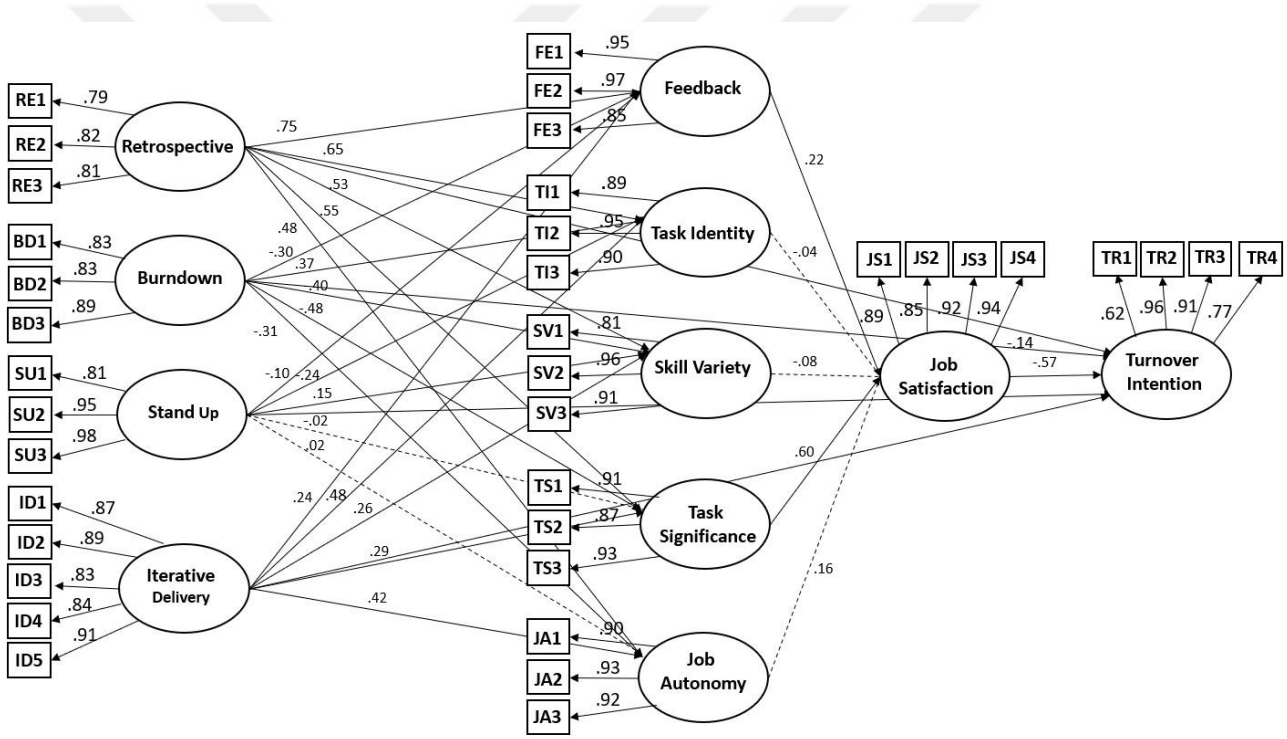

Figure 6.3. Structural Equation Model of the Agile Sub-Dimension Model with Regression Weight

7. CONCLUSION AND DISCUSSION

In recent years, rapidly evolving technology trends that quickly meet changing customer demands and expectations have increased the need for agile movement. The word agile means “quick” and “fast”. Agile is the ability to create and respond to change. Agile methods emerged as a new approach to project management with the declaration of the Agile Manifesto in 2001. Agile methods are used in an environment where the market changes almost every day and customer demands are constantly updated, in order to provide the fastest and most suitable solutions to customer demands. In this environment where the most suitable solution needs to be delivered in the fastest way possible, agile methods that focus on continuous iteration and aim for flexibility and rapid adaptation have begun to gain popularity in the fields of software development and project management. What sets agile methodologies apart from other software development approaches is the focus on the people over processes (Fowler & Highsmith, 2001). For this reason, agile project management is one of the working methods that many companies want to implement and many organizations already have.

As its use by organizations increases, studies focusing on agile project management have also increased significantly. These studies can be categorized under certain subject headings. Such as studies that introduce the agile project method and its practices from a holistic perspective (Dybå, 2014; Kautz et al, 2014), studies that examine the project-based effects of agile project management practices and aim to reveal best practices (Manole & Avramescu, 2017; Shamim, 2024), studies examining the employee-based effects of agile project management practices, such as job satisfaction (Huck-Fries et al, 2023; Kanwal & Khurram, 2022; Tripp et al, 2016; Tessem & Maurer, 2007) and turnover intention (Wiesche & Nguyen, 2023; Mueller & Benlian, 2022; Setor & Joseph, 2019) and, more.

In this study, the job satisfaction and turnover intention of information technology employees working with agile methodologies with the help of the job characteristic model by Hackman and Oldham (1974) were examined. When the literature is examined, relevant studies have shown that job satisfaction has a negative effect on turnover intention (Wiesche & Nguyen, 2023; Mueller & Benlian, 2022; Huck-Fries et al, 2022; Araújo et al, 2022; Setor & Joseph, 2019, Harden et al, 2018). A similar result was obtained in this study. According to the results of the hypothesis tests, it is seen that employees' job satisfaction has a negative effect on their turnover intention. It can be concluded from here that as the job satisfaction of employees increases, their turnover intention and their motivation to look for a new job decreases.

According to the findings obtained from the study, it can be said that agile PM practices have a direct positive effect on the job satisfaction of employees. When the literature was examined, it was seen that this result supported the literature, as there were many studies with results in this direction (Tripp et al, 2016; Kault et al, 2014, Whitworh & Biddle, 2007). It can be said that the business practices

implemented by agile methodologies are in a form that contributes to job satisfaction for employees. However, when the relationship between agile practices and job satisfaction is examined through job characteristics, it is seen that agile project management practices affect employees' job satisfaction only through the dimensions of feedback and task significance. Thus, it can be concluded from this study that members of the agile development team involved in projects run in accordance with agile project management practices perceive feedback systems related to their work at a higher level through agile practices, and this leads to higher levels of job satisfaction among employees. This conclusion was reached in other studies in the literature (Tripp et al, 2016; Kanwal & Khurram, 2022). The other important finding about the mediator effect of JCM is, that members of the Agile Development Team involved in projects run by agile project management practices perceive task significance related to their work at a higher level through agile practices, and this leads to higher levels of job satisfaction among employees. When the literature is examined, especially in terms of task significance, we come across studies that seem to focus on task significance of agile software development practices rather than agile PM practices (Tessem & Maurer, 2007; Tripp et al, 2016; Kanwal & Khurram, 2022). Since the target audience of this study has been expanded, it is seen that a different result has been obtained from studies targeting only software developers. According to the results of the study, agile practices positively affect the rate at which employees feel that work is meaningful, and this helps employees to have a more positive perception of job satisfaction.

By looking at the results, it can be said that agile PM practices directly have no statistically significant effect on employees' turnover intention. When the literature is examined, the results obtained are generally that characteristic such as organizational commitment and internal adoptation increase through agile practices, and this affects the intention to leave the job in the opposite direction (Sabuncuoğlu, 2007; Cho et al., 2009; Huck-Fries et al., 2022). However, according to the data obtained in this study, no significant relationship was revealed in this regard. There may be more than one reason for this, and it is thought that the most important determining factor in this regard is that the majority of employees are selected from people who work in the same position for the long term (See Table 5.1) It can be concluded from here that, considering the conditions of the sample group in which this study was conducted, other factors may be more decisive than agile PM practices in preventing employees' turnover intention.

8. LIMITATIONS AND RECOMMENDATIONS

This study takes place among the studies that address job satisfaction and turnover intention in terms of agile project management. Although studies examining the relationship between the use of agile methodologies and job satisfaction at the international level through the characteristics of job characteristics are seen, it is aimed to address this issue by adding the dimension of turnover intention. It stands out in the literature as a study examining the application of IT business development (e.g., using agile practices) as an antecedent to job characteristics. Therefore, the results obtained from this study provide new guidance for researchers who want to develop a theory on how to manage the IT workforce. In future studies focusing on this issue, examining which structures related to agile methodologies affect job characteristic perceptions and in what way will contribute to further deepening this issue. In addition, if the target audience of this study, namely information technology department employees, is further restricted and the target audience is reduced to only software developers working with agile methods, the software development part of agile projects can also be examined. With this more detailed perspective, there will be a chance to consider agile method applications from different perspectives.

Examining the effects of agile use in the organizational framework, for example, conducting this and similar studies with agile and non-agile teams in a hybrid company would be a useful study to confirm the effect of the use of agile methods on job satisfaction. It would also be beneficial to include in these studies the personal effects of such situations on employees rather than the effects on the organizational framework. This diversity of personal effects can be explained by relating it to concepts such as perceived workload, burnout, and employee performance.

Further, future research might explore the success of agile projects instead of the job satisfaction of employees. Since team performance and individual job satisfaction are not independent of each other, the relationship between the success of agile projects and job satisfaction can be put forward as another subject to be examined.

This study has several limitations. First, in terms of the generalizability of the findings, the sample was obtained from IT professionals working in the Republic of Turkey. Future research may consider cultural, geographical, and other differences to expand the generalizability of this study across contexts. This situation can be avoided with an international sample. Additionally, when the demographic characteristics are examined in this study, the level of work experience at the current position of the target group is largely similar and long, which is interesting considering they are from the IT sector where more frequent job change is expected. This situation may be the reason behind our finding of no

significant impact of agile PM on turnover intention. Our sample was composed mostly form public sector IT employees. In future studies, the results can be more diverse according to the selected target group especially start-up organizations who are further away from the public sector.

In addition, although there are studies in the literature examining the relationship between job characteristics and job satisfaction (Kanwal & Khurram, 2022; Tripp et al., 2016; Morris & Venkatesh, 2010), studies modeling job characteristics to examine turnover intention in IT employees are less common. Examining the factors through which job characteristics affect turnover intention can also be a study that can contribute to the literature on this subject.

A study specifically for the information technologies sector could be a useful research topic for future studies to examine the relationship between job satisfaction and turnover intention in terms of various dimensions of turnover intention. Such as job satisfaction and turnover intention are also affected by economic conditions (Markovits et al., 2014), long-term data collection will help us look at the issue from many different perspectives. Examining the use of agile practices by considering the economic situation and business conditions of the country will be useful for future studies. In addition, examining the remote/ hybrid working models, which have become widespread with the COVID-19 pandemic, and the positive or negative effects of this model on employees' turnover intention will be a useful study in understanding today's employee demands.

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APPENDIX I

Agile Project Management Practice Scale

Construct	Indicator	Item Text
Retrospective	RE1	In each project cycle my team organizes meetings on what can be improved in the next project.
	RE2	In each project cycle my team organizes meetings related to the previous work cycle.
	RE3	In each project cycle my team regularly reviews their previous work and looks for ways to improve performance
Burndown	BD1	In each project cycle my team uses indicators (tables, graphs, etc.) that report the status of the team.
	BD2	In each project cycle my team uses tools that allow me to understand whether team members are completing their work on time.
	BD3	In each project cycle the team displays the completed tasks on a graph in response to the tasks they have planned.
Stand Up	SU1	My team is informed about what they are working on with short meetings every day.
	SU2	My team holds a short meeting every day to discuss the latest developments on current projects.
	SU3	My team discusses things on a daily basis and together in a way.
Iterative Delivery	ID1	In each project cycle there is a structure that allows my team and stakeholders to make business decisions about releases.
	ID2	In each project cycle my team has a structure that allows us to make technical decisions about releases
	ID3	In each project cycle my team provides a flow of information about how much work can be completed.
	ID4	In each project cycle my team and stakeholders make decisions together about what will be delivered at the end of the project.
	ID5	In each project cycle my team makes a job forecast to complete each of the job's requirements.

APPENDIX II

Job Characteristic Scale

Construct	Indicator	Item Text
Feedback	FE1	The work I do provides me with information about my work performance
	FE2	The work I do is enough me to do the activities required by the job, to understand how well I am doing the job or not.
	FE3	After completing my work, I know whether I performed well or not.
Task Identity	TI1	The work I do is arranged in such a way that I can do it from the beginning to the end.
	TI2	The tasks I undertake throughout my work give me the chance to completely finish the work I started.
	TI3	The whole and parts of the work I do are arranged in such a way that I can complete it.
Task Significance	TS1	The work I do makes me feel personally important and meaningful.
	TS2	I think the results of the work I do significantly affect the lives and well-being of other people.
	TS3	The work I do feels very important and meaningful in general.
Skill Variety	SV1	The work I do requires taking part in many different projects using various skills and abilities.
	SV2	I feel that the work I do involves diversity.
	SV3	The work I do requires the use of a number of complex or high-level skills.
Job Autonomy	JA1	I have the freedom to plan how to do the work I do myself.
	JA2	I have the freedom to choose which metdods I will perform tasks related to my job.
	JA3	I have the oppourtunitiy to take initiative and use my reasoning ability while performing the tasks required by my job.

APPENDIX III

Job Satisfaction & Turnover Intention Scales

Job Satisfaction Scale		
Construct	**Indicator**	**Item Text**
Job Satisfaction	JS1	I feel satisfied with my work in general.
	JS2	It makes me very satisfied with the work I do at the company I work for.
	JS3	I think my job is enjoyable.
	JS4	I would like to continue doing the job I am doing now in the coming year as well.

Turnover Intention Scale		
Construct	**Indicator**	**Item Text**
Turnover Intention	TR1	Five years from now, I see myself in this company.
	TR2	I am planning to look for a new job.
	TR3	Next year, I am planing to be in a different company than the company I am now.
	TR4	I notice that I ofthen think about changing jobs.