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GRADUATE SCHOOL OF FACULTY OF ENGINEERING AND  
NATURAL SCIENCES



ADOPTION OF AN AGILE APPROACH TO E COMMERCE  
SOFTWARE DEVELOPMENT PROJECTS

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DEVELOPMENT PROJECTS

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<sup>of</sup>  
ADOPTION AN AGILE APPROACH TO E COMMERCE SOFTWARE  
DEVELOPMENT PROJECTS

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“I, Metin Bilen, confirm that the research presented in this thesis is entirely my own work, where the information has been derived from other sources. I confirm that the information provided from other resources has been quoted in the thesis.”



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METIN BİLEN

## **Abstract**

### **ADOPTION OF AN AGILE APPROACH TO E COMMERCE SOFTWARE DEVELOPMENT PROJECTS**

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Master of Science in (MSc) Management Information Systems

Advisor: Doç. Dr. Mehmet Nafiz Aydın

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Companies' business operation methods and processes have been vigorously affected by the reflection of electronic business to economy. Product-focused business model, which is executed by traditional companies, has been changed to customer-driven business model due to the speed and facility of communication among project members. The impact of end-users has been changed in a good way by the computers and mobile devices on e-commerce world. Customers have more power thanks to the increase of alternatives meeting the customer needs, pricing policy executed among competitors, competition to provide services, and ease of access to products. The power of customers has been increased by reason of being digital, and it conducted more demanding and hardly satisfied customer mass. Adopting information technologies to a business process, increasing productivity and speeding up the process has become the main purpose of e-commerce companies. The capability of parallel execution between processes implemented in software projects and e-commerce business process is a curiosity.

This thesis raises the issue of how an agile software development method catches up the same tempo and the same success with the software projects business dynamics. In particular, this research aims to understand the practice of adapting an agile method to various e-commerce software development projects from a framework adopted in method engineering. The framework employs static and dynamic aspects of the fragments of a method along with artifacts and actors types. We conducted a

case study in one of the leading e-commerce companies where many software development projects have been examined extensively. We found plenty of project characteristics with respect to business dynamics, project organizations, and product characteristics which have been essential to understand an extent to which the method fragments have been adapted. This research is an attempt to surface the context in which the method is adapted to the project or vice versa.

Keywords: Agile, E-commerce, Software Project, Project Management, Method Adaptation

## Özet

### E-TİCARET YAZILIM PROJELERİNDE AGILE YAKLAŞIMLARIN UYGULANMASI

Metin Bilen

Yönetim Bilişim Sistemleri Yüksek Lisans

Danışman: Doç. Dr. Mehmet Nazif Aydın

Mayıs, 2015

Elektronik ticaretin ekonomiye yansımalarıyla birlikte, işletmelerin iş yapış biçimleri, iş süreçleri ciddi manada değişmiştir. Geleneksel iş modellerinde uygulanan ürün odaklı yapı, proje üyeleri arasındaki iletişimde hız ve kolaylıklar sebebi ile müşteri odaklı bir iş modelinin uygulanmasını zorunlu kılmaktadır. Bilgisayar ve mobil cihazlar ile birlikte e-ticaret (elektronik ticaret) nihai üreticinin konumu farklılaşmıştır. Müşterilerin ihtiyaçlarına sunulan alternatiflerin artması, rakip firmalar arasında uygulanan fiyat politikaları ve kaliteli hizmet sunma yarışı ve ürüne erişilebilirlik ile birlikte müşteri artık daha çok söz sahibidir.

Tüketicilerin gücü dijitalleşme ile birlikte artarken, daha talepkar, daha zor tatmin edilen bir müşteri kitlesiyle karşı karşıya kalınmış, bilişim teknolojilerinin iş süreçlerine entegre edebilmek verimliliği ve süreçleri hızlandırmak e-ticaret şirketlerinin ana hedeflerinden biri olmuştur.

Yazılım projelerinde uygulanan süreçlerin, e-ticaret iş süreçleriyle birlikte aynı paralellikte yürütülüp yürütülemeyeceği merak konusudur. E-ticaret adı altında genelleşen firmaların temel amacının ticaret yapmak olduğu düşünülürse, yazılım projelerinin ticaret dinamikleri ile ne kadar tempoyu ve başarıyı AGILE ile yakalayacağı konu edilmiştir.

Özellikle, bu araştırma ile e -ticaret yazılım geliştirme projelerinde çevik yöntemlerin adaptasyon süreçlerinin anlaşılması amaçlanmıştır. Agile framework'üne ait kısımlar ve bu framework içerisinde bulunan aktörler statik ve dinamik bakış açısıyla uygulanabilmektedir. Çalışmamızda lider bir e-ticaret şirketine ait birkaç yazılım projesi geniş kapsamlı olarak incelenmiştir. Araştırma sonrasında bazı projelerin niteliği ve ticaret dinamikleri, proje organizasyonu, ürün nitelikleri bakımından metodoloji yöntemlerinin adapte edildiği tespit edilmiştir. Bu

arařtırma yzeyssel olarak hangi metotların projeye yada hangi projelerin yntemlere adapte edilebileceđini arařtırmaktadır.

Anahtar Kelimeler: Agile, E-Ticaret, Yazılım Projesi, Project Ynetimi, Yntem Mhendisliđi

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## **1. Introduction**

This paper examines the case of Company Sigma, which was founded in 2008. It is the first Turkish internet company going global and its office is located in Istanbul (Turkey). Business details of the company are kept confidential throughout the research to assure company privacy. Thus no real names are used in this master thesis.

Growing e-commerce companies should deliver extraordinary customer services. Business needs change rapidly and so how are businesses agile in practice?

Scrum is one of the well known methods or approach, which is characterized by its agile characteristics. According to the annual survey The State of Agile Development, the three top benefits obtained from implementing agile are: ability to manage changing priorities, improved project visibility, and increased productivity. (1) These results motivated Company Sigma to start being Agile too.

This research is focused on adoption of agile method and related fragments into many software development projects in Company Sigma.

The case study primarily focuses on the development processes in a selection of e-commerce software projects, a total of three software projects have been examined. 2 – 4 key developers from each project have been interviewed.

In order to obtain their perception of the development, the agile mapping chart is used to determine which agile practices are presented in the projects. The effects mentioned in the literature review will be investigated if related agile practices are in fact applied.

Inspiring by the research of (2), we analyzed the major method fragments in the Scrum cases seeking an understanding of how these fragments were adopted or adapted in the cases. (3) This analysis revealed two central dimensions that characterize the fragments. The analysis provided two central dimensions in the fragmentation and articulation of evolving agile methodology.

One dimension distinguishes static fragmentation versus dynamic fragmentation as distinguishing characteristics of the fragments. This was more of a criteria for articulation or re-articulation of the method than it was a factor of the criteria for fragment use.

Static fragments are often used or reused without changing the fragment internally. Dynamic fragments are often used or reused only after internal modifications or adaptations. These dynamic fragments were often themselves re-articulated in innovative ways. Dynamic fragments required internal changes before the next re-use in the method.

The second dimension distinguished actor fragments versus artifact fragments. In actor fragments, human autonomy was somehow featured in the fragment. Actor fragments tended to be loosely articulated; imbued with a permissive spirit giving people the latitude to re-arrange their behaviors during the development project. In contrast, artifact fragments suppressed human autonomy; imbued with a restrictive spirit that limited changes in individual behavior during the project.

Together, these two dimensions define four classes of fragments: Process, Objects, Organization, and Articulation.

The following research questions are motivated us to conduct this research:

- Is there any significant difference in the planned and realized agile method fragments in e-commerce system development project?
- What characteristics of software development projects play an important role in adopting agile method fragments?
- What are the organizational factors that affect realization of the method fragments chosen?
- What are the implications of planned and realized method fragment for overall project execution?

## **2. Relevant Research**

### **2.1. The Definition and Scope of E-Commerce**

E-commerce, which is considered as an electronic process of firms, has been defined as the online sales activities of companies. (4) According to a different perspective, e-commerce, which is seen as making deals in an electronic environment, is interpreted as doing all processes electronically in the business transactions. (5)

E-commerce comprises searching, finding the goods, ordering the product, paying and following these processes from the customer perspective, whereas it contains receiving orders, collection of money, despatching the goods and providing the services from for companies' point of view. Therefore, considering it as making and controlling every single online transaction, which has an economic value, will be the appropriate definition. In other words, it does not just consist of buying and selling the goods periods; it also includes searching, controlling, and payment processes. After all, e-commercial can be identified as a commercial style, which enables to run its all processes (from searching to despatching the goods) by using the Internet.

Some factors of the e-commerce match with the perfect competition market such as decreasing the search costs, enabling proper mapping on every subject, and providing perpetual and rapid access to the data. Besides, it has some elements which can result in market failures. (6) For example; the recipient and seller do not know each other, the receiver who may not be sure about the quality of the product, the receiver has to make the payment before the delivery, or sellers may misinform the buyers. In addition, unsatisfactory technology, overpricing goods, price discrimination, and the tendency of monopolism may be caused because of e-commerce.

There are three main forms of e-commerce; which are from business organization to business organization (B2B), from business organization to customer (B2C) and from to customer to customer (C2C). (7) Shortly, its performing part is shaped by the applications which have ability to make transaction via the Internet.

## **2.2. Software Engineering**

The beginning of the modern software basis on the article named “On computable numbers, with an application to the Entscheidungsproblem” was written by Alan Turing in 1936.

John W. Tukey, a statistician in the US, was the first user of the term "software". One of the aims of the software engineering is decreasing the complication of the software development.

Software engineering was defined as using the engineering principles for supplying the trustworthy and efficient applications inexpensively by a conference, which has held by NATO for discussing and identifying the necessary studies on software development in 1968. Despite the improvements on the field of software engineering since 1968, it is still not considered as equal as the other fields. Software engineering is developing complex software systems by using certain principles, methods, tools and specialization; these mentioned properties also consist on a target and system (8).

## **2.3. Software Development Process and Methodologies**

Since developing and servicing complex softwares are quite expensive and hard to execute, any software is developed by software engineers as strictly planned projects. This development plan is named as "software development project". It consists of well-timed, meaningly divided and visualized into stages. Therefore, it is developed step by step and relying on a plan. The stages mentioned above are relevant to each other and that is why there is a connection between them, while the stages are being developed.

Main software development phases are determined as analysis, design, coding, test, and integration. One of the earliest software development tool is flowcharts. Software development methodology did not clearly appear before 1960s. Software development life cycle (SDLC), which is typed for the information system building, can be pointed the oldest methodology for its purpose. In 1960s, the primary goal of this methodology was developing high-scaled business systems to the large companies.

Software development methodologies in respect of software engineering is a framework, in order to enable planning, controlling, and completing the information system development. Every framework needs time to get riped with its powerful and weak sides. A system development methodology may not be suitable for all types of projects. Each methodology

has its own diversity on the technical, organizational, and instrumental elements of the project.

It should not be expected that the software development method will be effective in every project. While it is determined, software projects, and features need to be considered. An unadapted method of a project could be the only reason for failure. Thus, it is really important to know which methodology or phases will be the best solution in which conditions.

The size and know-how of the team, customer profile criticality of implementation, the period of service, and the tendency of agility play an important role for deciding the method, which will be exercised in the project.

Every software development method has its own approaches for the software development.

The outstanding approaches are;

- Waterfall
- Prototyping
- Incremental
- Spiral
- Rapid Application Development(RAD)
- Extreme Programming (XP)
- AGILE Unified Process
- Test-Driven Development
- AGILE Data Method
- Feature-Driven Programming
- Scrum

### **2.3.1. Scrum**

With the usage of “light-weight” and “process framework” statements, scrum is one of the most preferred agile development.

-The process framework enables the harmony between the framework and the process which have to be accured by a specific set of practices. For example, sprints work with the Scrum process framework. The extreme programming framework requires pair programming.

-Lightweight minimizes the overhead of the process, in this way, it is more efficient in terms of time.

The specific categories of Scrum are artifact, time boxes, and roles. These categories enables to indicate Scrum from the agile process on concept and exercise. To be able to manage complex softwares and product development, which is running with incremental and iterative practice, scrum is the commonly used option.

Scrum has same similar advantages with classic waterfall process, such as, saving time and increasing productivity. Scrum process is able to catch and adapt quickly changing necessities; therefore, it matches with the evolving business goals. Scrum provides several apparent profits such as reinforcing the control on the project programme and status, overcoming the changes, enhancing the standards of the deliverables, enabling better predictions on creating, and finally saving time.

After considering the benefits mentioned above, customer satisfaction rates of scrum projects would be convincing.



Figure 1: Scrum Process (9)

A Scrum process has some common terms which are explained below:

**2.3.1.1. User Story**

User Story includes the perspective of the person (mostly a customer or user of a system) who desires the new capability which show up with a simple description feature (10).

**2.3.1.2. Product Backlog (PBL)**

PBL is a prioritized features list in Scrum, all functionality required in the project are listed by PBL with their short description. In the practice, a Scrum team does not require to write down all necessities of the project when a project has started. Scrum team and its product owner begin by list of agile backlog prioritization and this usage plays a very beneficial role on the project. The Scrum product backlog sets an improvement base and it would be changed according to the information about the product and its customers. (10)

**2.3.1.3. Scrum Board**

Scrum board enables the visibility of sprint backlog. When practicing Scrum, all team members could update the task board according to the urgent of the situation; likewise, if a team member thinks of a new task, he writes a new card and puts it on the wall. Estimates would be up or down, the task cards would be relocated around the scrum board on both during and before the daily scrum. (10)

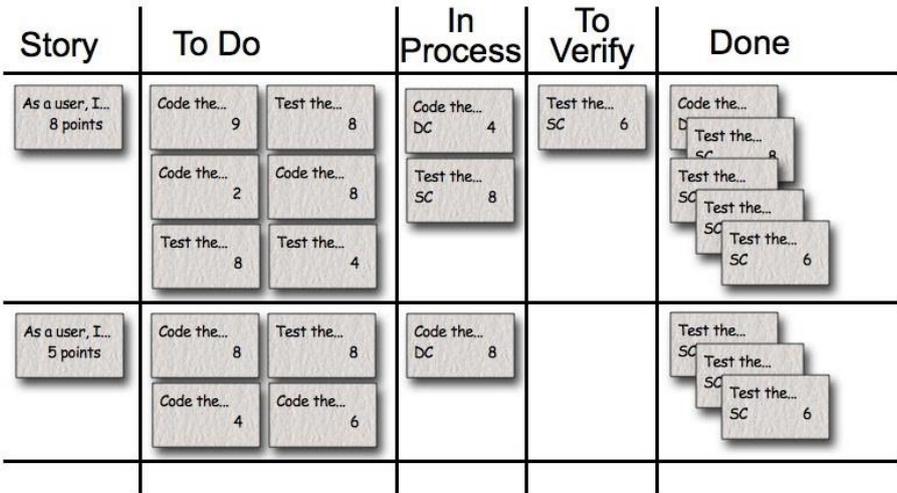


Figure 2: Scrum Task Board

#### **2.3.1.4. Burn-Down Chart**

Burn-down chart is Sprint level progress of completed product backlog items in the Product Backlog. The team follows its progress leaning on a release plan on a release burn-down chart on a Scrum project. The Scrum Master updates the release burn-down chart at the end of the each sprint.

On the chart, the horizontal axis expresses the sprints and the vertical axis expresses the work remaining at the start of the each sprint. The work remaining depends on the teams prefers; for example, it can be shown team days or story points. (10)

#### **2.3.1.5. Scrum Team**

None of the conventional software engineering role such as programmer, designer, tester or architect is involved by a Scrum team in a Scrum environment. For that project, everybody works off energy responsively in order to finish it as fast as possible. This project also helps Scrum teams improve their companionship and make them to feel like they are a crucial part of a community. (10)

#### **2.3.1.6. Product Owner**

The owner of the Scrum product is characteristically a project's significant stakeholder. Some missions of the product owner is to have an imagination of what he or she is willing to create, and pass that imagination to the scrum team. That is very important to begin with flying colors to any agile software improvement project. The owner of the agile product does this partly all the while the product backlog, which is a preferred features list for the product. (10)

#### **2.3.1.7. Scrum Master**

Being liable of making a Scrum team makes sure that it subsists the values and practices of Scrum is the duty of the Scrum Master. What the Scrum Master actually does is coaching for the team and helping it work effectively together. In other words, the Scrum Team is a sort of *process owner* for the team, balancing project's key stake holder, who is counted as the product owner. (10)

### **2.3.1.8. Sprint**

This is a time period, normally continues from 1 week to 4 weeks, in which developments happen to some of backlog items that the team has fulfill to. Also known as a time-box or iteration. (10)

### **2.3.1.9. Sprint Planning Meeting**

In Scrum, the product owner participates in the sprint planing meeting, ScrumMater and the whole Scrum team. External stakeholders might participate in, if invited by the team, even though this is uncommon in most venture.

While the sprint planning meeting is on session, the product owner defines the highest primary features to the team. The team can query the process and they can switch a maximum user story of the product backlog to the tasks explained in detail of the sprint backlog. (10)

### **2.3.1.10. Planning Poker**

Planning poker, also known as Scrum poker, is a technique based on a consensus for estimating, commonly used to estimate endeavor or relative size of development purposes in software development. In that technique, group members estimate by playing numbered cards staying face-down to the table, instead of speaking loudly. When the cars are revealed, the estimates made by members become a discussion subject. The group could prevent the conceptional prejudice of anchoring, where the first number that is spoken loudly establish a precedent for the following estimates, by hiding figures in this manner. (10)

### **2.3.1.11. Daily Scrum Meeting**

In Scrum, on a daily basis of a sprint, the team organizes a daily scrum meeting called ‘daily scrum’. Meetings are typical and organized in the same location and at the same time every day. Optimally, a daily scrum meeting is organized in the morning. These scrum meetings are exactly time-boxed to 15 minutes. This keeps the debate alive but related. (10)

### **2.3.1.12. Sprint Review Meeting**

In Scrum, each sprint required to provide a potentially portable product augmentation. That is to say that at the end of each sprint, the team has produced a coded, tested and available piece

of software. Eventually, a sprint review meeting is organized after each sprint. What is shown during this meeting is that the accomplishment of the Scrum team during the sprint. (10)

**2.3.1.13. Sprint Retrospektif**

An improvement opportunity stands always there notwithstanding how good a Scrum Team is. Even though a good Scrum team will be looking for improvement opportunities all the time, the team should allocate some time with complete dedication at the end of each sprint in order that they can contemplate over how good they are doing and search for ways to improve. This happens in the course of the sprint retrospective. The sprint retrospective is usually done as a final step in a sprint. (10)

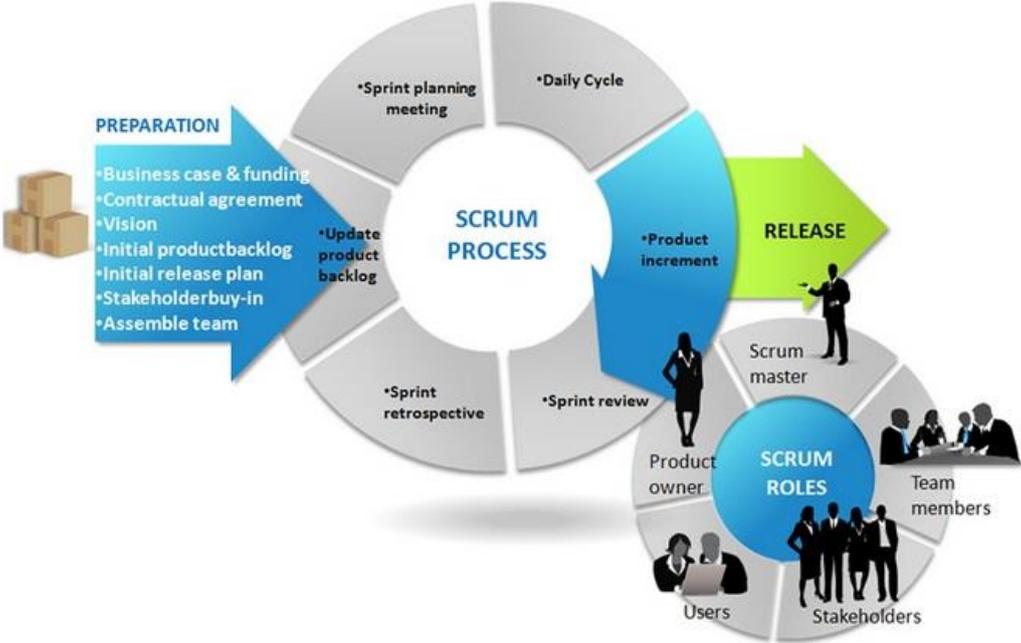


Figure 3: Scrum Roles and Process (9)

**2.4. Project Management Approaches**

A project is a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates a definite beginning and end. The end is reached when the project’s objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists. Temporary does not necessarily mean short in duration. Temporary does not generally apply

to the product, service, or result created by the project; most projects are undertaken to create a lasting outcome. (11)

The way of satisfying the project requirements consist of project management, which includes data, tools, skills and techniques to project activities. It is carried out through the proper application and integration of the rationally grouped project management process composing of the 5 Process Groups.

5 Process Group are mentioned above;

- Initiating,
- Planning,
- Executing,
- Monitoring and Controlling,
- Closing.

Typical project management contains:

- Requirements of identification,
- Painting the several needs, concerns and anticipation of the stakeholders in accordance with agreed project,
- Balancing the competing project constrains. There are 5 including elements of it:
  - Scope,
  - Quality,
  - Schedule,
  - Budget,
  - Resources,
  - Risk

Organizations with the project management approaches would be able to accomplish projects efficiently; it also enables to overcome internal constrains and dynamic external situations in the interim. Internal project constrains could be prevented or removed by organizations with project management, which also provide adaptation to unexpected changes in project scope or goals. A standard project management approach or combine multiple approaches would be the options to adopt for an organisation. There are various approaches;

- The traditional approach

- PRINCE2
- Critical chain project management
- Process-based management
- Agile project management
- Lean project management
- Extreme project management
- Benefits realization management

Another increase in project success rates were shown at the 2012 CHAOS results. All projects succeeding (delivered on time, on budget, with required features and functions) saw 39%. On the other

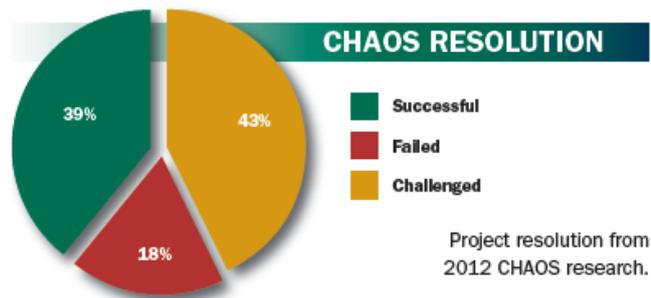


Figure 4: Software Project Success Chart (12)

hand, it were challenged (late, over budget and/ or with less than the

required features and functions) and remained 43%. Lastly, there were 18% failed (cancelled prior to completion or delivered and never used). Comparing with the previous study represent on up rise trend in the number of failures. In 2004, only 29%, which was the least point in the five study periods, of the projects were successful. In the history of CHAOS research, the 2013 outcomes show a high watermark for success rates. (12)

The agile process is now indicated as a cure for software development project failure. Basically, it is because the agile process enables to make small projects easier. Moreover, it splits larger projects into sets of smaller projects easier. The key points are the trial and error and delivery of the iterative process.

Any software needs iterative steps and small, focused teams, which are able to ensure the functionality in iterations (also known as a steppingstone). Lastly, the iteration activity provides a remarkable visual and practice check.



Figure 5: Project Resolution Results (12)

### 2.4.1. AGILE and Principles Behind the Agile Manifesto

Agile project management (agile management) is a method managing the design and builds activities for engineering, information technology. Also, it has a highly flexible and interactive manner for new product or service development projects.

Since the activities continue for the duration of the project, as long as there are features to build, and the means to deliver them, an agile project does not include analysis, design, coding and testing activities.

Although it is undeniable that the requirements may change, traditionally changes have been avoided in a software project because of cost matters. However, agile objects this idea and believes the cost of change can be stabilized.

There was an important meeting at Snowbird resort Utah on February of 2001. 17 software developers gathered together and discussed lightweight development methods. "Manifesto for Agile Software Development" was published by them after the meeting.

Development:

"We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

- Individuals and interactions** over processes and tools,
- Working software** over comprehensive documentation,
- Customer collaboration** over contract negotiation,
- Responding to change** over following a plan.

That is, while there is value in the items on the right, we value the items on the left more. The Agile Manifesto is based on 12 principles (13)

- I. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
- II. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
- III. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
- IV. Business people and developers must work together daily throughout the project.
- V. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
- VI. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
- VII. Working software is the primary measure of progress.
- VIII. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
- IX. Continuous attention to technical excellence and good design enhances agility.
- X. Simplicity--the art of maximizing the amount of work not done--is essential.
- XI. The best architectures, requirements, and designs emerge from self-organizing teams.
- XII. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly. “

#### **2.4.2. AGILE Project Management Frameworks**

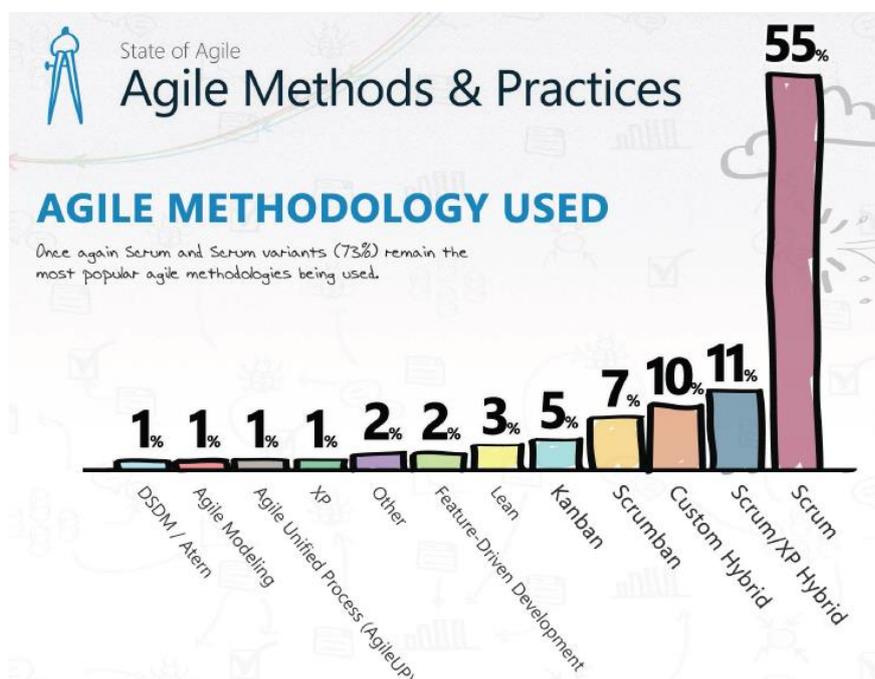
Various specific agile development methods can be found; in addition to that, most promote development, teamwork, collaboration and process adaptability during the life-cycle of the project. Methods/process frameworks of well known agile software development contain;

- Adaptive Software Development (ASD)
- Agile Modeling
- Agile Unified Process (AUP)
- Crystal Clear Methods (Crystal Clear)
- Disciplined Agile Delivery
- Dynamic Systems Development Method (DSDM)
- Extreme Programming (XP)
- Feature Driven Development (FDD)

- Lean software development
- Kanban (development)
- Scrum
- Scrum-ban

There are several aspect of the software development life cycle, and the agile methods are focused on different aspects as well. For example, XP, Pragmatic Programming, and Agile Modelling are focused on the practice. On the other hand, Scrum and some others based on managing the software projects. However, there are still other approaches, which provide the fullest extent of the development life cycle (DSDM, IBM, RUP, etc.). Yet, most of them (e.g. FDD) are suitable for phase specification.

In order to make more informed decisions about software community’s agile initiatives, VersionOne runs the State of Agile survey every single year.



**Figure 6: Agile Methods and Practices (12)**

Since the 73% of all clients use scrum and its variant, they remain the most popular methodologies.

### 3. Research Framework and Method

Scrum methodology is used in this research project as a frequent example of agile methodology. Scrum was originated as The Rugby Approach (14)

This approach uses small cross-functional teams to produce better results. The Rugby theme arose from concepts like “Scrum” and “Sprint” that referred to the game to describe how work was carried out by a team in this approach. We have read and categorized literature on Scrum. (14)

As a result, we identified four objects (abbreviated “N”), three types of organization (abbreviated “O”), and six types of process (abbreviated “S”).

- Objects (N)
  - User story (N1)
  - Product Backlog (N2)
  - Scrum Board (N3)
  - Burn Down Chart (N4)
  
- Organization (O)
  - The team motivated by themselves (O1)
  - Product Owner (O2)
  - Scrum Master (O3)
  
- Process (S)
  - Sprint
    - Sprint Planning Meeting (S1)
    - Poker Planning (S2)
  - Daily Scrum Meeting (S3)
  - Sprint Review Meeting (S4)
  - Retrospective (S5)

The thesis reported in this paper operated from a staged research design (two stages):

- I. The first stage involved a multiple case study with three different projects. Originally, the cases were chosen to study the diffusion and adoption of Scrum methodology.

However, an early finding of the studies was that all e-commerce software project cases had evolved agile methods.

	Projects	Resources
1	Project of Mail Console	I. Project Request Form II. Project Initiation Documentation
2	Project of Debt Card Integration	I. Project Request Form II. Project Initiation Documentation
3	Project of Mobile Application	I. Project Request Form II. Project Initiation Documentation

**Figure 7: Selected E-commerce Software Projects**

Hence, the focus in this paper is to develop a framework that helps explain how developers evolve agile methods during projects. We chose three different cases in order to build a replication logic for contrasting results among the cases. (15)

- II. The second stage created an evaluation engagement in which 9 practicing software developers received an orientation to the framework and were given the opportunity to evaluate its use in appraising the agile method adaptation processes in their own organizations.

We analyzed the major method fragments in the Scrum cases seeking an understanding of how these fragments were adopted or adapted into the cases. This analysis revealed two central dimensions that characterize the fragments. The analysis provided two central dimensions in the fragmentation and articulation of evolving agile methodology.

- One dimension distinguishes static fragmentation versus dynamic fragmentation as distinguishing characteristics of the fragments. This was more of a criteria for articulation or re-articulation of the method than it was a factor of the criteria for fragment use. (16)

Static fragments are often used or reused without changing the fragment internally. Dynamic fragments are often used or reused only after internal modifications or adaptations. These dynamic fragments were often themselves re-articulated in innovative ways. Dynamic fragments required internal changes before the next re-use in the method.

- The second dimension ascertained actor fragments versus artifact fragments. In actor fragments, human autonomy was somehow featured in the fragment. Actor fragments were tend to be loosely-articulated; imbued with a permissive spirit giving people the latitude to re-arrange their behaviors during the development project. In contrast, artifact fragments suppressed human autonomy; imbued with a restrictive spirit that limits the changes in individual behavior during the project.

Together, these two dimensions define four classes of fragments: Process, Objects, Organization, and Articulation. Each of these classes is described below (2).

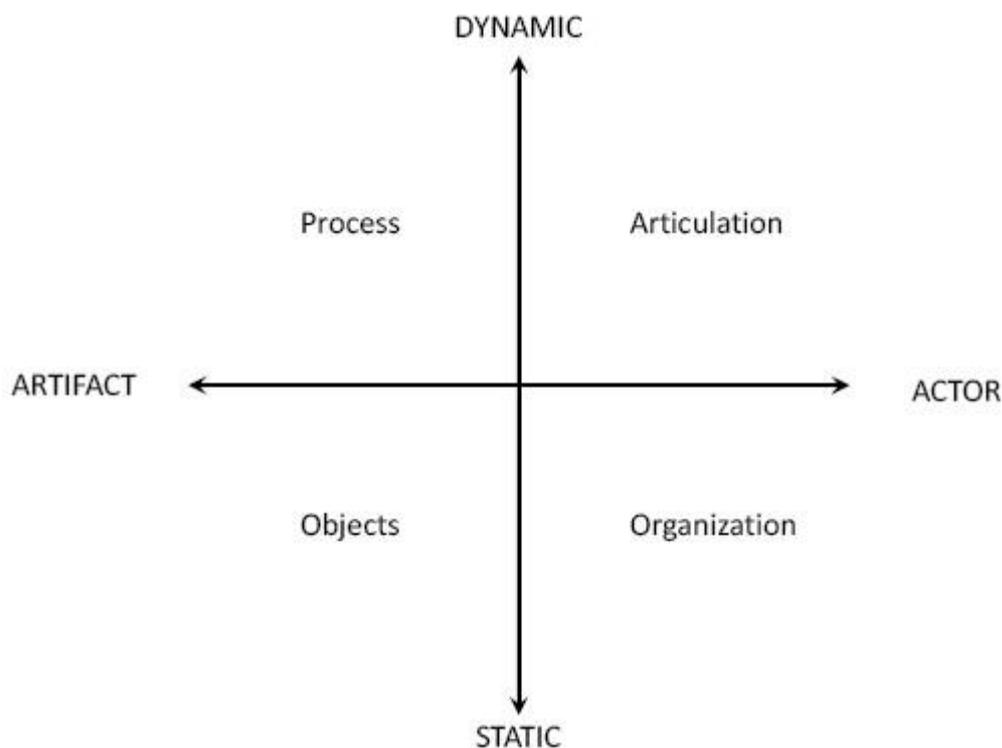


Figure 8: Dimensions of agile fragmentation and Reassembly (2)

## 4. Findings and Discussion

### 4.1. Project of Mail Console

**Project Scope:** During the process of sending information mails to customers of all the domains in the structure of the company, mail addresses of customers stroll among the staff as Excel files. Sending process gets completed in this way. It should be avoided that mail lists go around without a secure medium.

**Analysis:** By the end of analysis;

-A mail sending process was created,

-Mail sending providers were investigated,

-The process was optimized,

-New requirements were determined,

-Mockups were prepared,

-Tasks were determined with the software development team,

-A project plan was created using MS Project,

-All the tasks were opened on Jira Tool,

-Project team was created and the tasks were assigned to the team. There were 6 people in total: 1 Frontend, 2 backend developers, 2 system staff, and 1 project manager.

The project was stopped many times in the process of software development and other projects which have higher priority were completed. The project represented to the management could not get into UAT tests and has been frozen. When the time from the project to be requested to the freezing phase is investigated in the frame of AGILE.

- **Project Objects**

- **User Story (N1):** In this project, the owner of the project is the CEO of the company. User story is described as below by himself.

*“I request that the mails to be sent in the structure of the company to be in a more secure medium. I want an important data such as the mail addresses of*

*my clients to be kept in a secure medium and process of sending mails to be optimized.”*

- **Product Backlog (N2):** The requirements of the product were determined as tasks in the process of analysis.
- **Scrum Board (N3):** At the end of the analysis of the project’s requirements, analysis document was created and development tasks were determined by the document. In the frame of “divide and rule” understanding, small-scale tasks were created. The tasks generated were assigned to development team by opening the tasks as ‘issues’ under ‘mail console project’ title, which is created on JIRA project management tool. KANBAN Dashboard was built thanks to AGILE Plug-in, which is bought together with JIRA Tool. Statuses in the workflow, which is specifically prepared for the project, were defined as columns in KANBAN Dashboard to make it easy to monitor which issue was in which status.
- **Burn-Down Chart (N4):** There was no burn-down chart executed in the project.
- **Organization**
  - **Team motivated by themselves (O1):** The project developer team was created and all the works in product backlog were assigned to the team.
  - **Product Owner (O2):** This project was requested from the IT Department directly by the top management of the company. The IT management gave the “product owner role” to a staff member in the role of traditional project manager.

The requirements were collected, product to cover all deficiencies and optimization of mail sending process, and security of the mail addresses were included to project scope.

The staff to use the new product was determined as the project shareholders. However, these shareholders did not get the project ownership.

- **Scrum Master (O3):** In Scrum, there is no traditional project manager role. However, for Scrum, there was no staff assigned as Scrum manager. The project was carried out by the traditional project manager.

- **Process:**

- **Sprint:** The purpose of Scrum methodology is to deliver the desired product at the beginning in a fast, high-quality, and low-cost way. In Scrum, it is expected that the client-side requests specifications to be developed in 2 or 4 week periods (sprint) and reviewed.
  - **Sprint Planning Meeting (S1):** The assigned jobs in Backlog, which is planned in details, are not prioritized and it is aimed that all jobs to be completed and delivered. The jobs with the prepared project plan using traditional break-down structure are organized according to their connections to each other.
  - **Poker Planning (S2):** The period of time for tasks to be completed is determined with the project team using the point scoring system in scrum methodology. The leaders of the development team gave the estimated necessary effort under the guidance of their experiences and the project plan was created.
- **Daily Scrum Meetings (S3):** Daily scrum meetings were carried out not with the project team itself but with the software development team which was responsible for the same domain and allied to the development team leader. In the scrum meetings, except the project scope, “the works completed yesterday”, “the works to be completed today”, and “the works with possibility to become a problem” were the meeting issues.
- **Sprint Evaluation Meetings (S4):** Sprint evaluation meetings did not happen to be realized because of that product owner was the traditional project manager and the project outcome could not be evaluated in 2-4 weeks.

Although, the works in the product backlog could not be prioritized, the whole project was considered as the outcome. In the process of the project, it is questioned that whether the predetermined tasks in the project plan could be completed and -by daily monitoring the project- it is assured that there is no deviation in the project plan.

- **Retrospective (S5):** Since the sprints are not determined, “retrospective” in the scrum methodology is not applied in the project scope.

N1	N2	N3	N4	O1	O2	O3	S1	S2	S3	S4	S5	TOTAL
1	1	1	0	1	0	0	0	0	0	0	0	4/12

**Figure 9: Agile Score Board of Mail Console Project**

When the project is evaluated in the frame of AGILE/Scrum methodology, it was realized that this methodology was applied at the rate of 4/12 only.

The analysis of the critical situations as a result of applying dynamic adaptation instead of static adaptation in the scope of AGILE methodology to the problems encountered during the process of the project.

**Product Owner Role (O2):**

The projects managed by the product owner role caused the development process to stop many times since they had the priority. The project plan was overhauled 7 times and new deadlines were determined. Lastly, the project was out of project portfolio due to not being included to the budget of the following year.

**Sprint Planning Meeting (S1):**

Since the whole project was not divided into sprints and the new changes coming with the demos created after all the tasks were completed, they could not be adapted to the project fast enough. Thus, it took time for these changes to be applied to the whole project.

**Poker Planning (S2):**

Not everyone in the project team reported about how long it takes to complete the work, even though AGILE methodology suggests to do so. The leaders of the development team defined

some estimated time to complete the tasks based upon their experiences. However, the delivery process of the tasks was extended for the reason that the assigned staff was not competent as much as the leaders are.

**Daily Scrum Meetings (S3):** Since the product owner role was not applied as in the way of AGILE methodology suggests, daily meetings were not carried out and this caused some developed specifications to be taken out of the project. Hence, more energy was extended than it is required for the project.

**Summary:** Adaptation of the product owner role with dynamic adaptation way instead of static adaptation way in AGILE methodology caused S1 and S3 static adaptations under the title of the process not to be applied. The process could not be carried out in the way AGILE methodology suggests, it affected the project in a negative way.

Project teams think that documentation is good for a project to start. However, developing a project without dividing it into sprints causes change requests afterwards. The staff in the project team considers the changes as a nature of their work. Even though they get overwhelmed with the changes, they think it is a part of their work. Although the method to be used in the project is Agile methodology, this information was only shared between the top management and the project manager, but not with the project team. The team thinks it is better to give the product owner role to someone with the same level with them, not only for the following the work but giving the right format and explaining the work in the right way. The team requests all the product backlog to be shared with them. However, they are not aware of these requests are the process determined by the framework in advance. Also, they want works in product backlog with sprints, specific sprint backlogs to be created. In addition, they want to complete their work by spending less effort. All these requests show that the team has lack of experience about the project management methodologies and frameworks. Thus, the effect of the company culture over project management came to light and –in case the company starts AGILE, and Scrum changes with the necessary trainings- it will be understood that the main purpose is not only making development and creating a product, but completing a high-quality work with working discipline.

## 4.2. Project of Debt Card Integration

**Project Scope:** For online payment tools, in addition to credit cards, it was requested to use debit cards. The request was announced by the product owner by defining the request for the work and calculating the income to get.

**Analysis:** By the reports taken by the product owner, it was determined which banks' debit cards to be used in the request. For this reason, making contact with the IT departments of corresponding banks, and integration documents were requested.

-The tasks to be applied to the website were requested after the investigation of the documents.

-Design regulations were made by front-end and were assigned to the web design team.

-The tasks to be made by both back-end and front-end team were determined after the approval of design works.

-A project plan was created by MS Project.

-The tasks were created on Jira Tool.

-The project team was created: 1 Developer, 1 Backend Developer, 1 Frontend Developer, 1 Project Manager, 1 Web Designer, 5 in Total.

After the project was completed, it was sent for UAT tests. The test was accomplished, and the project was taken to live medium.

When the process from request to live was investigated in the frame of AGILE;

- **Project Objects**

- **User Story (N1):** In this project, the product owner is coming through "Product Management Director" role. User story is defined by his words as below:

*"In the structure of the company, under X domain, debit card option will be given to the clients to offer an alternative payment tool. In the borders of Turkey, clients having no credit card but an ATM card will create a new client portfolio."*

- **Product Backlog (N3):** The necessities of the product were determined as the tasks in the analysis process.
- **Scrum Board (N3):** After the project necessity analysis, the analysis document was created and development tasks were defined under the guidance of analysis document. In the frame of divide and rule understanding, small-scale tasks were created. The tasks defined were assigned to the development team by creating issues under “Debit Card Project” on Jira Tool. Thanks to Agile Plug-in bought with Jira Tool, KANBAN Dashboard was created. Statuses in the workflow which is specifically prepared for the project was defined as columns in KANBAN Dashboard and it was easy to monitor which issue was in which status.
- **Burn-Down Chart (N4):** There was no burn-down chart executed in the project.
- **Organization:**
  - **Team motivated by themselves (O1):** The project developer team was determined and all works in product backlog were assigned to the team.
  - **Product Owner (O2):** The staff with the role of product management director had the role of product owner.
  - **Scrum Master (O3):** In Scrum, there is no traditional project manager role. However, for Scrum, there was no staff assigned as a Scrum manager. The project was carried out by traditional project manager.
- **Process:**
  - **Sprint:**
    - **Sprint Planning Meeting (S1):** The assigned jobs in Backlog, which is planned in details, are not prioritized and it is aimed that all jobs to be completed and delivered. The jobs with the prepared project plan

using traditional break-down structure are organized according to their connections to each other.

- **Poker Planning (S2):** The period of time for tasks to be completed is determined with the project team using the point scoring system in scrum methodology. The leaders of the development team gave the estimated necessary effort under the guidance of their experiences and the project plan was created.
- **Daily Scrum Meetings (S3):** Daily scrum meetings were carried out not with the project team itself but with the software development team which was responsible for the same domain and allied to the development team leader. In the scrum meetings, except the project scope, “the works completed yesterday”, “the works to be completed today”, and “the works with possibility to become a problem” were the meeting issues.
- **Sprint Evaluation Meetings (S4):** The product owner was informed during the milestones of the project. But it was a process carried out by traditional project manager. Sprint evaluation meetings did not happen to be realized because of that product owner was the traditional project manager and the project outcome could not be evaluated in 2-4 weeks. Although, the works in the product backlog could not be prioritized, the whole project was considered as the outcome. In the process of the project, it is questioned that whether the predetermined tasks in the project plan could be completed and -by daily monitoring the project- it is assured that there is no deviation in the project plan.
- **Retrospective (S5):** Since the sprints are not determined, “retrospective” in the scrum methodology is not applied in the project scope.

N1	N2	N3	N4	O1	O2	O3	S1	S2	S3	S4	S5	TOTAL
1	1	1	0	1	1	0	0	0	0	0	0	5/12

**Figure 10: Agile Score Board of Debt Card Integration Project**

When the project is evaluated in the frame of AGILE/Scrum methodology, it was realized that this methodology was applied at the rate of 5/12 only.

The analysis of the critical situations as a result of applying dynamic adaptation instead of static adaptation in the scope of AGILE methodology to the problems encountered during the process of the project.

**Sprint Planning Meeting (S1):** It was aimed that the project not to be divided into sprints, but all the tasks of the project to be completed and the project to be delivered. Since the product owner was informed during all the project process, all the works were completed as it was planned before. Static sprint meetings were not carried out as AGILE methodology suggests but it was also avoided to go out of the plan with integrated monitoring system belonging PMI (Project Management Institute) methodology.

**Poker Planning (S2):** Not everyone in the project team reported about how long it takes to complete the work, although AGILE methodology suggests to do so. The leaders of the development team defined some estimated time to complete to the tasks based upon their experiences. However, since the staff assigned for the project was competent as the leaders are, tasks were completed as it was planned.

**Daily Scrum Meeting (S3):** The meetings AGILE methodology suggests were not carried out statically. Sprint Planning Meetings and Daily Scrum Meetings were combined dynamically. It was managed dynamically with the project monitoring process in the scope of PMI methodology.

**Scrum Master Role (O3):** As this role was not adapted to the project as AGILE methodology suggests, it was also not considered to adapt a different role in a dynamic way. The project was managed with the role of the traditional project manager as PMI project management methodology recommends. The project manager, in the way PMI project

managements methodology offers, carried out the processes of “Launcing”, “Planning”, “Implementation”, “Monitoring and Controlling”, and lastly “Closure” and enabled the project to be succesfully completed.

**Summary:** The product owner worked with the staff together in all the processes of the project supported at every stage. Even though the rituals of AGILE methodology were not implemented correctly, not in the scope of scrum meetings, the project was accomplished with the traditional project shareholder information process. Poker planning (S2) process is not implemented either in dynamic or static way that showed this methodology is actually implemented to increase the reality possibility of the estimated efforts made by the developer team. In this project, the fact that since the developer was experienced enough to avoid going out of the estimated effort plan by the leader of the developer team.

#### **4.3. Project of Mobil Application (Android/IOS)**

**Project Scope:** A e-commerce company serving over website wanted to give service on mobile platforms as well to adapt developing technology. Thus, Android and IOS applications were requested to be developed.

**Analysis:** The request owner is the top management. All the functions of the website will be included to the Android and IOS applications.

-The necessary functions to compile API for data to offer users in the applications to be able to be used through the substructure of the website were determined.

-The interfaces to be in the mobile applications were designed.

-The API software was completed.

-Since the hired senior software davelopers were working in a different domain, the application development part of the project was outsourced.

-The scope of the project was seperated into phases and the work priorities were determined.

-The predetermined works were opened via Jira Tool and assigned to the developer team.

-The project was launched with 1 Designer, 1 Backend Developer, 1 Project Manager, and an outsource company.

-The project was completed part by part accomplishing the first ones and prioritized the works and opened for the clients to use.

-The project was sent to UAT tests and accomplished the tests, taken to live medium afterwards.

When the process from request to live was investigated in the frame of AGILE:

- **Project Objects**

- **User story (N1):** In this project, the owner of the project is product management director. User story is described as below by himself.

*“Our e-commerce company serving over the website wants to give service on mobile platforms to adapt developing technology and requests Android and IOS applications to be developed.”*

- **Product Backlog (N2):** The requirements of the product were determined as tasks in the process of analysis.

- **Scrum Board (N3):** At the end of the analysis of the project’s requirements, analysis document was created and development tasks were determined by the document without project scope document and small-scale tasks were created. The tasks defined were assigned to the development team-by opening the tasks as ‘issues’ under ‘IOS Project’ and ‘Android Project’ titles, which are created on JIRA project management tool. KANBAN Dashboard was created thanks to AGILE Plug-in which is bought together with JIRA Tool. Statuses in the workflow which is specifically prepared for the project was defined as columns in KANBAN Dashboard, and it was easy to monitor which issue was in which status.

- **Burn Down Chart (N4):** There was no burn-down chart executed in the project.

- **Organization:**

- **Team motivated by themselves (O1):** The project developer team was created and all the works in product backlog were assigned to the team.
- **Product Owner (O2):** The staff with the role of project manager had the role of the product owner.
- **Scrum Master (O3):** Scrum Master Role was carried out by the IT director.
- **Process:**
  - **Sprint:**
    - **Sprint Planning Meeting (S1):** The assigned works in the product backlog, which is planned in details, were prioritized and divided into phases.
    - **Poker Planning(S2):** The period of time for tasks to be completed is determined with the project team using the point scoring system in scrum methodology. The assigned staff determined the estimated effort needed by themselves.
  - **Daily Scrum Meetings (S3):** Daily scrum meetings were not carried out in the scope of the project.
  - **Sprint Evaluation Meetings (S4):** Sprint evaluation meetings were not carried out in the scope of the project.
  - **Retrospective (S5):** Since the sprints are not determined, “retrospective” in the scrum methodology is not applied within the project scope.

N1	N2	N3	N4	O1	O2	O3	S1	S2	S3	S4	S5	TOTAL
1	1	1	0	1	1	1	1	0	0	0	0	7/12

Figure 11: Agile Score Board of Mobile Application Project

When the project is evaluated in the frame of AGILE/Scrum methodology, it was realized that this methodology was applied at the rate of 7/12 only.

The analysis of the critical situations as a result of applying dynamic adaptation instead of static adaptation in the scope of AGILE methodology to the problems encountered during the process of the project.

**Poker Planning (S2):** Not everyone in the project team reported about how long it takes to complete the work, although AGILE methodology suggests to do so. The developer team defined some estimated time to complete the tasks based upon their experiences. However, since the staff assigned for the project was competent, tasks were completed as it was planned.

**Daily Scrum Meeting (S3):** The meetings AGILE methodology suggests were not carried out statically. They were managed dynamically by the scrum master with project monitoring process.

**Scrum Master:** This role was adapted statically as AGILE methodology suggests. However, the traditional project manager also took place in the process of the project as PMI project management methodology offers.

The project manager, taking place in the stage of creating API, in the way PMI project managements methodology suggests, carried out the processes of “Launcing”, “Planning”, “Implementation”, “Monitoring and Controlling”, and lastly “Closure” and enabled the project to be successfully completed.

**Summary:** The product owner worked with the staff together in all the process of the project and supported at every stage. The scrum master and product owner monitored AGILE processes statically to complete the predetermined works in the backlog. It was accomplished as planned before.

#### 4.4 Discussion

Is there any significant difference between the planned and realized agile method fragments in e-commerce system development project?

In all three projects examined there was no specific activity concerning determining planned fragments. That is, no formal step was observed for deciding on planned fragments. Thus, the difference between planned and realized fragments is not relevant to the cases examined. One may conclude that realized fragments were based on unwritten rules or common practice in the organization.

What characteristics of software development projects play an important role in adopting agile method fragments?

The size of a project team, know-how of the team, and customer profile associated with product owner play a significant role in adopting software development methods.

What are the organizational factors that affect realization of the method fragments chosen?

Lack of the product owner and scrum master roles caused organizational problems before the agile adopting of the self-motivated team. One may argue that due to the lack of those roles in the company culture, they were used dynamically. Despite their own duties, being the product owner and scrum master by different people makes it impossible to follow agile process in project management without changing the company culture.

What are the implications of planned and realized method fragments for overall project execution?

Embracing agile processes and culture truly requires that people need ongoing support concerning the value of agile transformation, viability of applying method fragments to the ever changing project situation. If this is possible, there will be no difference between static and dynamic adaptation. Nevertheless, given the nature of business environment, complexity of dealing with last-minute changes, static adaptation is not an effective mechanism.

## 5. Conclusion

This research is an attempt to better understand the adoption of an agile method and its relevant fragments (possibly inclusion of contemporary method fragments as well) to three e-commerce system development projects in the companies. We used a framework as a conceptual ground to examine three projects. Such framework is an extension of the dynamic-static perspective on method fragment by adding actor and artifact elements. In this regard, we are able to examine both dynamic and structural aspects of the method and its component thereof.

We observed that agile objects were used statically in the methodology in the company culture. After analyzing the project requests as "user stories" directly, analysis and documentation processes were integrated into the process to prepare the product backlog, although they were not a part of the agile. Product backlog was prepared with waterfall methodology and integrated into the process dynamically. Scrum board was used for monitoring.

Project Name	User Story (N1)	Product Backlog (N2)	Scrum Board (N3)	Burn Down Chart (N4)
Project of Mail Console	1	1	1	0
Project of Debt Card Integration	1	1	1	0
Project of Mobil Aplikasyon (Android/IOS)	1	1	1	0

Figure 12: Crosscheck of Objects

Lack of the product owner and scrum master roles caused organizational problems before the agile adopting of the self-motivated team. One may argue that due to the lack of those roles in the company culture, they were used dynamically. Despite their own duties, being the product owner and scrum master by different people makes it impossible to follow agile process in project management without changing the company culture.

None of the processes to the agile methodologies were used because of the lack of established process, rules, and even common practice (leading to habits) in the company. In this regard,

one can question if and how spirit and fragments of agile method are truly realized in the projects.

Project Name	Team motivated by themselves (O1)	Product Owner (O2)	Scrum Master (O3)
Project of Mail Console	1	0	0
Project of Debt Card Integration	1	1	1
Project of Mobil Aplikasyon (Android/IOS)	1	1	1

Figure 13: Crosscheck of Organization

**Process:**

Project Name	Sprint Planning Meeting (S1)	Poker Planning (S2)	Daily Scrum Meeting (S3)	Sprint Review Meeting (S4)	Retrospektif (S5)
Project of Mail Console	0	0	0	0	0
Project of Debt Card Integration	0	0	0	0	0
Project of Mobil Aplikasyon (Android/IOS)	0	0	0	0	0

Figure 14: Crosscheck of Process

In summary, to be able to agile processes and culture embraced truly, people need ongoing support concerning the value of agile transformation, viability of applying method fragments to the ever changing project situation. If this is possible, there will be no difference between static and dynamic adaptation. Nevertheless, given the nature of business environment, complexity of dealing with last minute changes, static adaptation is not an effective mechanism.

Failure to follow agile principles blocks the sprint planning under the process topic while agile objects are being used dynamically. Hence, the object, organization and process steps must be considered together to provide agility.

## 6. Appendix

### 6.1. Project of Mail Console Interviews

You joined the project as a frontend developer. This project was mentioned in your master's thesis. Your answers given to the questions below will be analyzed in the thesis.

(Frontend Developer: YI)

1. How long have you been working in IT sector? Have you been working as frontend developer since you started your professional career?

*I have been working for 3 years in this sector. Actually I have been working as a frontend developer but I also worked as a backend developer.*

2. How long have you been working in this company?( and team)

*I have been working for 1.5 years as a frontend developer.*

3. What does this project mean for you? How do you describe it in general?

*The project is a fresh start for me and an opportunity for developing myself*

4. Which tasks have you carried out in this project?

*I have performed to send mails automatically and collectively. These mails used to be re-prepared by us manually before this project*

5. Can you tell us about the positive cases of the project according to you?

*- There was the finished backend coding and I developed the frontend coding upon this.*

*-Project manager was the job-tracker of our works*

*-Document of project was enough.*

6. Can you talk about the negative cases oh the project according to you?

*- I hadn't worked in project like this before.*

*-Time was limited*

*-And project was quite comprehensive*

7. What was the point of these issues? What did you encountered with the project?

*- Project documents had been prepared before coding and my questions had been answered every time by project manager who did job-track on this project. So I didn't lock through the coding step.*

*- I couldn't coding of high quality because of we had limited time in spite of project scope was quite wide.*

*- Lack of sufficient experience was an opportunity for me.*

8. What was the connection to your business of these cases? How did they effect you

and what was the importance for you?

*-This was the first project of mine when I started work in this company. I got used to the culture of I.T team with this project.*

9. Did you have idea about how to develop your part for to complete your tasks?

*-I hadn't .I formed an opinion with document and it was major effect for me.*

10. Have you been informed about a project management methodology to apply?

*-I haven't been .Only, I was informed about it has to be completed in a short time.*

11. If you have been informed about methodology, When was it done and how was it done? Was it done with meeting or after?

*-I haven't been informed.*

12. Was the statement done with inscribed or verbally?

*NA<sup>1</sup>*

13. What happened after? ( conflicts, problems, conditions)

*-Process was done in accordance with the deadlines. However due to the lack of time, reviewing codes took a lot of time. I finished the work in the deadlines but I spent a lot of time for that.*

14. If you assess the project in the terms of the scrum methods (static or dynamic adaptation), what was the reason to use it? In the process, what was the target? Was it suitable for you?

*-In the project, scrum meeting was not done with the product owner. Therefore we couldn't be sure whether the developed functions met the requirements. If we had knew all the details, it would have been much better.*

15. If you faced the same situation, what would you do?

*I would choose the deadline on my own and keep it longer. So I would have much time to review the codes clearly and I wouldn't have to change it much.*

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<sup>1</sup> NA: Not Applicable

You joined the project as a backend developer. This project was mentioned in your master's thesis. Your answers given to the questions below will be analysed in the thesis.

(Backend Developer: FC)

1. How long have you been working in IT sector? Have you been working as frontend developer since you started your professional career?

*I have been working in 7 years. First 3 years I dealt with both frontend and backend developing. After, I worked only as a backend developer.*

2. How long have you been working in this company? ( and team)

*I have been working for 1,5 years in the company.*

3. What does this project mean for you? How do you describe it in general?

*Affecting many parts, relatively bigger tasks.*

4. Which tasks have you carried out in this project?

*I completed all backend coding of e-mail console project.*

5. Can you tell us about the positive cases of the project according to you?

*-Existence of documentation*

*-Dealing frontend tasks by a different team*

*-Being free in terms of code structure*

6. Can you talk about the negative cases oh the project according to you?

*-Lack of time*

*-Deciding the details in the project process, not in the planning period*

7. What was the point of these issues? What did you encountered with the project?

*-Scope of the project was changed while it was in progress but the time was not updated.*

8. What was the connection to your business of these cases? How did they effect you and what was the importance for you?

*-All the change requests were coded by me.*

9. Did you have idea about how to develop your part for to complete your tasks?

*-Yes, I completed similar tasks before.*

10. Have you been informed about a project management methodology to apply?

*-No*

11. If you have been informed about methodology, When was it done and how was it done? Was it done with meeting or after?

NA

12. Was the statement done with inscribed or verbally?

NA

13. What happened after? ( conflicts, problems, conditions)

*-This kind of changes and re-coding of the same parts were difficult for me. But it was ok due to the fact that I used to face them. These are normal in the processes*

14. If you assess the project in the terms of the scrum methods (static or dynamic adaptation), what was the reason to use it? In the process, what was the target? Was it suitable for you?

*-If we had used the scrum, at least with dynamic adaptation, we would have managed all changings much more easily. Possible mistakes would have been prevented at the end of the sprints. We would have complete the project with smaller tasks and that would have avoid coder to focus on the parts one by one to complete the big work.*

15. If you faced the same situation, what would you do?

*-If I wasn't strong enough to change the process, I would complete coding as it is.*

You joined the project as a backend developer. This project was mentioned in your master's thesis. Your answers given to the questions below will be analysed in the thesis.

(Backend Developer: IG)

1. How long have you been working in IT sector? Have you been working as frontend developer since you started your professional career?

*-I have been worked as a backend developer constantly for 14 years.*

2. How long have you been working in this company?( and team)

*I have been working for 1,5 years in the company.*

3. What does this project mean for you? How do you describe it in general?

*Product.*

4. Which tasks have you carried out in this project?

*-I have developed a library that provides communication between mail console and its suppliers.*

5. Can you tell us about the positive cases of the project according to you?

*-Properly separated works.*

*- Explicitly defined job descriptions.*

*- Being other team members experienced.*

6. Can you talk about the negative cases oh the project according to you?

*-Absence of supplier integration document.*

*-Hitches due to provider.*

7. What was the point of these issues? What did you encountered with the project?

*- As a result of properly seperated works and well defined job descriptions i have known what i code. However, technical problems originating from provider extended the process time. Furthermore, nonconcurrency of development test environments retarded the work.*

8. What was the connection to your business of these cases? How did they effect you and what was the importance for you?

*-I have failed to complete my work before its deadline*

9. Did you have idea about how to develop your part for to complete your tasks?

*-Yes, work was clear.*

10. Have you been informed about a project management methodology to apply?

*-No*

11. If you have been informed about methodology? When was it done and how was it done? Was it done with meeting or after?

*NA*

12. Was the statement done with inscribed or verbally?

*NA*

13. What happened after? ( conflicts, problems, conditions)

*-There was a no problem due to well defined work.*

14. If you assess the project in the terms of the scrum methods (static or dynamic adaptation), what was the reason to use it? In the process, what was the target? Was it suitable for you?

*- Project manager represents himself as a project ownerr dynamically. If there was no project manager, project owner wanted his requests from us by a non-techical language.Neither he/she can tell properly what he/she mean nor we understand him/her. Dynamic adaptation was successful with project manager.*

15. If you faced the same situation, what would you do?

- I have known tasks only related with me, i have not known subjects that requested from entire project. If i have known whole project, i could predict something about that. Also i could complete my code-process accordingly. I have only coded what demanded from me.

## 6.2. Project of Debt Card Integration Interviews

You joined the project as a designer. This project was mentioned in your master's thesis. Your answers given to the questions below will be analysed in the thesis.

(Designer: KK)

1. How long have you been working in IT sector? Have you been working as frontend developer since you started your professional career?

*- I have been worked as a webdesigner for 5 years.*

2. How long have you been working in this company? ( and team)

*I have been working for 3.5 years in the company.*

3. What does this project mean for you? How do you describe it in general?

*-Content and presentation*

4. Which tasks have you carried out in this project?

*- Re-designing of payment page*

5. Can you tell us about the positive cases of the project according to you?

*- Project brief was prepared, business plan was known.*

*- Content and text that was used in design was given.*

*- Scope was known, which banks and which card types was known.*

6. Can you talk about the negative cases oh the project according to you?

*-A/B test not done.*

*-There was a no UX process*

7. What was the point of these issues? What did you encountered with the project?

*- Absence of UX caused longer design duration.*

*- Absence of A/B test prevent evaluating of user experience originated from work consequences*

8. What was the connection to your business of these cases? How did they effect you and what was the importance for you?

*- I have failed to complete my work before its deadline*

9. Did you have idea about how to develop your part for to complete your tasks?

*-UX processes had to test with \*prototyping\* before it came however i made the design directly.*

10. Have you been informed about a project management methodology to apply?

*-No*

11. If you have been informed about methodology? When was it done and how was it done? Was it done with meeting or after?

*NA*

12. Was the statement done with inscribed or verbally?

*NA*

13. What happened after? ( conflicts, problems, conditions)

*- There was a problem that not being UX process, this situation took both my time and project manager's time.*

14. If you assess the project in the terms of the scrum methods (static or dynamic adaptation), what was the reason to use it? In the process, what was the target? Was it suitable for you?

*- If meeting was made directly with project manager, UX process had to be discussed in this meetings. However this is not a responsibility of design team. Design team located for performing UX processes which are completed analysis.*

15. If you faced the same situation, what would you do?

*- If I determine the UX process once again, I wish I have demanded additional time*

You joined the project as a Backend Developer Team Leader. This project was mentioned in your master's thesis. Your answers given to the questions below will be analysed in the thesis.

(Backend Developer Team Leader: AK)

1. How long have you been working in IT sector? Have you been working as frontend developer since you started your professional career?

*-For 7 years, I started working with monitoring engineering then continued with backend developing and now I am the team leader.*

2. How long have you been working in this company? ( and team)

*-I have been working for 5 years. I started as a backend developer.*

3. What does this project mean for you? How do you describe it in general?

*- It is a group of works which has a goal and a leader.*

4. Which tasks have you carried out in this project?

*- I did API client implementation and I integrated it into our programme.*

5. Can you tell us about the positive cases of the project according to you?

*For the first time we did not do the analyse. There was a team responsible for that.*

6. Can you talk about the negative cases oh the project according to you?

*-Lack of banks' documents for integration*

*-It was not certain which error would be given for each situation in our system.*

7. What was the point of these issues? What did you encountered with the project?

*- Instead of focusing on development, we spent some time also for analysis in the past. It is better for us to focus on coding only. I also saved more time by getting answers directly to my problems.*

*- We lost time with problems and we lost our passion.*

8. What was the connection to your business of these cases? How did they effect you and what was the importance for you?

*- Prolonged and incomplete works don't satisfy me.*

9. Did you have idea about how to develop your part for to complete your tasks?

*- Yes, it is my job anyway.*

10. Have you been informed about a project management methodology to apply?

*-No*

11. If you have been informed about methodology? When was it done and how was it done. Was it done with meeting or after?

*NA*

12. Was the statement done with inscribed or verbally?

*NA*

13. What happened after? ( conflicts, problems, conditions)

*- It was not a problem for me not to know project management methodology.*

14. If you assess the project in the terms of the scrum methods (static or dynamic adaptation), what was the reason to use it? In the process, what was the target? Was it suitable for you?

*-I cannot answer this since I don't know the details of Scrum. I was responsible at that date for the work and I dealed management. There were not conditions which divide all roles to different people in that project.*

15. If you faced the same situation, what would you do?

*-After reading an article, I think that those project management methodologies are popular sometimes but never proved scientifically.*

### **6.3. Project of Mobil Aplikation (Android/IOS) Interviews**

You joined the project as a Backend Developer. This project was mentioned in your master's thesis. Your answers given to the questions below will be analysed in the thesis.

(Backend Developer: MK)

1. How long have you been working in IT sector? Have you been working as frontend developer since you started your professional career?

*-For 7 years. I worked as a backend developer for 5 years, webmaster and frontend developer for 2 years.*

2. How long have you been working in this company? ( and team)

*-For 4 years I have been working in this company. All these experiences are on backend developing and team leading. Now I am working as backend team leader and search engine server expert.*

3. What does this project mean for you? How do you describe it in general?

*- It is an idea to create a new product or service.*

4. Which tasks have you carried out in this project?

*I improved API endpoints on the website of the IOS mobile application project and I made the website working on more than one layer.*

5. Can you tell us about the positive cases of the project according to you?

*-Unlike SOAP API which I had developed before, I experienced Restfull web services. I improved my knowledge on Python programming language and tastypie framework. I got involved in a mobile application project.*

6. Can you talk about the negative cases oh the project according to you?

*-Lack of time*

*-Disadvantages of working with an outsource company*

*-There was no test processes*

7. What was the point of these issues? What did you encounter with the project?

*-In spite of being planned for months, the project was started immediately and the plans were not followed.*

*-Although there was a deal with the outsource company on common standards, they delayed the project due to the lack of experience.*

*- The software was not developed with a test process due to lack of time and developers, no stress tests were done and that lower the code quality.*

8. What was the connection to your business of these cases? How did they effect you and what was the importance for you?

*-Due to the mistakes in time planning and management, developers lost their motivation and an unoptimized work was done.*

*-Instead of making developments, I gave training to the company about how the common standards to be used. There was already time shortage for the project. I also worked overtime to support the project.*

*We would have expected mistakes and improvement requests to decrease after the project delivery, on the contrary they increased.*

9. Did you have idea about how to develop your part for to complete your tasks?

*-Due to the lack of time and source, we couldn't make the analysis and each task was assigned to me. I dealt them by using my past experiences and making researches.*

10. Have you been informed about a project management methodology to apply?

*-By dividing project into 3 phases, estimated efforts were demanded for each phase and each task. None of the project management methodologies were mentioned.*

11. If you have been informed about methodology? When was it done and how was it done? Was it done with meeting or after?

*-We determined to divide the project into 3 parts in a short meeting. Every phase would last 1 week and every Friday we would evaluate the tasks in the phase.*

12. Was the statement done with inscribed or verbally?

*-There was an oral notice*

13. What happened after? ( conflicts, problems, conditions)

*- Some tasks finished early and some tasks lasted longer than estimated effort. I*

*supported outsource company although they had common standards and documents. Therefore my delivery date was delayed.*

*After development, testing process was delayed because of the outsource company.*

*The work finished 9-10 months later than the planned time.*

14. If you assess the project in the terms of the scrum methods (static or dynamic adaptation), what was the reason to use it? In the process, what was the target? Was it suitable for you?

*-Dividing the project into phases helped us to handle it more efficiently. So we could finish the parts and made some services ready before the whole work was done.*

*We would have divided the project into more phases to have a better result. We would have chosen a software development methodology which was more suitable for testing. In that way, small tasks would have been tested better and the error rate could have been reduced.*

15. If you faced the same situation, what would you do?

*-According to the scope document, I would have divided the project into smaller phases. Then outsource team would have been made progress without waiting for me. The most important part is that with this way we would have behave together for the maintaince issues. If the outsource company didn't have enough experience in the project, at least I would choose the deadlines suitable for them.*

You joined the project as a Project manager. This project was mentioned in your master's thesis. Your answers given to the questions below will be analysed in the thesis.

(Project Manager: MB)

1. How long have you been working in IT sector? Have you been working as frontend developer since you started your professional career?

*- For 5 years I am in IT sector. First 2 years I worked as a project analyst*

2. How long have you been working in this company?( and team)

*-I am working in the same company for 2,5 years.*

3. What does this project mean for you? How do you describe it in general?

*-A project is a work request which has a startpoint and endpoint and is never repeated.*

4. Which tasks have you carried out in this project?  
*-I got involved in the analyse process and managed the project.*
5. Can you tell us about the positive cases of the project according to you?  
*- I gained experience in mobile platform projects.*  
*-I became product owner in the project due to the lack of a real product owner*  
*-I gained experience in outsource source management.*
6. Can you talk about the negative cases oh the project according to you?  
*-Lack of interest of the project owner.*  
*-Incapable developers in the outsource company*  
*-Deadline was decided before specifying project scope so time was not enough*
7. What was the point of these issues? What did you encountered with the project?  
*-I had to make some decisions because the project owner was uninterested. We had some changing requests after finishing the project because of that.*  
*So much time was spent to fix the bugs due to the lack of knowledge of the developers.*  
*Development process was started without analysing process and that caused changing requests a lot.*
8. What was the connection to your business of these cases? How did they effect you and what was the importance for you?  
*- Effort given to the project was more than the expected time. So my other projects were delayed.*
9. Did you have idea about how to develop your part for to complete your tasks?  
*- Yes*
10. Have you been informed about a project management methodology to apply?  
*-No*
11. If you have been informed about methodology? When was it done and how was it done? Was it done with meeting or after?  
*NA*
12. Was the statement done with inscribed or verbally?  
*NA*
13. What happened after? ( conflicts, problems, conditions)  
*- The project was managed according to the company culture. Therefore the project was done after the estimated deadline because of the change requests.*

14. If you assess the project in the terms of the scrum methods (static or dynamic adaptation), what was the reason to use it? In the process, what was the target? Was it suitable for you?

*-Normal project processes were not done in this project. (e.g. open, monitoring etc)All tasks were assigned to the development team without giving estimated deadline and analysis. This process is not suitable for the project.*

15. If you faced the same situation, what would you do?

*-I was adjusts myself to the company culture and I managed the project as it was wanted.*

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