

FACTORS CONTRIBUTING TO THE INTENTION OF USERS TO ADOPT
BEACON TECHNOLOGY SUPPORTED MOBILE FITNESS INSTRUCTOR
APPLICATION IN FITNESS CENTERS

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ABSTRACT

FACTORS CONTRIBUTING TO THE INTENTION OF USERS TO ADOPT BEACON TECHNOLOGY SUPPORTED MOBILE FITNESS INSTRUCTOR APPLICATION IN FITNESS CENTERS

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This study examines the Beacon technology supported Mobile Fitness Instructor Application (BS-MFIA) system based on Mobile Service Acceptance Model (MSAM) which is an extension of Technology Acceptance Model (TAM) by fitness participants in fitness centers. In order to explore predictors of behavioral intention toward BS-MFIA, *perceived ease of use*, *perceived usefulness* (as main factors from TAM), trust, context (from MSAM) were studied. The effect of these on *the intention to use* this system was studied. After pilot study and assuring the validity and reliability of the scale, the items were re-analyzed and the final version of the scale as the research tool was obtained. In the main study, the quantitative data were collected from 210 fitness participants with a questionnaire in two fitness centers of the Middle East Technical University (METU) to test the hypothesized relationship of Mobile Service Acceptance Model. Analysis of the quantitative data using Structural Equation Modeling (SEM) pointed out that perceived usefulness, perceived ease of use, trust and context toward using BS-MFIA play important roles in intention to use BS-MFIA. Thanks to analyzing the user adoption of Beacon technology supported mobile fitness application, this study will contribute to understand how people use and adopt the technology in sports sector.

Keywords

Beacon, mobile service acceptance model, technology acceptance model, intention to use, fitness applications

ÖZ

KULLANICILARIN BEACON TEKNOLOJİ DESTEKLİ MOBİL FİTNESS DANIŞMANI UYGULAMASINI KULLANMA NİYETİNE KATKIDA BULUNAN FAKTÖRLER

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Bu çalışma, Beacon Destekli Mobil Fitness Danışmanı Uygulaması Sistemini (BD-MFDUS) fitness bağlamında Teknoloji Kabul Modelinin (TKM) bir uzantısı olan Mobil Hizmetler Kabul Modelini (MHKM) temel alarak incelemektedir. BD-MFDUS'a yönelik davranışsal niyetin belirleyicilerini araştırmak için, *algılanan kullanım kolaylığı*, *algılanan kullanılabilirlik* (TKM'nin temel faktörleri) ve (MHKM'den) *güven* ile *bağlam* çalışıldı. Çalışmanın temel amacı, bu faktörlerin sistemi *kullanma niyeti* üzerine etkilerini bulmaktır. Pilot çalışma yapıldıktan ve ölçeğin geçerlik ve güvenilirliğini sağladıktan sonra, maddelerin yeniden analizi yapıldı ve ölçeğin en son hali araştırma aracı olarak elde edildi. Ana çalışmada, Mobil Servis Kabul Modelinin varsayılan ilişkisini test etmek amacıyla, ODTÜ'nün iki fitness merkezinde 210 fitness katılımcısından anket ile sayısal veri toplandı. Sayısal verinin Yapısal Eşitlik Modeli kullanarak yapılan analizine göre, algılanan kullanılabilirlik, algılanan kullanım kolaylığı, güven ve bağlam BD-MFDUS'u kullanma niyetinde önemli rol oynamaktadır. Çalışma, Beacon destekli mobil fitness danışmanı uygulaması sisteminin kullanıcı benimsemesini analiz ederek, insanların spor sektöründe teknolojiyi nasıl kullandığını ve benimsediğini anlamaya katkıda bulunacaktır.

Anahtar Sözcükler

Beacon, mobil servis kabul modeli, teknoloji kabul modeli, kullanma niyeti, fitness uygulamaları

This dissertation is dedicated to my lovely and supportive wife, Nilay Dinc Altun who has been a constant source of encouragement during the challenges of graduate school and life.

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LIST OF ABBREVIATIONS

BLE	Bluetooth Low Energy
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
EFA	Exploratory Factor Analysis
GFI	Goodness of Fit Index
HSEC	Human Subjects Ethics Committee
KMO	Kaiser-Meyer- Olkin
METU	Middle East Technical University
MFDUS	Mobil Fitness Danışmanı Uygulama Sistemi
MSAM	Mobile Service Acceptance Model
MSKM	Mobil Servis Kabul Modeli
NFI	Bentler-Bonet Normed Fit Index
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
RMSEA	Root Mean Square Error of Approximation
SEM	Structural Equation Modeling
SRMR	Standardized Root-Mean-Square Residual
TAM	Technology Acceptance Model
TKM	Teknoloji Kabul Modeli
TRA	Theory of Reasoned Action
WHO	World Health Organization

CHAPTER I

INTRODUCTION

1.0 Presentation

This dissertation aims to report on a study that aims to redefine and describe the relationship of modern technologies with the physical fitness behaviors of people in order to serve the fitness sector as well as human health by providing useful and easy-to-use mobile and Beacon technology supported fitness help and spotting the strength and effectiveness of the technologies used underlining the areas of improvement.

The first chapter of this dissertation, the introduction, consists of four sections. The initial section of this chapter provides a background to the study specifying the historical developments that have led the way to this research being conducted. After this background, the second part is allocated to the statement of the problem indicating why this research has been necessary. The third section portrays the aim and the scope of the study which are specified so that the mental map of the study can be drawn. Lastly, the significance of the study is explained in order to locate it in its correct place in the research world.

1.1 Background to the Study

1.1.1 From Web-browsing to Software Applications

Until less than three decades ago, the Internet used to host fewer than a million users. Most of the uses in the early years were through web hosting, which is still a highly used purpose of the Internet. However, in the last decades, with the introduction and extensive and rapid development of mobile devices including mobile phone technology, the Internet has been used for mobile applications that have triggered a drastic change in how and why the Internet is used.

According to Chaffey (2017), who release statistical findings on the use and adaption of the Internet and mobile applications with an aim to help, shape and lead mobile applications, web sites and online marketing sectors, web browsing is losing its popularity paving the way to mobile software applications. The same statistics indicates a tendency to use smaller and more portable devices compared to desktop devices. This displays a decline in the percentage of the use of desktop computers as opposed to an incline in the use of tablet computers and mobile phones to go online. In relation to this finding, the study underlines a huge change in people's use of the Internet claiming that "We are now firmly in the 'app age'." 90% of mobile time is spent on apps (Chaffey, 2014).

Therefore, it would be fair to claim that the popularity and rapid expansion of smart mobile devices are motivated and/or facilitated by the software applications provided in the market (Rao, Troshani, & Rao, 2007).

The change in how and with what devices people go online has also affected why people go online. People started to use mobile applications not only as a substitute for web browsing but also as a part of many basic daily activities. Mobile applications have been used in many areas like an application controlling how well one brushes his/her teeth (used by the mobile hung in the mirror while brushing teeth) or an application which reminds the user to drink water at specific times. This increasing tendency to use mobile devices and software's applications has raised a point of improvement for health and fitness sector in which this technology can well be used and benefitted.

1.1.2 The Health Benefits of Physical Activity, Fitness and Exercise (Physical Activity, Fitness and Exercise: Benefits and Changes)

Over more than half a century scientific and epidemiological studies have been conducted to understand, indicate and speak out the importance of moderately intense physical activity on human health. Despite these intense studies and important positive correlations found between fitness and good health, inactivity is becoming more and more widespread and turn out to be a major cause for many

chronical diseases. With the aging population of the earth, prevention of chronic diseases, as a result, increasing the activity level of the people has become an important point to ponder.

It has been by no means accepted that physical activity is at the core of the very existence of a healthy human being. However, the comfort modern transportation provides people with and the process of urbanization leading people to more office jobs with long work hours have made it necessary for people to prepare deliberate fitness programs and do exercise.

Physical activity is an important guard of well-being in many ways and for many reasons. An important number of recent research indicate that physical activity has a strong power in reducing cardiovascular diseases, especially heart disease (King et al., 1995). Also, enough physical activity is a strong weapon against obesity, and the weight control it provides has long lasting effects. It reduces the possibility of experiencing problems of hypertension and doing a good amount of physical activity ameliorates some chronical diseases like osteoporosis cancer, non-insulin dependent diabetes etc. Physical activity not only creates a positive effect on the body and physical well-being of the people but also improves the psychology of the individual by making the emotional state better and slowing down the aging process.

On the other hand, physical inactivity causes many serious health issues. More than 9% of premature mortality is caused by physical inactivity only; thus, eliminating this factor might increase the life expectancy 0,68 years (I.-M. Lee et al., 2012).

The health benefits of physical activity are, in many scholarly articles, mentioned. However, these benefits are widely accepted; thus, in many sources, it is not mentioned what benefits does physical activity provide people with. The main reason for this is that the benefits of physical activity is taken for granted, which means it is accepted as it is. This level of acceptance which this study does not aim and is not willing to challenge.

On the contrary, this study accepts the health benefits of an active life and ponders about how to improve public health by making every single individual of it more physically active, and as a result, both mentally and physically in a better state.

In order to maximize the benefits of pursuing an active life and diminishing the possible negative outcomes of an inactive lifestyle, there is a detailed recommendations list released by World Health Organization (WHO) (WHO, 2010). These recommendations are informative for those who are unaware of the fact that each person needs a minimum 30-minute moderately intense activity to be healthy. The recommendations also serve as a reminder for those who are fully aware of the importance of physical activity but resists to have an active life (Morrow, Krzewinski-Malone, Jackson, Bungum, & Fitzgerald, 2004). This underlines the possible inconsistency between what people know and what they intend to do.

At this critical juncture, mobile applications act on the stage. Their main job is both to teach and to remind the need for physical activity, closing the gap between the thought about ideals and the real behaviors.

Before mentioning the promising outcomes of customized fitness programs for every single patient or consultant, leisure time physical activity is also worth mentioning. Schnohr (2009) in his study “Physical activity in leisure time: impact on mortality” studied if the mortality reported during sport activities can be referred as a result of the activity done. Especially in the case of sportspeople who are professionals and challenge their limits in sports working hard, there is a claim of less mortality because of many incidents in which young athletics die immediately due to heart attack. The results indicated that mortality is linked with physical activity, however, a moderate level of physical activity is much more desirable than an intense program. It should be noted that mortality is also affected by different variables other than physical exercise. Some examples are age, sex, smoking, plasma total cholesterol, plasma HDL-cholesterol, systolic blood pressure, diabetes mellitus, alcohol consumption, body mass index, education, household income, forced expiratory volume, number of sports activities.

All in all, it can be almost doubtlessly claimed that well-tailored physical exercise routines are of great help to increase the health of individuals and increasing the accessibility of physical exercise programs to all layers of society is an important social innovation as well as improving health and business world.

1.1.3 Effects of Technology and Mobile Technology Usage on Health and Fitness Sector

Technology, creating a revolution in an aspect of life every single day, has increased its momentum over the last decades. Especially, information technology, fostered with mobile phones, has spread over daily life changing the way people chat, shop or even represent themselves. The definition of “phone” has changed from a “talking device” to a more complicated one. A mobile now has to be able to navigate, count the steps and distance someone has walked and inform the owner about the weather conditions. In such a world, it has become inevitable that people started to think of the ways how to integrate this new device –smart phone- and similar technologies into their lives more benefitting from them in as many aspects as possible. That is, people, especially professionals in sports started to contemplate on how to make people benefit more from their mobile phones when it comes to physical exercise.

The ancestors of behavior change support mobile systems have proven to be effective by a couple of studies (Dekker- Van Weering, Vollenbroek-Hutten, & Hermens, 2012; Tabak, Op den Akker, & Hermens, 2014). They functioned by sending reminders to the participants. However, modern technologies provide the participants and service providers more complicated ways to support the users with more tailored and personalized messages. These customized messages are sent by mobile applications on mobile phones or wearable devices like smart watches etc.

As mobile phone applications seem to penetrate to every single cell of people’s lives, they seem to be promising for fitness activities, too. Having been proven

effective by previous studies, mobile applications that aim to create a change in fitness behavior deserves a chance to be studied on.

1.1.4 Development of Smartphone Applications Aimed at Developing Fitness and Exercise

Even before smartphone applications, reminder short messages served to fulfill the role of fitness coaching. The aim of these short messages was to cause an intervention. This intervention started to be managed by websites and e-mails. Even tailored messages or coaching could be provided with the help of these new technologies. However, the most important challenge at this point has been to maintain the effectiveness of the intervention in the long run. It is not surprising to read some reports on how much the effectiveness of such interventions decreases over time (Napolitano et al., 2003; Neville, O'Hara, & Milat, 2009; Norman et al., 2007; Vandelanotte, Spathonis, Eakin, & Owen, 2007). As this has been the greatest challenge, the reasons why the effectiveness decreases need to be analyzed in detail. It has been claimed that the main reasons for this is that the intervention becomes boring and useless because to the unchanging content. The content starts to lose its value as a stimulant (Norman et al., 2007; Vandelanotte et al., 2007).

Keeping this background of the field in mind, the challenge today is to develop ways to expose the users to the interventions that are engaging and long lasting. An important step to achieve this is to understand what affects the users' choice and engagement in these interventions.

This study, which aims to build upon a latest technology mobile application and Beacon technology to monitor and foster the fitness activities of a group of participants, is a new generation intervention. This dissertation aims to understand how and in what ways this new generation type of intervention can be developed, promoted and validated.

1.2 Statement of the Problem

As public health is of great importance for both the academia as well as sports practitioners, any study that has an impact on it needs to be on the spot.

Considering some previous studies that were mostly on web-based informative use of technology (Hur, Ko, & Claussen, 2012; Kwak & McDaniel, 2011), the effect has been verified. However, the dramatic increase in the use of wearable mobile technology made it necessary to evaluate the effect of mobile technologies different from web based online technologies.

Therefore, the main problem that this research addresses is the qualitative insufficiency of the large-scale research in order to build upon the already existing academic research as well as technology. In order for academy not to fall behind what is happening in the world of technology, the studies as such are needed.

Beacon technology can be used to offset high labor costs is by helping gyms and fitness centers to provide automated, virtual training programs. This study aims to achieve conclusions that can provide a foundation for the improvement of Beacon supported mobile fitness services in fitness sectors. As a long-term insight, this study aims to establish guidelines for the evaluation of Beacon supported mobile fitness apps in sports and fitness environments, which significantly affect potential users' acceptance of newly introduced services. In addition, fitness industry that are willing to build mobile fitness apps and integration with Beacon can provide mobile services that are more useful, interactive, easy, and satisfactory for fitness participants.

1.3 Purpose and Scope

Mobile fitness applications and Beacon technology have already started to take over an important place in the lives of the people who devote themselves to fitness either professionally or as an amateur. The main purpose of this study can be analyzed in a couple of sections. The first one is to understand why people use these applications. The second main purpose of this study is to understand how

they use it. With this knowledge in mind, the main and core concern of this study is to understand the user tendencies and turn this information into practical use by proposing ways to improve the Beacon supported mobile phone applications.

In order to understand the effectiveness and the user tendencies, a Beacon supported system called “Beacon Supported Mobile Fitness Instructor Application System” (henceforth BS-MFIA) was developed. This system was developed and applied to be able to provide more valid and reliable data that portrays mobile application acceptance. This data is capable of understanding and developing the ways Beacon supported mobile applications are developed and used.

Buttussi & Chittaro (2008) displays that mobile fitness applications enhance the training and coaching activities. Taking this information into consideration, this dissertation aims to make valuable contributions to physical education literature as well as the distance education in the field by providing scientific findings on an effective way to diminish the boundaries of space and time with the chance of an informal training through mobile technologies.

This study also provides some managerial findings for Beacon technology and mobile fitness application developers as it hopes to provide a better understanding about customer choices and needs. This is likely to result in better supply of the demands in the market and a growing market.

This dissertation aims to understand the effectiveness of Beacon technology and mobile applications on personalized and customized fitness studies. The first theoretical implication of this study is to understand the psychological effects of customized fitness programs on the individuals and the power of these mobile applications. Besides this individual purpose, the scope of this study covers an aim to better social health and decrease some serious health problems caused by lack of physical activity.

Keeping the growing demand and improving supply of Beacon technology, mobile devices and the applications used on them for a variety of purposes

including health and fitness, this research has a promising potential to help understand what triggers and develops the mobile applications and the adoption of them.

Last but not the least, this study aims to contribute to the sport management academia by portraying empirical findings on the adoption of technology in sport and fitness related fields.

The overall objective of the present study is to contribute to the knowledge of why and how people adopt the BS-MFIA. The present study objective is to test a theoretical model to understand actual adoption and acceptance of BS-MFIA.

Based on the Technology Acceptance Model (TAM: Davis, 1989; Davis, Bagozzi & Warshaw, 1989) and Mobile Service Acceptance Model (Gao, Krogstie and Siau, 2011) is employed to understand BS-MFIA users' adoption behavior.

1.4 Significance of the Study

Although mobile applications used on mobiles and wearable devices are attracting more and more attention every day, only few studies have been conducted to understand the long-term effectiveness of these applications.

In other words, this study contributes to the sport management area by providing an empirical example of sport-related technology adoption. To date, there are limited studies have been performed regarding Beacon supported sport-related technology adoption behavior in the domain of sport management area.

It is well known that wearable mobile devices and Beacon technology for fitness and health are growing; this study may serve as a guideline for understanding adoption of other mobile health and fitness technologies.

BS-MFIA helps fitness training and coaching, so this study has the potential to contribute to both sports technology and sports related promotion, intervention literature by providing an empirical example of informal learning of fitness, exercise and healthy lifestyle clues through mobile technology.

Lastly, with a better understanding of factors affecting BS-MFIA users' adoption behavior, current mobile services companies and potential developers can make better products that meet the needs of consumers. In addition, the marketers of Beacon firms can gain deeper insights to develop more effective strategy with the findings of this study.

CHAPTER II

REVIEW OF THE LITERATURE

2.0 Presentation

This chapter aims to cover the most important concepts in the literature along with some key theories, studies and scientific findings which make the study in this dissertation necessary and noteworthy. In order to draw a clear framework of the theories used in the study, “Beacon technology”, its relationship with sports and exercise, “Technology Acceptance Model” and its mobile applications are exquisitely touched upon. Later, a chronicle of some previous studies covering fitness studies and technology acceptance model is provided with an aim to attract attention to what has been done so far, which is important to shed light on what needs to be done next.

2.1 Theoretical Framework of the Study

In this section of this dissertation, some groundbreaking theories, Technology Acceptance Model (henceforth TAM) (Davis, 1985; Davis, 1989; Davis, 1995), the Theory of Reasoned Action (Ajzen et al., 1980; Hale, Householder, & Greene, 2003), Innovation Diffusion Theory (Murray, 2009; Rogers, 1995; Wonglimpiyarat & Yuberk, 2005), Involvement Theory (Zaichkowsky, 1985; Zaichkowsky, 1986) and Self-efficacy Theory (Bandura, 1977; Bandura, 1986; DeVellis, 1983; Schunk & Pajares, 2009) are the basic theories that shape the backbone of this dissertation and of the explanations that ponder the effectiveness and efficacy of mobile phone applications in fitness.

Besides these theories on which the theoretical model of this dissertation is built upon, some new technologies like the “Beacon Technology” is going to be

discussed and its effects on mobile world is studies with an effect to elaborate on the possible effects on the fitness world.

2.1.1 The Theory of Reasoned Action

Throughout history human behavior has been studied in many different aspects. Especially for business sectors, studying the predictability of human behavior has been an important area of research because understanding what can predict one's opinions can guide both what to be researched and developed in business and how these new developments will be presented and advertised.

In psychology, the very influential theory which connects human behavior with previous beliefs and attitudes is called Theory of Reasoned Action (henceforth TRA). TRA is a promising theory as it provides the basic premises that show the link between beliefs and behaviors with the help of perceived behavior control. A decision for a behavior is an intention to do that behavior; thus, this shapes the basic understanding behind TRA.

Fishbein & Ajzen (1975) founded the basics of TRA and developed the theory in the following years with a consecutive set of studies. This theory, different from many other previous ones that focus on intention and behavior, specifically focuses on the behavior and studies the effects of attitude on these behaviors. However, it should be underlined that TRA accepts and foresees some situations that might limit the influence of attitude on behavior. The summary of the theory can be as follows:

The person may or may not be motivated to comply with any given referent. The normative beliefs and motivation to comply lead to normative pressures. The totality of these normative pressures may be termed "subjective norm" (Fishbein & Ajzen, 1975, p.16).

According to TRA, behavioral intentions can be understood by two factors: attitudes and norms. These attitudes and norms can fall in a clash from time to time. *Attitudes* mostly suggest the personal wishes and desires while *norms*

represent what is accepted as normal in the society. Very similar to the definitions of *id* and *superego* by Freud (Cherry, 2014), these two notions (attitudes and norms) can be conflicting and opposites. As a result of this conflict one has in terms of behavioral intent, two questions come to the scene: How important the action is for the person who is likely to be the doer of the action? What do other people think about him/her if she does such an action? The evaluation of these two parameters play a crucial role in behavioral intent.

This theory is of crucial importance for this dissertation because TAM, which makes up the backbone of this study, has been born with the premises put forth by TRA. TRA can help understand behavioral intentions.

Ajzen & Fishbein (1980) claim that “...individuals will intend to perform a behavior when they evaluate it positively and when they believe that important others think they should perform it” (p. 6). That is, what the perceived effectiveness of something is becomes the major factor in creating intention to use it. At this point, the relationship between the main rationale behind this study and TRA becomes clearer.

2.1.2 Technology Acceptance Model

After Fishbein & Ajzen (1975) mentioned TRA, Davis (1985) built upon this theory and put forward the TAM, taking the new technology in consideration and trying to understand the reasons why some new technologies are accepted before the others.

Having mentioned TRA, TAM specifies behavioral intent to computer world and claims to understand “...the effect of system characteristics on user acceptance of computer-based information systems” (Davis, 1985, p. 9).

TAM has been discussed as a result of modern technology like mobile applications, emails and mobile phones. It expanded the understanding of why users adopt some strategies more than the others.

Davis et al. (1989) stated that the goal of TAM was “... to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user population, while at the same time being both parsimonious and theoretically justified.” (Davis, 1985, p. 24).

A summary of TAM can be seen in the following diagram:

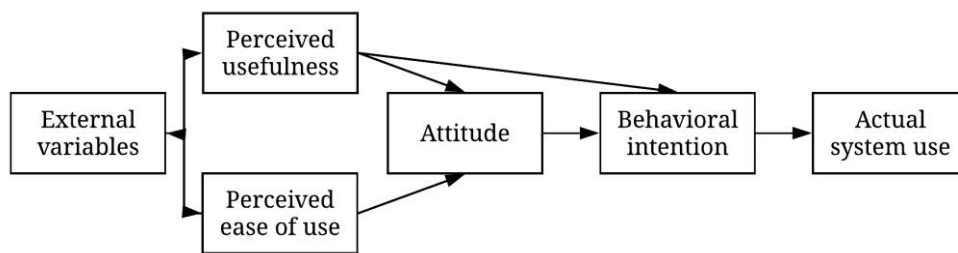


Figure 1. A summary of TAM proposed by Davis (1989)

As Figure 1 illustrates, Davis showed that the main goal of TRA is to understand the relationship among beliefs, their effects, attitudes, intentions and actions; on the other hand, TAM focused on perceived usefulness (henceforth PU) and perceived ease of use (henceforth PEOU) to evaluate what the intent is and what the actual behavior is. According to TAM, the use of a system is directly linked to intention for the act to be done whereas this intent is based relatively on PU.

One’s attitude towards the system is related directly with the PU and PEOU. In addition, considering some extrinsic factors that might be on play, Davis (1985) underlines the likelihood of the effect of situational limitations, individual abilities and the IT used.

The two important terms PU and PEOU are defined by Davis in clear terms. For Davis PU is a “prospective user’s subjective probability that using a specific application system will increase his or her job performance within an organizational context” (Davis, 1985, p. 11). That is, PU is a personal idea about the effectiveness of a system in that it can help the performance or success

improve or the goal be achieved. On the other hand, PEOU can be explained as “the degree to which the prospective user expects the targets system to be free of effort” (Davis, 1985, p. 12). PEOU is about the ease of use while PU is about the possible benefits of a system. PU asks the question why a system is used while PEOU asks the question how easy a system can be used.

TAM is a need for today’s technology world to understand the user reactions and possibilities to use a new system. “TAM is used to provide a basis for tracing the impact of external variables on internal beliefs, attitudes and intention” (Legris, Ingham, & Collette, 2003, p. 9). That’s why all technologies, including the ones developed for health and fitness sectors need to be considered in terms of what has been suggested by TAM. Understanding PU and PEOU can help the technology developers, health and fitness practitioners and the users of technology.

2.1.3 Mobile Service Acceptance Model

Although TAM provides important insights to understand and measure the users’ adoption of new technologies, wearable and portable mobile technologies necessitate deeper, specified and customized measurement tools to understand the customer and user choices.

Although innumerable mobile services and applications are provided to the users each and every day, only a few of these applications can survive in the competitive virtual world of applications. Thus, it becomes more important to find ways to evaluate the user choices regarding mobile applications. The benefits of such a measurement can serve in both ways: the existing mobile services can be reevaluated and developed to serve better and the mobile services that are to-be-released are prepared and designed according to the research findings.

Table 1

Constructs of MSAM (Gao, 2008)

Construct	Description
Context	Context defined as any information that can be used to characterize the situation of entities that are considered relevant to the interaction between a user and application (Greenberg & Saul, 2001).
Personal Initiatives and Characteristics	Personal initiatives can be defined as the user's willingness to try out new applications. Personal characteristics are age, gender, educational background, knowledge and skills, culture and preferences (Gao, Krogstie, & Gransæther, 2008)
Trust	Trust can be defined as user's beliefs or faiths in the degree to which a specific mobile application can be regarded to have no security and privacy threats (Gao et al., 2008)
Perceived Usefulness	The degree to which a person believes that using a particular system would enhance his or her task
Perceived Ease of Use	Defined as the extent to which a person believes that using a particular system would be free from effort.
Intention of Use	The user's likelihood of using the application

Regarding such an important need in the research world, Gao, Krogstie, & Gransæther (2008) developed a scale to measure the adoption and acceptance of mobile services. Benefitting from the already existing TAM and research on mobile applications, a new research model called Mobile Service Acceptance Model has been created. In this model, the insights TAM has provided (PU, PEOU

and intention to use) are used. Moreover, some new constructs (context, trust, personal characteristics and initiatives) that are believed to affect the acceptance of the mobile technology has been added (Gao et al., 2011; Gao, Krogstie, & Siau, 2014; Gao, Moe, & Krogstie, 2010).

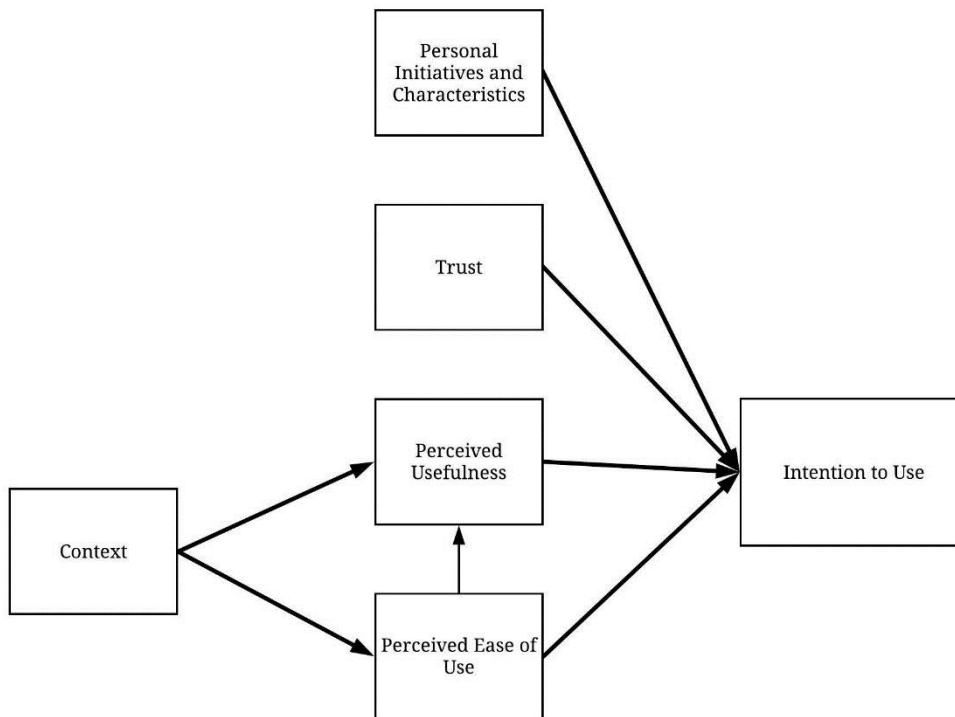


Figure 2. Mobile Services Acceptance Model

The figure 2 above shows the relationship among the constructs of MSAM. According to the model, each single construct is directly related with the intention to use. Although context is only influential on perceived ease of use and perceived usefulness, all four constructs have an important effect on the intention to use the mobile services (Table 1).

2.1.4 Involvement Theory

A series of studies by two leading scientists (Barki & Hartwick, 1994a, 1994b, 2004; Hartwick & Barki, 1994a; 1994b) portrayed the importance of user participation in the use of information systems. They first elaborated on the

previous qualitative and quantitative research to build their research on. They concluded that the level of user participation is doubtlessly of great importance.

Before moving on with the importance of involvement of users the difference between participation and involvement need to be underlined. Participation is mostly about the preparation process of the system. It also covers the quantitative data like the time spent on the activities. That is, participation is the objective data about how much the system is used. However, involvement covers a more subjective, personal and psychological relatedness to the system. Involvement is considered as an important triggering effect to the participation to a system.

Hartwick & Barki (1994) studied the effect of involvement in mobile system use and reached to the conclusion that the involvement levels of users play an important role in how much the system is used and how beneficial the system has been. It can be stated that Hartwick & Barki (1994) validated the widely-accepted previous assumption that in order for a mobile system to be effective and successful, user involvement is crucial.

Involvement theory is important for this dissertation because of the belief that the more the users are involved in the system, the more likely they are to participate in it, and with their active use, there is a higher chance for them to benefit from it.

2.1.5 Self-Efficacy Theory

Bandura (Bandura, 1977; Bandura, 1986b) coined the term self-efficacy to define a person's belief in his/her abilities to successfully complete a specific task. For the purposes of this dissertation self-efficacy is of vital importance as the self-efficacy of one is supposed to be very effective in his/her involvement and achievement in a task. Self-efficacy of the users might have an important play at the use of a mobile system that guides them to physical activities. If the person is less likely to believe in his/her skills in succeeding in an activity, s/he is more prone to feel hesitant to do it.

Perceived self-efficacy that can be defined as

people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave.
(Bandura, 1994, p. 2)

Self-efficacy, though related, should not be confused with self-confidence. Self-confidence refers to one's belief in himself/herself in general. However, self-efficacy is related to one specific task. It is not a generalized trait (DeVellis, 1983). Self-efficacy, together with skills, holds the key to success. Research shows that given the same or similar level of skills, self-efficacy beliefs seem to play a crucial role in determining the final results.

The traits of people with high and low self-efficacy can be defined as polar opposites. "A strong sense of efficacy enhances human accomplishment and personal well-being in many ways. People with high assurance in their capabilities approach difficult tasks as challenges to be mastered rather than as threats to be avoided" (Bandura, 1994, p. 4). Even with the definition of such positive adjectives, one can relate high self-efficacy with success.

In contrast, people who doubt their capabilities shy away from difficult tasks which they view as personal threats. They have low aspirations and weak commitment to the goals they choose to pursue. When faced with difficult tasks, they dwell on their personal deficiencies, on the obstacles they will encounter. ... They are slow to recover their sense of efficacy following failure or setbacks.
(Bandura, 1997, p. 4)

Self-efficacy beliefs create an important effect in the final performance levels and this effect is achieved through four major processes: cognitive processes, motivational processes, affective processes and selection processes.

To start with, self-efficacy beliefs of an individual affects his/her cognitive processes. If the person has high self-efficacy beliefs, s/he imagines or anticipates

the possibility of positive outcomes of an activity like being successful or achieving the task. However, a person with low self-efficacy is more likely to anticipate disasters, failures and feelings of humiliation.

Self-efficacy beliefs affect one's motivation levels with an effects on the goals set, perseverance and reaction to possible failures. Bandura (1997) claims that people with low self-efficacy beliefs are to achieve less and attribute their failures to their lack of abilities. They tend to give up more than the people who have higher self-efficacy beliefs, who set higher goals and attribute the failures to lack of effort.

Self-efficacy and the affective processes are intricately interwoven because the affective processed manage and regulate the emotional reactions people give in specific situations. These reactions are important in determining the success factor. The example Bandura (1994) gives is that people with low self-efficacy beliefs are less likely to control the stressors in their environments and they are more prone to damage their health while the ones with higher levels of self-efficacy are more likely to control the stress factors around them and direct their stress to more health-promoting exercises.

Last and one of the clearest connection of self-efficacy beliefs is the one with selection processes. At the heart of selection processes is the belief in the ability to achieve. That is, people are more likely to choose the activities they believe they can be successful at.

The theory of self-efficacy is to be dwelled on in the theoretical background of this dissertation because the self-efficacy beliefs in the ease of use and the ability to use a mobile system is likely to play an important role in determining whether to use it or not. The understanding of perceived ease of use is a core concern in this study and the theory of self-efficacy. This relation is to be touched upon the in the results and discussion parts of this dissertation.

2.2 Beacon Technology

2.2.1 What is Beacon Technology?

A Beacon is a small device that can be attached to any surface or device and used to convey and decode messages with the other devices around, using Bluetooth technology, which means that Bluetooth of the mobile devices need to be switched on to get the messages given by a Beacon. Because it is a part of low energy mode, Beacons are also called Bluetooth Low Energy (BLE) Beacons.

This technology is used especially in marketing, advertising the products around to the possible customers. As an example, if a prospective customer is walking around some shops that sell clothes, ads about those shops, their new products and the sales are advertised in the prospective customer's mobile. This way, the prospective customer is supposed to be tempted to the product and buy it.

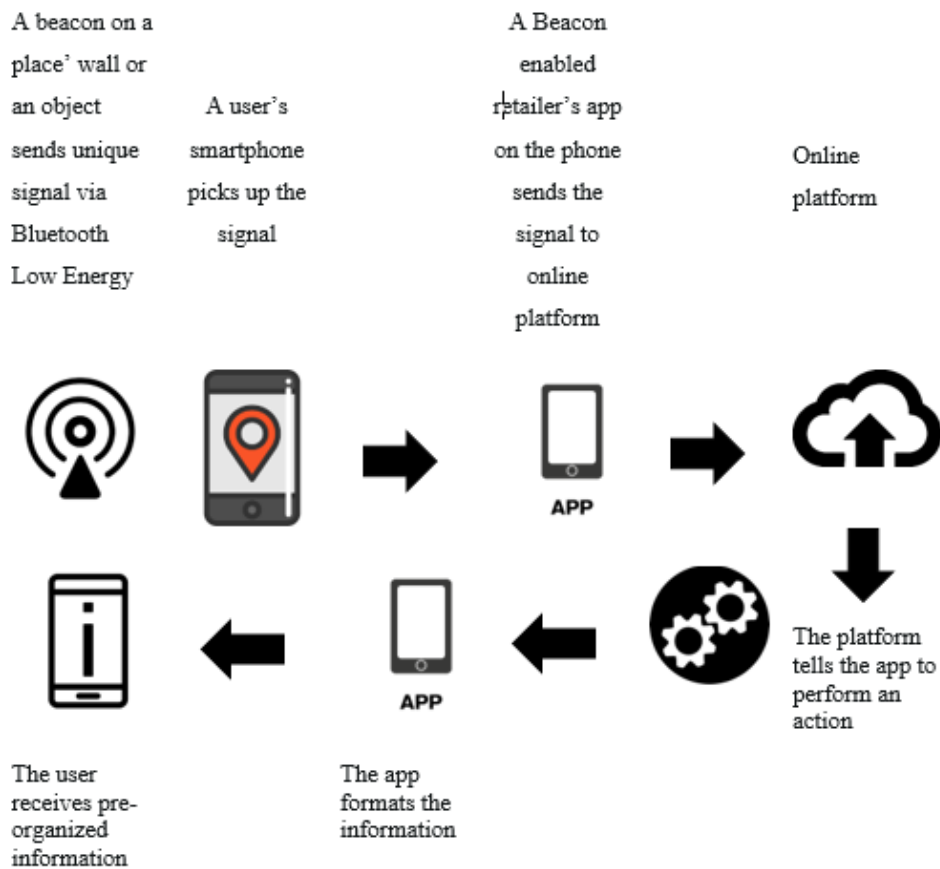
A BLE Beacon gives out messages at certain times with a unique ID. This is a one-way communication because Beacons are prepared to transmit messages but not to receive them. The receiving device is expected to get the data from the signals and perform according to that. Beacons are not yet strong enough to send media content because the maximum load a BLE Beacon can carry is 257 bytes.

There are many advantages of Beacons. Firstly, a Beacon is a cost-efficient device. It is long lasting and not expensive. The second advantage is their availability. Because Beacon features can be used at almost any smartphone, they are easy to find and use. The power in which the device is to broadcast might be adjusted in many devices.

Indoors BLE Beacons are used for similar purposes. Received Signal Strength Indication in the receivers is capable of analyzing the strength of the Bluetooth signal, which makes it possible to identify the distance of the Beacon device to the receiver. This identification helps the users get the right messages in right locations.

There are several types of Beacons in the market now such as iBeacon (2013), Eddystone (2015), LiveBeacon, ONYX, etc. As can be inferred from its name, firstly, the iBeacon was developed by Apple for apple users and there are others for android users developed by companies, as well. Now, there are many Beacons and cloud systems available to be used in different sectors.

Following is a simple figure that summarizes how a Beacon works. A Beacon is placed on a specific location with the purpose of sending messages to the targeted devices. When the targeted device is physically close to the Beacon, it sends the signals. The targeted device (the participant's mobile phone in this specific context) receives the signal. Then, the Beacon, which is enabled, sends the signal to the online platform using a cloud. The platform stimulates the application to perform the pre-determined action. Later, the application formats the information which has been the core objective of this system and sends it. The participant receives the customized information.



□

Figure 3. How a Beacon works

2.2.3 How to Benefit from Beacon Technology in Fitness

Until very recent years, the only interjection of technology and fitness was considered to be the machines used for fitness. However, smartphones made it possible to integrate technology into every single moment of fitness experience in a variety of ways.

Similar to many other sectors, gyms can use Beacons to analyze the customers' use of fitness center equipment, facilities and other amenities. As an example, Beacons can help the fitness center managers understand and analyze which exercise machines are the most commonly used. Thus, they can organize and plan the center and its equipment accordingly. Beacons allow the managers of fitness centers to provide better supplies of amenities by providing statistical data on the

customer demands. Some of the benefits of Beacon technology in fitness centers can be listed as proximity marketing, customized and personalized messaging and automatic check-in. The first benefit, proximity marketing can be exemplified with a juice bar that is advertised to the customers when they pass by. Beacons turn the mobile phones into billboards that advertise specifically to the possible customer and anyone who exercises in the gym is a potential customer for the juice. The second possible use is customized and personalized messaging. To illustrate, if a user frequently attends to some classes, s/he can be informed about the upcoming classes of the like. Personalized diet programs, group exercise invitations or personalized coaching can be provided using Beacon technology. Another, but definitely not the last, possible use of Beacons is automatic check-in. The technology makes it possible for the customer to check in the fitness center without any other effort.

2.3 Previous Studies

The literature review part of this dissertation is to be divided into three sections. The first part is going to focus on the studies that look for the use of mobile applications and the acceptance of these applications in different areas. The second part will focus on the studies that search the Beacon technology used in different walks of life. The last but not the least part of the literature review will provide a chronicle of studies that focus merely on mobile applications and Beacons used in fitness and health. This last section is the most related but the rarest studied part, which underlines the need for research in this specific area and emphasizes the importance of this dissertation.

There are quite a lot of research on TAM and MSAM applied in a variety of fields. From education to medicine, there has been quite many fields that used mobile technology for developmental and business concerns. To start with some preventive medicine research has been conducted. Fukuoka, Gay, Joiner, & Vittinghoff (2015) studied the effect of a mobile application on the prevention of diabetes. They studied on 61 overweight adults and provided an intervention in their exercise program with a mobile application decreasing the in-person sessions

with trainers and replaced the sessions in group with home sessions that required self-monitoring and mobile application-based exercise. The results, despite showing no significant effect on the glucose levels, indicated a statistically important weight control which provides promising results with larger studies as well.

An important study is conducted to prepare a baseline measurement device for the further research on adoption of mobile services. Gao et al. (2011) aimed at preparing a scale to measure the perception of users on mobile services. The scale was prepared using some existing scales from the instruments used before and some additional items have been added. A group of 25 participants piloted the scale and the final 22 items have been extracted. The results indicated a strong reliability on the part of the scale.

Following their own measurement device another empirical study is conducted by Gao et al. (2014) to propose mobile services acceptance model. This research has groundbreaking hypotheses proposed to investigate the adoption of mobile services at a Norwegian University. The proposed model and the hypotheses were tested quantitatively through a questionnaire collected from the users of mobile services. The findings validated and enhanced the proposed research model and hypotheses. Also, the findings underlined that the most important variable that influenced the results were personal traits and initiatives taken.

TAM is a follow-up finding on TRA (Ajzen et al., 1980). However, this extension and its limitations have been discussed by many researchers (Benbasat & Barki, 2007). On the other hand, many other researchers believed in the need to extend TAM to portray a better model (Legris et al., 2003). Another criticism directed to TAM is that TAM is not comprehensive enough to explain and reflect the factors that shape the contextual and technological factors that might influence the acceptance of mobile technologies by the users (Moon & Kim, 2001). Thus, despite being validated, PU and PEOU are effective but not enough to fully describe the user's adoption of mobile services. This inadequacy has been validated by many former studies as well.

As an example, Wu & Wang (2005) studied other factors that might have an effect on user adoption of mobile services. Their main was mobile commerce and they aimed to explore the factors other than the ones proposed by TAM. The two major factors they came up with were behavioral intention and compatibility. In a similar fashion, Lee & Jun (2005) came up with the notion of contextual perceived usefulness while trying to understand people's mobile commerce acceptance. They claimed that contextual perceived usefulness had a statistically significant positive effect on people's intentions to use mobile services. Another research on mobile service acceptance in from the field of banking. Yu (2012) explored the factors that affect the users adopt mobile services and found out that individual intentions and facilitating factors played the greatest role in the users' adoption of these mobile services. Another interesting and illuminating study explores the possible effects of gamification –turning the application into a game-like form- on the prospective consumers Hofacker, de Ruyter, Lurie, Manchanda, & Donaldson, 2016). Their final assumption provides glimpses of a positive correlation; however, further research need to be conducted, as stated by the authors. A recent study conducted in Turkey explored the acceptance and use of a university-specific mobile system: Mobile Education Information System of Sakarya University (SABIS) (Koç & Turan, 2014). They found a statistically significant effect of ease of use and the understanding of safety and privacy; however, the variables of personality differences and perceived benefits have not proven effective according to the results of this research.

The second part of this part aims to focus on the use of Beacon technology in different branches. Beacons are context aware contents. The definition of and detailed information about Beacons are given in many different publications (Thompson, 2013) specifying the outcomes it caused after it became a part of daily use. A content is context-aware if it is able to provide relevant data from the context (Dey, 2001). These context-aware contents have attracted a lot of attention in recent research. A commonly cited example of context-aware contents is a context aware tourist guide (Cheverst, Davies, Mitchell, Friday, & Efstratiou, 2000). A similar example of navigation systems that are built upon context-aware

contents is studied by Bieber & Giersich (2001). They developed electronic assistants for fairs and exhibitions. Not surprisingly, context-aware systems started to be used for shopping as well. Fano (1998), even in the early years of Beacons, conducted an experimental study on how Beacons and similar context-aware contents can serve the shopping habits of the people. Lastly, interactive application on mobile devices that act as personal assistants have been more context aware (Chávez, Ide, & Kirste, 1999). These context-aware assistants have also helped people to navigate and search.

Research on Beacons are not limited to the ones listed above. Detailed and developing studies have been conducted in different areas of research (Geddes, 2014; Thompson, 2013; Townsend et al., 2015).

Despite being the rarest group, the most relevant studies to this dissertation are the ones that cover the use of Beacons and mobile technology in health and fitness fields. The early studies were conducted mostly on the effects of personalized messages sent to mobile devices to foster the health benefits such as a study which tried to decipher the effects of customized and personalized health messages on physical activity (Bull, Kreuter & Scharff, 1999). The results of the study indicated a positive effect of such messages on the amount of physical activity. However, the authors conclude with an important remark that underlines the importance of the psychological and social factors that might help these messages be more effective.

A similar study that correlates a mobile phone intervention and the amount of physical activity is conducted on women with inadequate amounts of physical activity, and the results of the study showed that the mobile phone intervention proved to be effective to encourage sedentary women to do more physical activity (Fukuoka, Vittinghoff, Jong, & Haskell, 2010).

Following the text-messaging era, mobile applications surrounded every single space in people's lives. This made it necessary to work on the effects of mobile application on health. The research that was conducted with a specific mobile

application *Fit4Life* aimed to understand how effective it is to promote more physical activity and control the ideal body mass index (BMI) of the participants; however, the authors end up with a critical comment on how powerful these interventions can be and how they need to be managed (Purpura, Schwanda, Williams, Stubler, & Sengers, 2011)

Another study focuses a very recent popular application on mobile phones which used the application *bActive* to motivate walking, and the results validated the hypothesis that mobile applications are of help (Harries, Eslambolchilar, & Stride, 2013). A similar mobile and online intervention provided results in a similar fashion (Thorsteinsen et al., 2014). The difference in this study was that it mentioned gamification –turning the applications into games.

Many other studies focused on the use of indoor positioning technologies for fitness sectors (Consolvo, Everitt, Smith, & Landay, 2006). Studying the effect of mobile application on the sedentary behaviors of mid-life adults, King et al. (2016) made an eight-week program for three different groups with different customized fitness programs. According to the findings “Mixed-effects models indicated that, over the 8-week period, the social app users showed significantly greater overall increases” (King et al., 2016).

In a similar fashion, Hamper (2015) proposed a “concept of context aware system for physical activity promotion” (p. 3204). This system aims to provide a baseline for comprehensive context-aware information. It enables people to promote their physical activity in time.

CHAPTER III

METHOD

3.0 Presentation

This chapter presents the method utilized while conducting this research study. The present study has two main aims. First, the present study was designed to test a valid scale of the Mobile Service Acceptance Model. Second, it aims to test a theoretical model to understand actual adoption and acceptance of the BS-MFIA. In this respect, this chapter delineates the methodology of the study, the research design, research questions, demographic information of the participants, and the instrument utilized to collect data and the procedures of data collection. The last section introduces the data analysis used in this study. This study contributes to the sport management academia by providing an empirical example technology adoption in fitness context.

3.1 Research Hypotheses

The purpose of the present research is mainly two-fold including: (1) to test a theoretical model to understand the actual adoption and acceptance of the BS-MFIA. (2) to adopt selected measurement (which is proved to be valid and reliable) instrument into fitness context. The hypotheses aimed to explore the relationship among (a) perceived ease of use, (b) perceived usefulness, (c) trust, (d) context and (e) intention to use. As such, this study is designed to reveal the people's tendencies to use BS-MFI and intention. Since at the heart of this study, there is the aim to understand the tendencies to use the BS-MFI, the following research hypotheses are aimed to be tested:

H1. Fitness participants' perceived ease of use will significantly and positively influence their intentions to use the BS-MFIA.

H2. Fitness participants' perceived usefulness will significantly and positively influence their intentions to use the BS-MFIA.

H3. Fitness participants' perception of trust will significantly and positively influence their intentions to use the BS-MFIA.

H4. Fitness participant' perception of context will significantly and positively influence their perceived usefulness of the BS-MFIA.

H5. Fitness participant' perception of context will significantly and positively influence their perceived ease of use of the BS-MFIA.

H6. Fitness participants' perceived ease of use will significantly and positively influence their perceived usefulness of the BS-MFIA.

Following is a visual representation of the hypotheses on the effects of the five factors mentioned on the intention to use.

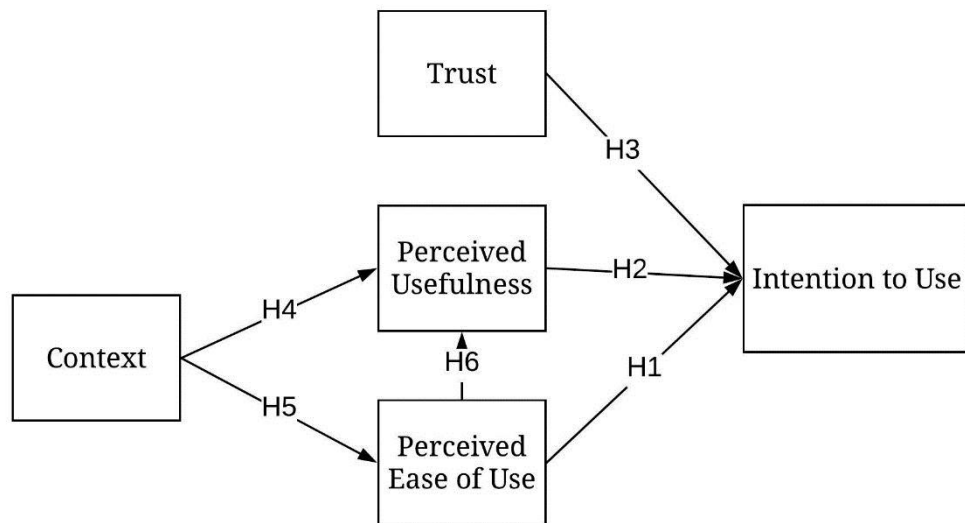


Figure 4. Visual representation of the hypotheses tested on the study

3.2 Research Design

This study was built on to investigate the relationships among perceived ease of use, perceived usefulness, trust, context and intention to use; therefore, this study is an associational research. In associational research, relationships among two or more variables are studied without manipulating variables, and numerical representation is possible to display the relationship between variables (Fraenkel & Norman, 1993).

For both the pilot study and the main study, the data were gathered quantitatively by using the adopted scale. The quantitative method was preferred due to the fact that it helps collecting a large amount of numerical data using statistics or survey instruments with closed ended questions, and this provides broad information which can represent the population; so, researchers can generalize the results (Punch, 2005). Also, quantitative research allows the researchers to get more reliable conclusions using the numerical data.

The study adopted the survey approach since it is an effective way to collect data and when properly designed, it also provides accurate and cost-efficient outcomes (Anderson, Sweeney, & Williams, 2005).

Since the questionnaire approach was decided to be applied, a scale which could also provide content validity was aimed to be chosen. With this aim, the scale selected for the study was adapted from the original measurement scale used in Mobile Service Acceptance Model (Gau, Krogstie, & Siau, 2011).

In order to use the scale, the permission of the developers of the scale were obtained. Later, the applications in order to get necessary permissions from METU Human Subjects Ethics Committee (HSEC) were made. Data for the pilot study were collected from 178 participants; while, 210 participants were included in the main study for the data analysis.

The system called BS-MFIA (Beacon Supported Mobile Fitness Instructor Application) was developed for the study. BS-MFIA is a system which consists

of four main parts (Table 2). The first part of the system is Beacons. Beacons are basically little Bluetooth based devices which send the content to mobile devices when they get close to them. The Beacons used in this study were produced by LiveBeacon company, and they were placed in the fitness center in advance. The second part of the system is the application named LiveBeacon. This application was created by LiveBeacon company, and it is free in App Stores and Play Stores. The participants downloaded this application to their mobile phones before they entered the fitness center. The third part of the system is LiveBeacon Cloud Portal which is system to send the information to the mobile devices. Typeform is the fourth and the last part of the system. It is basically a database on which information is uploaded. The information –video, instruction and content in the study- was uploaded on Typeform. In short, when the participants reached the areas of LiveBeacon, LiveBeacon Cloud Portal transmitted the information on Typeform portal to the LiveBeacon application which were downloaded to the participants' mobile devices.

Table 2

The parts of BS-MFIA and their main responsibilities

Equipment	Main responsibilities
Beacons (LiveBeacon)	Live Beacon is a small, battery-powered, cloud-controlled device that transmits web content to smartphones and tablets up to 30 meters (100 feet) away. The Beacons transmit our content. Placed in the two area of fitness center.
LiveBeacon application (Android and IOS)	The free app receives your content. It can be downloaded from Google Play Store and Apple App Store.
LiveBeacon Cloud Portal	The cloud portal is used to communicate with Typeform and update our content.
Typeform	Data collection tool and used as a database for LiveBeacon Cloud Portal to provide fitness exercises for muscle groups in the app and easy to follow and mobile friendly.

3.2.1 Participants of the Study

With an aim of determining the factor structure of the scale in the fitness context of a Turkish sample, firstly Exploratory Factor Analysis (EFA) was conducted with 178 participants. Secondly, the identified factor structure was evaluated with Confirmatory Factor Analysis (CFA) in a different sample of 205 participants to provide a measurement model and test how well the measured variables represent the number of constructs. Finally, as the main study, the selected model was tested by with 210 participants.

In terms of the sampling strategy, convenience sampling technique was employed in the present study. Sampling is required to be done from a homogeneous group due to the fact that it not only allows to come up with more exact predictions but

also reduce the risk of coming to false conclusions about deciding the covariations among the variables (Calder et al., 1981).

In order to provide a homogenous group; data were collected from university students who do fitness in sports centers of a university as students represent a more homogeneous group based on age, occupation, and interest. Descriptive statistics of the main study sample were presented below.

Following is a table that depicts the demographic information of the participants of the study.

Table 3

The number of fitness participants

Variables	Category	Number	%
Gender	Female	86	41
	Male	124	59
Total		210	100

210 people were the participants of the study, and 86 of them are female which equals to 41% of the total participants. Male participants are 124 in number, and this corresponds 59% of the total participants.

Table 4

The frequency of fitness participation in a week

Frequency of visits	# of participants	% of participants
No	5	2.4%
1 times a week	67	31.9%
2 or 3 times a week	108	51.4%
4 or 5 times a week	22	10.5%
6 or 7 times a week	5	2.4%
7 + times a week	3	1.4%
Total	210	100

Also, the regular workout habits of the participants are also noted. As can be seen in the Table 4, the highest number of participants are the ones who visit the fitness center at least 2-3 times a week (n= 108). This group covers slightly more than half of the participants. The second most common group is composed of the ones who visit the center once a week. The percentage of these participants are 31,9%. The fewest number of participants are the ones who visit the fitness centers seven times or more.

3.2.2 Data Collection Instrument

This research has been conducted as a quantitative research study using a questionnaire that was designed with a Likert Scale. The five-point Likert scale which ranges from 1 (strongly disagree) to 5 (strongly agree), which was adapted from the original measurement scales used in Mobile Service Acceptance Model (Gau, Krogstie and Siau, 2011) was used in this study. The main reason to prefer the model was the fact that it is an extension of Technology Acceptance Model. In addition to the original scale, participants' demographic information and the information about the frequency of fitness participation were collected.

In the Mobile Service Acceptance Model, some new constructs were added such as trust, context and personal initiatives and characteristics which are also essential to study the model. Because of proving appropriate to the study, the scale used in the model were reused in the study. The scale later was used in a Turkish context in technology platform was developed and implemented by Sakarya University Information Systems Department (Koç & Turan, 2014). Since their study used the scale in Turkish language, the Turkish version of the scale was used with some modifications and the necessary wording changes to fit the context of the BS-MFIA usage.

Before applying the scale tool, the reliability measures were considered. The summary of the scale and Cronbach's alpha values (that indicate the reliability levels of the scale) are portrayed in the table below.

Table 5

Source of Subscales and Cronbach's Alpha Values

Scale	Number of items	Source	Cronbach's alpha
Context	7	Dey (2001)	.940
Personal initiative and characteristics	7	Gao et al. (2008)	.875
Trust	7	Gao et al. (2008)	.978
Perceived usefulness	5	Davis (1989)	.947
Perceived ease of use	5	Davis (1989)	.915
Intention to use	2	Fishbein and Ajzen (1975); Davis (1989)	.922

Adapted from (Koç, Turan & Okursoy, 2016)

As can be seen from the table above, the internal consistency/ intra-reliability of the scale is considerably high, which is the main reason behind the choice of this instrument.

3.2.3 Ethical Issues

The first ethical issue to be dealt with was to get the informed consent of the participants. In order to include the participants into the research, each single participant was informed about the rationale, technique and the procedure of the research. In addition to being informed about what was being done, the participants were assured that under no circumstances would their personal information, including their names or mobile phone data, never be shared with others.

As a second step, the scale that shaped the core of the scale used was originally Gao's research study (Gao et al., 2011) and Turkish version was taken from Koç & Turan (2014). Written permission was granted by the owners.

3.3 Data Collection Procedures

After the analysis of the pilot study, the final version of the tool was come up with. Later on, the main data collection procedures took place.

The data were collected via both paper-based and online questionnaire. For the online version of the questionnaire, *Typeform* platform have been used. Special attention was paid in order to keep the face validity of both media high and equal. Participants made their own choices to fill in the online form or the hard-copy of the questionnaire.

The data collection procedure took place over a two-month period from April 10 to November 27, 2017. It took place at the two fitness centers of Middle East Technical University (METU) main campus with the participants who are the students of the university.

Ethics approval for this study was granted by the METU Human Subjects Ethics Committee on the 8th of March 2017. Informed consent was obtained from all participants. All the participants knew that their data were going to be used for a research; however, no intervention other than the application of the main research procedure was staged.

Beacons that were used in the study were provided by the company LiveBeacon after giving information about the content of the study. Two LiveBeacons were planted to the areas (near dumbbells, barbells area for fitness exercises and mat areas for stretching) in the fitness center. The information about BS-MFIA was explained in the posters hang on the walls of fitness center.

The posters were used as an advertisement and notification in the fitness centers. The students who intended to do fitness in the centers were informed about the study, and the participants volunteering to join the study were given Beacon supported mobile fitness instructor invitation included the purpose of study, explanation of study procedures, confidentiality of individual responses, information about the raffle. They were informed that after the usage, they would be provided both paper-based or web-link to the online questionnaire tool according to the convenience to the participant.

When the participants agreed to participate the research, they were also agreed to download LiveBeacon application, which was already existed for both Android and iOS systems, on their mobile devices.

Hence, LiveBeacons could trigger the users' apps when they got close to the LiveBeacons. A representational map of the fitness center and the locations of the Beacons are as follows:

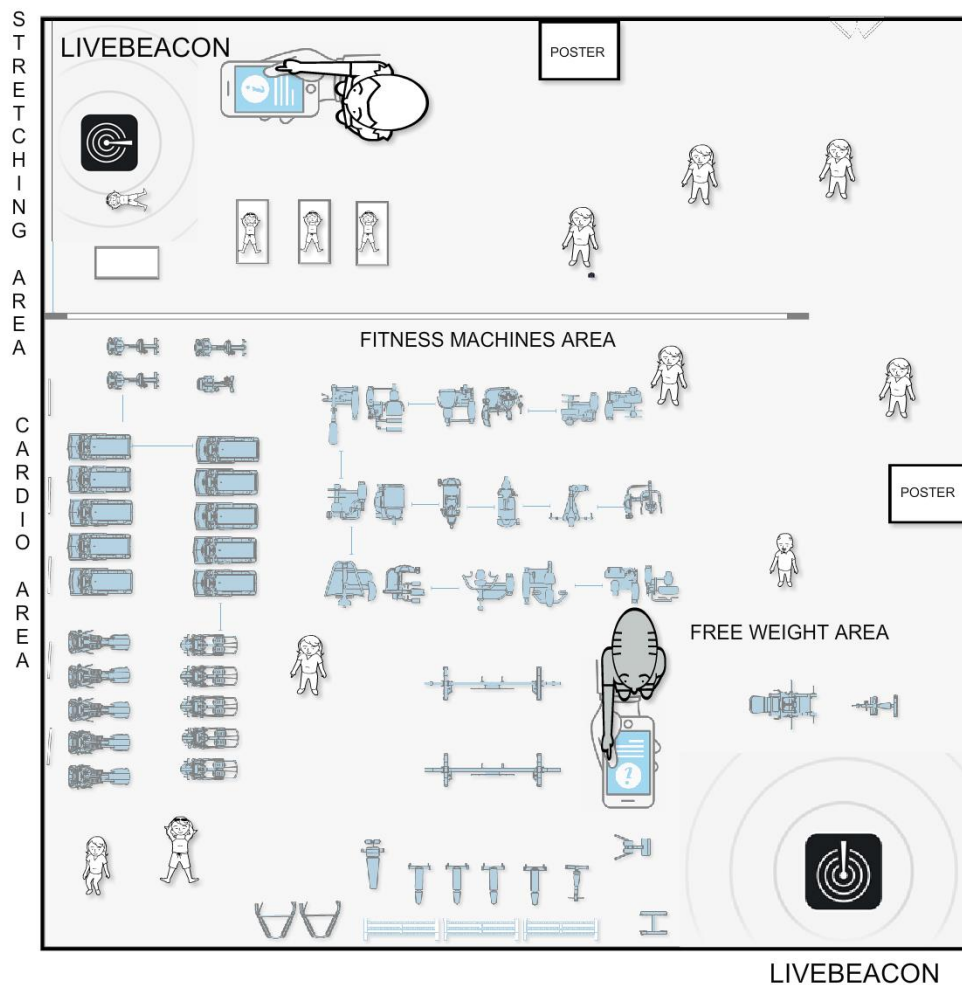


Figure 5. The map of LiveBeacon's in fitness center

As can be seen in the map, the Beacons were placed in two locations where most people do their work out and, as a result, need further assistance. This way, it was aimed that people would join in the research and benefit from this technology by being a participant in it.

When the participant got close to dumbbell or mat area in the fitness center, the mobile phone provided the relevant dumbbell, barbell and flexibility related fitness exercises information. BS-MFI could determine whether he/she was near the dumbbell-barbell area. When students moved to the stretching area, LiveBeacons which had been set in advance triggered the LiveBeacon application in their mobile phones and transmitted necessary stretching exercises to the users.

The rationale behind how Beacon technology works is portrayed in the figure below:

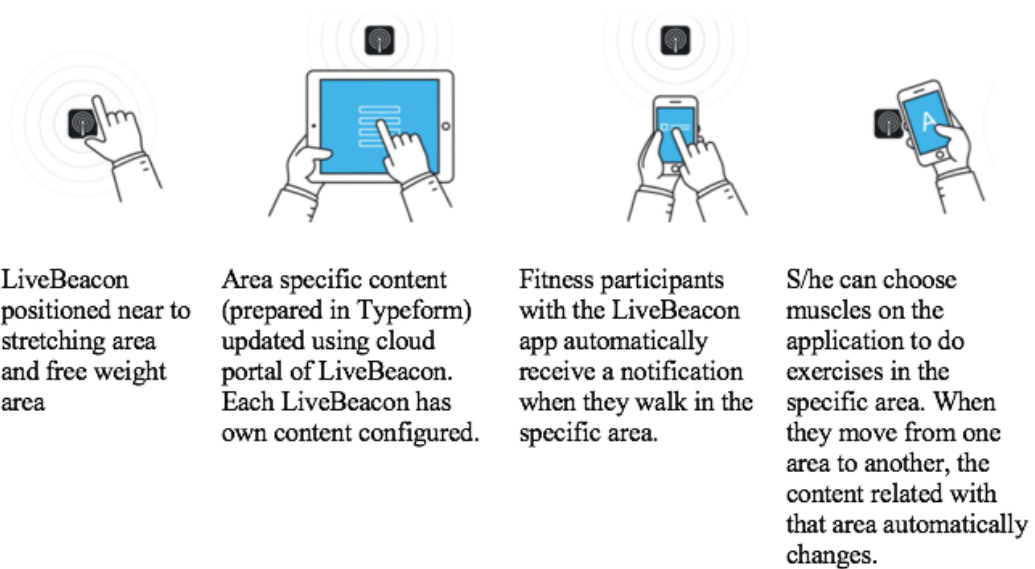


Figure 6. The working system of a BS-MFIA

As the figure along with its detailed definition depicts, the Beacon technology acts like a trainer to the participant. This trainer is able to understand what the participant thinks he/she needs getting signals about the place he/she spends time at. The database of BS-MFI is connected with the Typeform which is an online data collection tool. A cloud portal of LiveBeacon was also used to provide the update information and was also connected to Typeform to provide necessary triggered messages for users.

When all these Beacon and cloud technology are managing the process, the user/participant sees a customized interface on their mobile phone screens. When close to Beacon, they see the following figure on their mobiles.

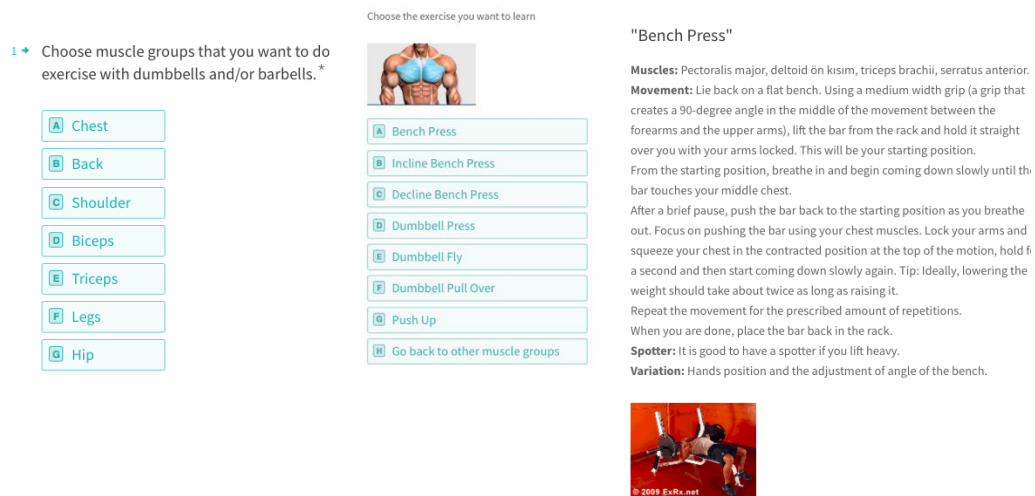


Figure 7. A sample mobile phone screenshot for Free Weight BS-MFIA Area Notification

As can be seen, understanding the location, and thus the needs, of the participant, the program offers some possible training alternatives. After the participant chooses the desired option, specific physical exercises are provided again. The participant again chooses an exercise suitable for his/her needs.

After the specific exercise is chosen, the mobile application provides the participant with detailed descriptions of how to do the exercises. The application uses videos, visuals and explanations on how to do the exercise correctly. Another sample from the stretching zone is as follows:

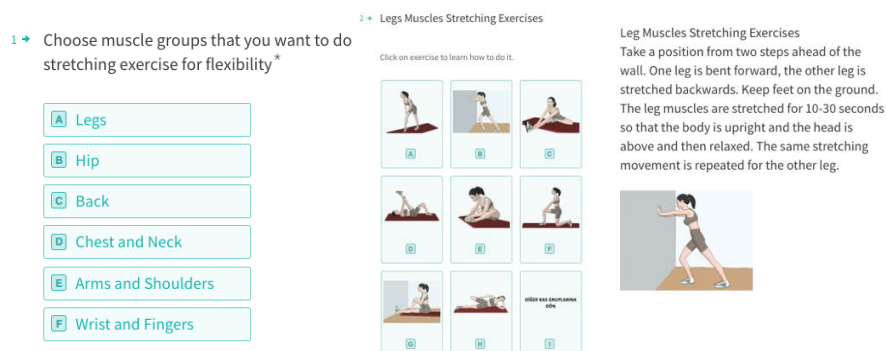


Figure 8. A sample mobile phone screenshot for Stretching BS-MFIA Area Notification

The main logic in both Beacon zone is the same. In both parts, the inclusion of the participant needs, and choices play an important role and the way the information is provided via the mobile service is exactly same.

3.4 Data Analysis

Data were analyzed using the Statistical Package for Social Science (SPSS) 22.0 and Analysis of Moment Structures (AMOS) 22.0. Firstly, descriptive statistics were conducted to provide simple summaries of the sample characteristics. The second step of data analysis was conducted to test the theoretical model with the collected empirical data using structural equation modeling. The structural equation modeling technique is an effective tool for identifying causal relationships between several constructs and is one in which separate multiple regression equations are estimated simultaneously (Hair et al., 1998). The structural model was examined over these criteria; a) the overall goodness-of-model fit, b) individual casual paths in terms of standardized path coefficients.

3.5 Pilot Study

Pilot studies are mostly conducted if the procedure in data collection and analyses are well-constructed. They act like a preparation of the main study. They also aim to indicate if it is possible to arrive at reasonable and valuable results in terms of both statistics and the field of research.

One of the advantages of conducting a pilot study is that it might give advance warning about where the main research project could fail, where research protocols may not be followed, or whether proposed methods or instruments are inappropriate or too complicated.
(van Teijlingen & Hundley, 1998 p.54)

In all three steps of this study, the piloting played an important role. The first step of piloting was to adopt the scale to the fitness context because scale used in this study was not applied in fitness context. Some important adoptions about the

terminologies and language use was needed to be done. As an example, the words “fitness center” were replaced with “daily fitness workout”. Then, the scale was applied to 15 people to check if the items in the scale suited to the fitness context and to see whether the BS-MFIA was working properly. This application helped the researcher understand if the scale in its adapted form is suitable to go on with the main study. Afterwards, exploratory factor analysis was conducted. It was concluded that some of the items were not directly appropriate to the scope of this study. Some of the items were excluded from the scale because of low loading values ($< .32$) (Tabachnick & Fidell, 2012). In order to make the scale more compact in terms of content and context, these items were eliminated in the further stages of the study. Out of 33 items, 23 items were found to be relevant and it was concluded that these 23 items were the ones to be used in the following stages.

As the second step of the pilot study, with 23 items scale confirmatory factor analysis (CFA) was conducted. In this step, the purpose was to check if the instrument fit in the model to be applied (SEM). With the CFA results of 205 participants who provided data for this step, it was proved that the model and the scale items complied with each other. Therefore, it can be concluded that the tool fit in the model to be applied in this study.

As the final step of this research, relations between the following constructs were analyzed: *context and perceived usefulness (PU)*, *context and perceived ease of use (PEOU)*, *PEOU and PU*, *PU and intention*, *PEOU and intention*, *trust and intention* (for a detailed visual representation of the associational relations see figure 4). At this point, the variable *context* along with the variables PEOU and PU are analyzed to see how they affect each other if they do. Also, the relationship between these variables and the intention to use was under investigation. The results indicate that all the mentioned constructs have a statistically significant positive effect on the intention to use the system, with trust being the most influential.

3.6 Validity and Reliability Issues

Validity is a construct that claims a study should assess what it claims to assess. That is, the content of the data collection instrument needs to fit in the context in which it is going to be used. This concern is overcome by the EFA and CFA.

Firstly, an already validated research tool was chosen. Secondly, 3 experts who are fitness trainers, and instructors from the department of Physical Education and Sports and English Language checked the data to provide the validity in terms of content and language. Additionally, contents used in the study were chosen by and with the approval of the instructors of the Physical Education and Sports Department of METU and sports trainers. The instructions for the exercises and pictures were taken from the books about exercise guidance for weight training and stretching (Altun & Koçak, 2010; Altun & Koçak, 2013). Lastly, videos were taken from the website, Exrx.net, which provides the copyright of the videos free.

Reliability of a test means that the test can give similar results if tested in different times. Therefore, reliability is intricately interwoven with the idea of consistency. The consistency of the retained factors is assessed calculating Cronbach's alpha coefficient.

3.7 Assumptions

The study is based on the following assumptions:

1. The participants downloaded LiveBeacon application to their phones.
2. The participants understood the functions and functionalities of the BS-MFIA adequately.
3. After testing BS-MFIA, the participants paid attention to each item in the questionnaire and responded them accurately.
4. The participants were honest when answering the questions in the questionnaire.

CHAPTER IV

RESULTS

4.0 Presentation

The aim of this chapter is to present the quantitative results of pilot and main study. The chapter opens with a detailed report of findings and it develops with one by one responses to the hypothesis proposed at the beginning of this dissertation.

4.1 Results for the Pilot Study

In this study, the Mobile Services Acceptance Model was used to determine the factors that affect the adoption and the usage of the mobile services acceptance model in fitness context. In order to determine the factor structure of the scale in fitness context in a Turkish sample firstly EFA was conducted. EFA aims to explore the factor structure depending on the correlations between the variables (Tabachnick & Fidell, 2013). While selecting the items to be included in the scale in EFA, it is considered that the eigenvalues of the items should be at least 1 (Shevlin & Lewis, 1999), factor loadings of the items should be at least .32 (Tabachnick & Fidell, 2012). Secondly, identified factor structure evaluated with confirmatory factor analysis (CFA) in a different sample of respondents. CFA is a statistical technique frequently utilized to measure whether measurement instruments are consistent with the data, CFA has been conducted to confirm the factor structure of the scale determined by EFA (Graham, Guthrie, & Thompson, 2003).

4.1.1 Exploratory Factor Analysis Results

In this study, using a Turkish fitness context exploratory factor analysis was analyzed with an aim to understand the associational relations among the constructs of mobile fitness technology.

The number of participants was chosen considering the ratio of number of subjects to the variables (N/p) necessary to be able to create internal validity in internal validity studies. For the sample size, at least $N/p \geq 5$ is necessary; however, $N/p \geq 10$ is also acceptable (Hair, 2006). With this calculation, 178 sample was considered adequate for the 33-item scale. The means of the items which were between 3.56 and 3.98. Before the investigation of the exploratory factor analysis, pre-determined assumptions including Skewness-Kurtosis values, histograms and Q-Q Plots were checked. The Skewness and Kurtosis values were found between -3.00 and +3.00 (Tabachnick & Fidell, 2007) and given below (Table 6).

Table 6

Descriptive Statistics and Skewness-Kurtosis Values

Variables	Mean	SD	Skewness	Kurtosis
Usefulness_1	3.59	.81	-.12	-.12
Usefulness_2	3.56	.95	-.47	-.35
Usefulness_3	3.59	.94	-.33	-.58
Usefulness_4	3.66	.94	-.20	-.73
Usefulness_5	3.70	.94	-.38	-.40
Ease_of_use_1	3.83	.87	-.51	-.04
Ease_of_use_2	3.85	.91	-.68	.22
Ease_of_use_3	3.94	.83	-.57	.26
Ease_of_use_4	3.98	.81	-.78	1.05
Ease_of_use_5	3.98	.79	-.57	.47
Trust_1	3.85	.91	-.32	-.77
Trust_2	3.74	.96	-.40	-.49
Trust_3	3.91	.94	-.44	-.67
Trust_4	3.77	1.05	-.49	-.62
Trust_5	3.78	1.05	-.56	-.37
Trust_6	3.78	1.01	-.54	-.38
Trust_7	3.79	1.02	-.55	-.36
Personal_characteristics_1	3.98	.92	-.55	-.36
Personal_characteristics_2	3.69	1.05	-.51	-.22
Personal_characteristics_3	3.07	1.12	-.14	-.51
Personal_characteristics_4	3.59	.94	-.42	-.18
Personal_characteristics_5	3.70	1.07	-.40	-.79
Personal_characteristics_6	3.69	.98	-.46	-.33
Personal_characteristics_7	3.74	.97	-.46	-.36
Context_1	3.70	1.01	-.57	-.17
Context_2	3.62	1.05	-.57	-.28
Context_3	3.64	1.06	-.63	-.21
Context_4	3.63	1.05	-.53	-.23
Context_5	3.71	1.01	-.58	-.16
Context_6	3.78	1.03	-.61	-.20
Context_7	3.61	1.09	-.52	-.33
Intention_to_use_1	3.75	1.03	-.63	-.14
Intention_to_use_2	3.82	1.10	-.75	-.13

Before the application of the factor analysis, the values of Barlett test of sphericity and Kaiser-Meyer-Olkin were investigated. Bartlett test of sphericity resulted statistically significant, $\chi^2(df = 253) = 3736.6$, ($p < .05$). The results supported the factorability of the correlation matrix as in Table 7. Kaiser-Meyer- Olkin (KMO) test that scored .91 indicated an important recommended value of .60 (Kaiser, 1974; Tabachnick & Fidell, 2007).

Table 7

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.91
Bartlett's Test of Sphericity	Approx. Chi-Square	3736.6
	<i>df</i>	253
	<i>Sig.</i>	.00

$p < .05$

As an indicator of multivariate normality, Mardia's test result was not found significant ($p > .05$). It indicates that multivariate normality assumption was met, hence maximum likelihood was selected as an extraction method. Maximum likelihood method gives factor loadings for the sample population and it increases the possibility of sampling (Tabachnick & Fidell, 2012).

To be able to get an idea about the factorability, correlation matrix should be controlled by checking correlation coefficients of .30 and above. The items can be said to correlate for this study because they ranked higher than .30 (Hair et al, 2006).

Table 8 below highlights the existence of factorability in this study. Although all of the scores did not surpass the .30 threshold, still the R can be considered as factorable.

Table 8

Correlation matrix of each item in the modified instrument

Variables	U1	U2	U3	U4	U5	E1	E2	E3	E4	E5	T3	T4	T5	T6	T7	C2	C3	C4	C5	C6	C7	Int1	Int2	
U1	-																							
U2	.56	-																						
U3	.55	.60	-																					
U4	.50	.47	.57	-																				
U5	.49	.38	.38	.54	-																			
E1	.34	.21	.22	.31	.50	-																		
E2	.34	.41	.37	.39	.39	.51	-																	
E3	.34	.29	.25	.29	.27	.41	.46	-																
E4	.35	.32	.22	.29	.28	.35	.41	.54	-															
E5	.32	.22	.23	.27	.27	.43	.32	.39	.48	-														
T3	.44	.36	.37	.43	.37	.27	.34	.35	.27	.26	-													
T4	.46	.28	.38	.43	.36	.26	.26	.26	.19	.25	.68	-												
T5	.45	.38	.44	.43	.34	.30	.31	.27	.27	.32	.55	.68	-											
T6	.47	.37	.47	.50	.37	.35	.32	.28	.20	.24	.54	.59	.69	-										
T7	.44	.30	.44	.43	.34	.29	.32	.24	.24	.27	.55	.57	.56	.69	-									
C2	.27	.18	.13	.25	.29	.26	.24	.22	.25	.21	.23	.29	.16	.22	.20	-								
C3	.38	.27	.30	.37	.38	.28	.35	.24	.25	.27	.34	.33	.34	.34	.31	.54	-							
C4	.42	.28	.33	.38	.41	.26	.26	.26	.27	.26	.38	.44	.43	.38	.36	.43	.65	-						
C5	.44	.32	.35	.43	.47	.29	.30	.31	.25	.28	.48	.41	.40	.42	.46	.34	.45	.64	-					
C6	.43	.29	.35	.33	.39	.35	.23	.31	.22	.26	.40	.45	.38	.43	.43	.27	.35	.46	.66	-				
C7	.30	.20	.25	.29	.29	.25	.21	.24	.18	.25	.39	.29	.25	.29	.35	.39	.29	.36	.45	.57	-			
Int1	.40	.25	.32	.34	.35	.32	.34	.28	.28	.27	.45	.45	.37	.39	.47	.31	.36	.37	.44	.46	.62	-		
Int2	.37	.29	.29	.32	.35	.23	.19	.29	.28	.22	.37	.42	.40	.43	.39	.29	.36	.41	.46	.46	.44	.64	-	

Considering the results of the exploratory factor analysis with Maximum Likelihood and Promax with Kaiser Normalization method seven items that were under “personal initiative and characteristics” were eliminated from the scale, because of loadings lower than .32 (Tabachnick & Fidell, 2012) observed.

Also, it was observed that many items under the “personal initiative and characteristics” were scattered to different factors. The items scattered are: PIC1. “I am capable of using the BS-MFIA”, PIC2. “I have fun using the BS-MFIA”, PIC3. “I prefer to be the first one using the BS-MFIA”, PIC4. “Using the system gives me an advantage over those who don’t”, PIC5. “I would only use the BS-MFIA if it was available for me”, PIC6. I find it rewarding to use the BS-MFIA, PIC7. “Using the BS-MFIA is a good idea.”

Two items about “trust factor” and an item from “context factor” were taken out from the scale because of loadings lower than .32 (Tabachnick & Fidell, 2012) and because of the cross-loadings. On the other hand, two items regarding “context factor” was loaded under “intention to use factor”. As a result, “intention to use factor” was decided to have four items which have common meanings.

Preacher & Maccallum (2003) stated that a factor fewer than three items accepted as weak and unstable. The factors in this study are strong enough because each factor has at least four items that measure more than .32 (Tabachnick & Fidell, 2012). Thus, this factor model can be the considered as the final factor model (Table 9).

Table 9

Summary of Factor Loadings

	<i>Factors</i>				
	1	2	3	4	5
T_4	.91				
T_5	.86				
T_6	.76				
T_3	.71				
T_7	.66				
E_4		.74			
E_3		.70			
E_1		.62			
E_5		.59			
E_2		.58			
U_3			.88		
U_2			.86		
U_4			.55		
U_1			.54		
U_5			.32		
C_7				.91	
Int_1				.81	
Int_2				.56	
C_6				.53	
C_4					.93
C_3					.80
C_2					.55
C_5					.49

Extraction Method: Maximum Likelihood.

Rotation Method: Promax with Kaiser Normalization.

Note. Factor 1 = Trust; Factor 2 = Ease of Use; Factor 3 = Usefulness;
Factor 4 = Intention; Factor 5 = Context

The best way to determine the number of factors of the scale is checking more than one method. Therefore, in order to determine the exact number of factors, eigenvalues (Table 10) was also checked. Identifiable factors were needed to have eigenvalues greater than 1 (Shevlin & Lewis, 1999). When looking at Table 10 below, it can be seen that five factors were greater than 1 and they explained the 64% of the variance.

Table 10

Eigenvalue, Percentages of Variance and Cumulative Percentages

Factors	Eigenvalue	% of Variance	Cumulative %
1	8.92	38.79	38.79
2	1.78	7.72	46.51
3	1.68	7.30	53.81
4	1.27	5.51	59.32
5	1.06	4.61	63.93

Note. Factor 1 = Trust; Factor 2 = Ease of Use; Factor 3 = Usefulness; Factor 4 = Intention; Factor 5 = Context

The correlation level between the factors were also investigated by calculating the correlation levels among them. They ranged between $r = .52$ and $r = .69$. As Table 11 pointed out that factors are moderately and positively correlated with each other. The correlation level between the factors also provides discriminant validity for the scale of this study.

Table 11

Factor Correlation Matrix

Factors	1	2	3	4	5
1	1				
2	.52	1			
3	.64	.55	1		
4	.69	.61	.55	1	
5	.60	.55	.68	.60	1

Extraction Method: Maximum Likelihood

Rotation Method: Promax with Kaiser Normalization.

Note. Factor 1 = Trust; Factor 2 = Ease of Use; Factor 3 = Usefulness; Factor 4 = Intention; Factor 5 = Context

4.1.2 Confirmatory Factor Analysis Results

Identified factor structure was evaluated with confirmatory factor analysis (CFA) in a different sample of respondents ($n = 210$). Confirmatory factor analysis differs from exploratory factor analysis by allowing the researcher to impose a structure

or model on the data and test how well that model “fits.” The “model” is a representation of (a) the number of factors, (b) whether the factors are correlated or uncorrelated and (c) how items are associated with the factor (Haggerty et al., 2011).

The confirmatory factor analysis was conducted using the maximum likelihood method by the program AMOS 22. The model was composed of five factors and twenty-three items that were come up with using the results of exploratory factor analysis.

As the main purpose of this section of the research is to understand if the items of the scale fit in the model to be analyzed, some fit indices were used. The fit indices are supposed to indicate how adequate the model is. Following is a table that depicts what the acceptable levels of fit indices are.

Table 12

Fit Indices and their suggested acceptable thresholds

Fit Index	Summary of Fit Indices
Chi-square	Low X^2 relative to degrees of freedom with an insignificant p value ($p > .05$)
Chi-Square/df	$X^2/df \leq 3$ (Kline, 2004) $X^2/df < 2$ (Tabachnick & Fidell, 2007)
GFI	.90 < GFI, acceptable (Maruyama, 1998; Schumacker & Lomax, 1996)
CFI	.95 \leq CFI (Hu & Bentler, 1999)
RMSEA	RMSEA < .05, close fit; .05 < RMSEA < .10, mediocre fit; RMSEA > 1, poor fit (Browne & Cudeck, 1993) RMSEA < .08, adequate fit (Jaccard & Wan, 1996) 0.08 < RMSEA < .05 mediocre fit; RMSEA > .10, poor fit (MacCallum, Browne, & Sugawara, 1996) RMSEA < .06 (Hu & Bentler, 1999) RMSEA < .07 (Steiger, 2007)
SRMR	SRMR < .08 (Hu & Bentler, 1999)
NFI (TLI)	.90 < NNFI, acceptable (Maruyama, 1998; Schumacker & Lomax, 2004) .95 \leq NNFI (Hu & Bentler, 1999)

*RMSEA: Root mean Square Error of Approximation; CFI: Comparative Fit Index; GFI: Goodness of Fit Index; NFI: Bentler-Bonnet Normed Fit Index; (S)RMR: Standardized Root Mean Square Residual

Chi square (χ^2) is a very common fit index to understand if the data analyzed and the model fit in each other appropriately (Quintana & Maxwell, 1999; Weston & Gore, 2006). If the significance level of χ^2 is an indicator that the model does not fit the data. On the other hand, if the significance level of χ^2 is low, this implies that the model fits in the data (Weston & Gore, 2006). Moreover, a nonsignificant χ^2 implies a similarity between the covariance matrix and the re-construct model (Schumacker & Lomax, 2004, p.81).

Goodness of fit index (GFI) uses a sample covariance matrix (S) and evaluates if the relative amount of variance and covariance in it. The explanation of GFI can be one with population covariance matrix (Σ). The possible values fall between 0 and 1.0. The higher the value, the better the fit is (Bryne, 2010).

Comparative fit index (CFI) is a comparative measurement of the advancement of the fit of the model. Its other name is null model or independence model because it is able to show if there is no relational cause among the variables in the study. CFI values range from 0 to 1.0. Similar to other indices, a value close to 1 is an indicator of a good fit (Weston & Gore, 2006, p. 742).

Root mean square error of approximation (RMSEA) is a type of index which aims to fix and stabilize the model's complexity. If two different models are both able to explain the data well, it can be claimed that the model can indicate RMSEA value of 0. This value 0 indicates an exact fit. Also, any value under .05 indicates a close fit. If the value is higher up to .05 to .08, it can be claimed that there is a fair fit. Any value between .08 and .10 is an indication of a mediocre fit, and the values over ten or more is a sign of a poor fit (MacCallum, Browne, & Sugawara, 1996).

Standardized RMR is a measure of the possible difference which appears between the model and the data (Weston & Gore, 2006). This can be considered as a

discrepancy. That is why, the smaller the number is, the better the fit is. It is numbered between 0 to 1.00. It is a sign of well-fitting model, if the value is smaller than .05, this shows that the model and the items fit in each other and the discrepancy is relatively and adequately low (Bryne, 2010).

In this study, the findings on the confirmatory factor analysis suggest values in the statistically acceptable range ($\chi^2 = 466.012$, $df = 219$, $\chi^2 / df = 2.13$; GFI = .91, CFI = .95; RMSEA = .052; TLI = .94; SRMR = .043). The results indicate that the tool used in this study fits with the model.

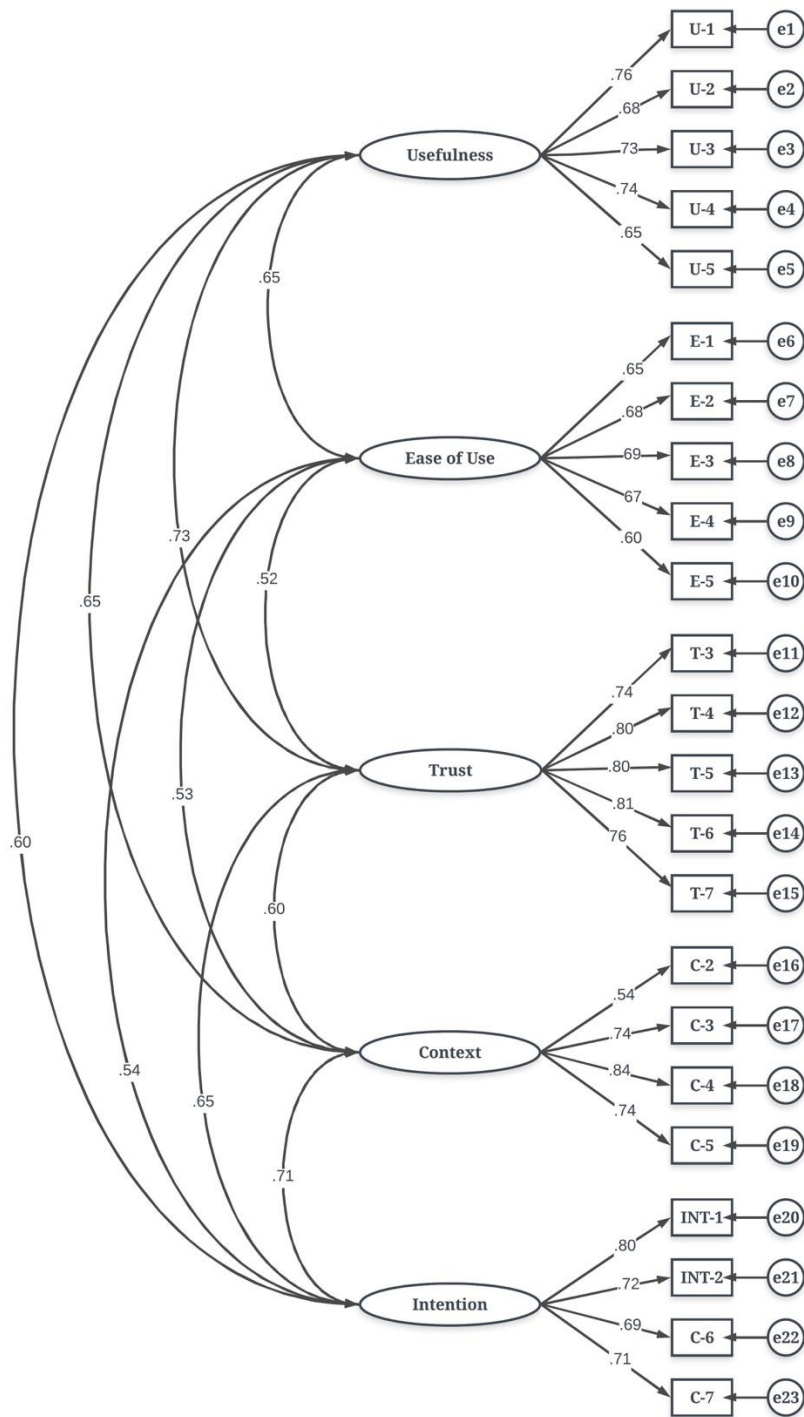
Following is a table that portrays the numerical findings of the study. The comparison of each single item with the norm values (values that are statistically acceptable and/or nonacceptable) show that the model and the items of the questions are compatible with each other.

Table 13

Goodness of fit indices of confirmatory factor analysis

	χ^2	df	χ^2 / df	RMSEA	GFI	TLI	CFI	SRMR
Hypothesized Model	466.012	219	2.13	.052	.91	.94	.95	.043

The results of CFA (Table 13) and detailed results of fit indices are shown in the diagram below. The items and findings can be visually represented as follows:



Confirmatory Factor Analysis (CFA) Model Fit Indices:
 . $\chi^2/d.f. = 2.13$ ($\chi^2 = 466.012$, $d.f. = 219$)
 . RMSEA = .052
 . GFI = .91
 . TLI = .94
 . CFI = .95
 . SRMR = .043
 p < .05

Figure 9. Illustration of the confirmatory factor analysis of modified mobile service acceptance model

The figure above illustrates the final version of the model specification. The boxes shown with U, E, T, C and Int symbolize the items used in the study. It shows how the items and the constructs (usefulness, ease of use, trust, context and behavioral intention) are related. The values represented on the arrows show the relationship between the construct and items.

Also, Figure 9 showed the association among the constructs and how well the constructs fit in each other. The values are again provided on the arrows and they indicate the statistical correspondence.

4.1.3 Internal Consistency of the Scale

After conducting the exploratory factor analysis, and determining the factor structure of the scale, Cronbach's alpha values were computed for the internal consistency issues of the retained factors. Following is a table summarizing the results of Cronbach's alpha coefficient values.

Table 14

Internal Consistency of the Factors

Factors	Cronbach's Alpha	Number of Items
Perceived usefulness	.83	5
Perceived ease of use	.79	5
Trust	.89	5
Context	.80	4
Intention to use	.82	4

As it can be observed on Table 14 above, Cronbach alpha values ($\alpha > .70$) of the items were reasonably high (Nunnally, 1978). The consistency level of PU factor was calculated as $\alpha = .83$, the alpha level of the PEOU factor was as $\alpha = .79$. The level of trust was evaluated as $\alpha = .89$. The score of the context in terms of internal consistency was $\alpha = .80$ and the intention to use factor was calculated as $\alpha = .82$.

Considering that .70 is a cut-off point to point out reliability of the investigated factor, it can be claimed that the tool used in this study is reliable enough to be able to measure the factors (Fraenkel & Wallen; 2000).

It was also checked if the Cronbach's alpha coefficient values gets higher when any of the items are deleted. The results in table 15 showed that the Cronbach's alpha coefficient values did not rise, so there was no need to eliminate any of the items.

Table 15

Internal Consistency of the Items if item deleted

Items	Cronbach's Alpha if Item Deleted
PU1. Using the BS-MFIA would increase the efficiency of my daily fitness work	.79
PU2. The BS-MFIA would allow me to find exercise areas in the fitness center	.80
PU3. The BS-MFIA would make it easier to keep track of my weekly Fitness tasks	.79
PU4. The BS-MFIA would allow me to better schedule my time	.79
PU5. The BS-MFIA would be useful for me as a fitness participant	.82
PEOU 1. Learning to operate the BS-MFIA would easy for me.	.75
PEOU 2. I would easily find the information I am looking for using the BS-MFIA	.75
PEOU 3. I would find the user interface of the BS-MFIA clear and intuitive.	.74
PEOU 4. I would find the BS-MFIA to be flexible to interact with.	.74
PEOU 5. I would find the BS-MFIA to easy to use.	.76
T1. If the BS-MFIA protects the privacy of its users	.87
T2. If I feel confident that I can keep the BS-MFIA under control.	.86
T3. If I feel confident that the data returned by the BS-MFIA is reliable.	.86
T4. If I believe it is risk-free to use the BS-MFIA.	.86

Table 15 (continued)

T5. If it is safe to use the BS-MFIA.	.87
C1. If most people around me are using the BS-MFIA.	.81
C2. If I had nice experience in using mobile services before.	.72
C3. If the university encourage students to use the BS-MFIA.	.70
C4. If the BS-MFIA was easy to obtain and install	.78
I1. If it is meaningful/relevant to my daily fitness tasks.	.80
I2. If I did not have Access to a desktop computer or laptop.	.76
I3. Assuming I have access to the BS-MFIA, I intend to use it.	.74
I4. Given that I have access to the BS-MFIA. I predict that I would use it.	.79

Note. PU: Perceived usefulness; PEUO: Perceived ease of use; T: Trust; C: Context; I: Intention

4.2 The Results of Main Study

4.2.1 Structural Equation Modeling Results

To examine the hypothesized relationships in this study, the causal model was tested using the maximum-likelihood estimation procedure of Analysis of Moment Structures (AMOS) version 22. The fit indices (for further discussion see 4.1.2) in this analysis is also acceptable for this study.

Keeping in mind that the acceptable values are the same, the SEM analyses, similar to CFA analysis yielded affirmative results.

Results for this analysis yielded acceptable values as follows; ($\chi^2 = 679.535$, $df = 224$, $\chi^2 / df = 3.03$; GFI = .91, CFI = .95; RMSEA = .053; TLI = .94; SRMR = .049). The results of the study indicated that the constructs fit in the model and the model is applicable in the fitness context. The model is not rejected taking the acceptable interval of goodness of fit statistics as the basis.

The following table portrays the results of SEM in comparison with the acceptable levels of fit indices.

Table 16

Fit indices for the structural equation model

Fit statistics	Decision criteria (source)	Result
χ^2 / df	≤ 3 (Kline, 2004)	3.03
GFI	.90 < GFI (Maruyama, 1998)	.91
SRMR	SRMR < .08 (Hu & Bentler, 1999)	.049
RMSE	RMSEA < .08 (Jaccard & Wan, 1996)	.053
CFI	.95 \leq CFI (Hu & Bentler, 1999)	.95
NFI (TLI)	.95 \leq NNFI (Hu & Bentler, 1999)	.94

As can be seen in the table 16, when all the fit indices are examined in detail, it can be concluded that SEM analyses indicate acceptable results. Following is a visual representation of the results of the overall model:

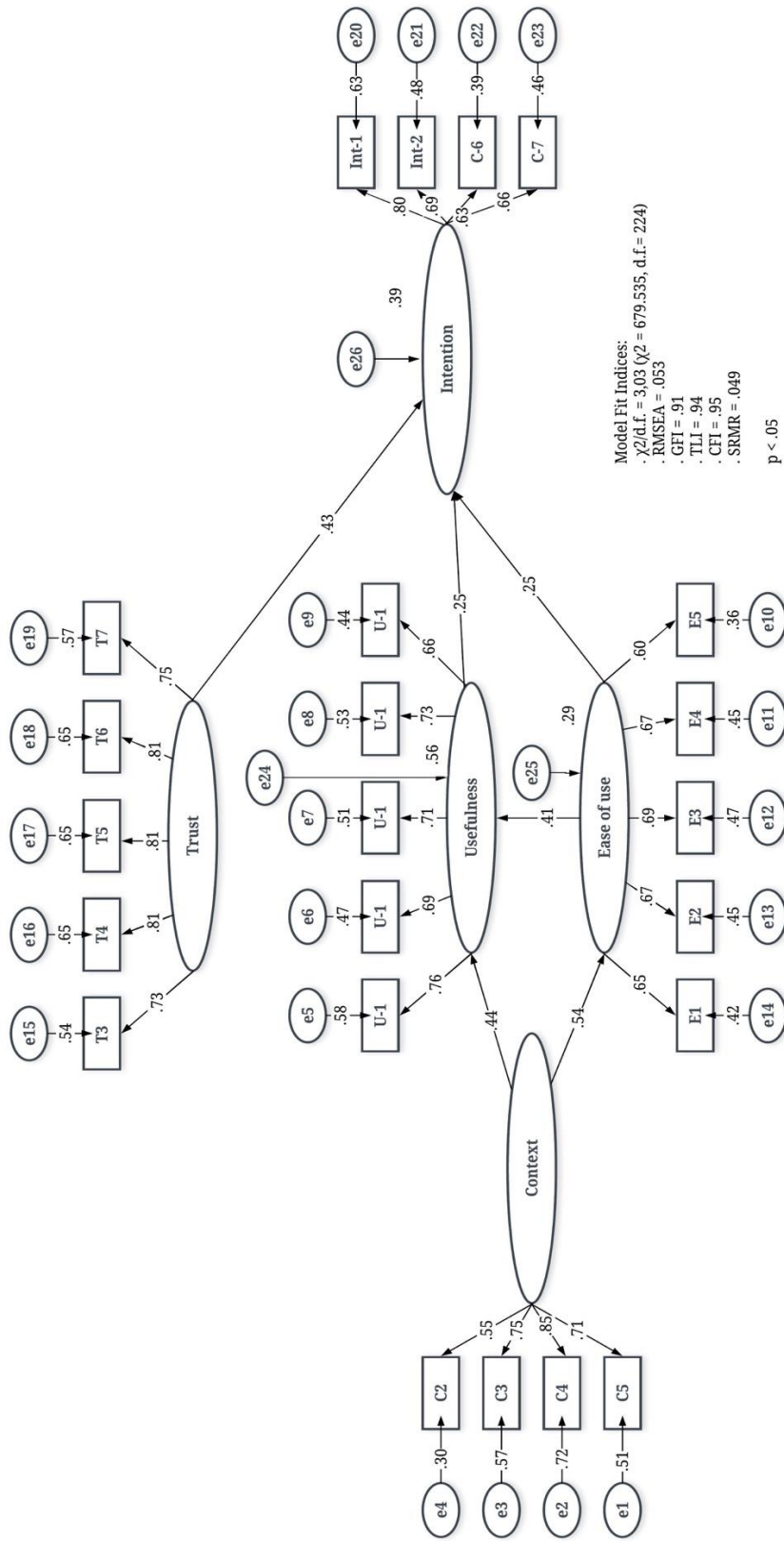


Figure 10. Path Analysis of Modified Mobile Services Acceptance Model

As can be seen in the figure, perceived usefulness and ease of use have similar effects ($\beta = .25$) on the intention to use. It is followed by trust ($\beta = .43$). Trust ranked first in terms of influence. In addition to this, context has a considerable high influence on usefulness ($\beta = .44$) and ease of use ($\beta = .54$), which results in an indirect effect on intention to use. The context factor accounted for 29% variances in perceived ease of use and 56% variances in perceived usefulness. All factors within the structural model, together explained the 39% variances in intention to use BS-MFIA.

4.3 Overall Results

The overall results of this study are three folds:

- (i) The EFA tests confirmed the usability of this test for measuring if the items can fit in the constructs of fitness context.
- (ii) The CFA tests confirmed the fact that the model can be applied to the data.
- (iii) The overall findings of SEM also indicate that there are significant influences between the factors and the intention to use as well as among the factors, themselves.

The hypotheses were tested using structural equation modeling analysis. The strengths of path relationship are presented with standardized path coefficients, which are the same as the beta weight in a multiple regression. The standardized path coefficients between the constructs were presented in Figure 10.

Hypothesis 1: Fitness participants' perceived ease of use has significantly and positively influenced their intentions to use the BS-MFIA ($\beta = .25$, $p < .05$).

Hypothesis 2: Fitness participants' perceived usefulness has significantly and positively influenced their intentions to use the BS-MFIA ($\beta = .25$, $p < .05$).

Hypothesis 3: Fitness participants' perception of trust has significantly and positively influenced their intentions to use the BS-MFIA ($\beta = .43$, $p < .05$).

Hypothesis 4: Fitness participant' perception of context has significantly and positively influenced their perceived usefulness of the BS-MFIA ($\beta = .44$, $p < .05$).

Hypothesis 5: Fitness participant’ perception of context has significantly and positively influenced their perceived ease of use of the BS-MFIA ($\beta = .54$, $p < .05$).

Hypothesis 6: Fitness participants’ perceived ease of use has significantly and positively influenced their perceived usefulness of the BS-MFIA ($\beta = .41$, $p < .05$).

Table 17: *Path co-efficient and t-values for structural model*

Hypotheses	Causality	Path coefficients	t values	Result
H1	Fitness participants’ perceived ease of use has significantly and positively influenced their intentions to use the BS-MFIA.	.25	2.75	Confirmed
H2	Fitness participants’ perceived usefulness has significantly and positively influenced their intentions to use the BS-MFIA.	.25	2.84	Confirmed
H3	Fitness participants’ perception of trust has significantly and positively influenced their intentions to use the BS-MFIA.	.43	6.84	Confirmed
H4	Fitness participant’ perception of context has significantly and positively influenced their perceived usefulness of the BS-MFIA.	.44	5.95	Confirmed
H5	Fitness participant’ perception of context has significantly and positively influenced their perceived ease of use of the BS-MFIA.	.54	6.68	Confirmed
H6	Fitness participants perceived ease of use has significantly and positively influenced their perceived usefulness of the BS-MFIA.	.41	5.29	Confirmed

$p < .05$

CHAPTER V

DISCUSSION

5.0 Presentation

This chapter of the study includes an overview of the study, the discussion of the results, practical and academic implications, limitations, and recommendations for future researches.

5.1 A Study Overview

The general purpose of this study was to contribute to the knowledge of adoption behavior of BS-MFIA and the development of Beacon technology in the fitness and exercise field. Another goal of this study was to empirically test the theoretical model of Mobile Service Acceptance Model with the collected data and evaluate the validity of the model and its scale.

It is a well-known fact that mobile phones have a great place in modern people's lives in 21st century. Most people carry their mobile phones everywhere and for almost a decade they have used smart phones since they provide convenience. Since, it would be impossible to keep sports and mobile phones separate in fitness centers, a more pragmatic approach was taken in order to utilize the benefits of the mobile phones. In some studies, this positive relation was proven, and they showed evidence about the fact that mobile phone-based approaches encourage the physical activity (Monroe, Thompson, Bassett, Fitzhugh, & Raynor, 2015).

It is significant to state here that not only mobile phones but also applications have an impact on people's life-styles. Owing to using it almost everywhere, it should be encouraged to use it in fitness centers. The important point here is to promote the applications in order to make them useful. Recent studies have displayed that

using a mobile phone application has a positive impact on life style, and fitness applications can be an instrument for that (Minerva Medica, Gabbiadini, & Greitemeyer, 2018). Therefore, both mobile phones and applications have gained importance in sports sector, and they ought to be used in the area so as to increase the benefits.

With the need of an application for individual testing of Beacon technology in fitness centers, the application named BS-MFIA was developed for the study. The feeds functioning in BS-MFIA are location based; therefore, specific and supportive information about fitness can be provided, when necessary. With these qualities, it is obvious that BS-MFIA is different than other mobile information services on the fitness & sports market. Beacon, which is a new generation of low-cost Bluetooth devices, is a device that allows fitness centers to track the exact location of members via their mobile devices, and this characteristic is useful for both fitness centers and their members by providing centers the location of their members and giving members the information they need to get such as tips about health or exercise.

This study has showed how Beacon technology works in fitness centers whereby triggering the mobile device and providing the relevant exercise information to the members about intervention, promotion and demonstration of the right exercise technique.

5.2 Discussion of Results

In this part, the results of the study were discussed. After analyzing the pilot study, the results supported the idea that the items under personal characteristics and initiatives needs to be removed in the main study as supported by the literature. For instance, in a study which measured the effect of mobile information system in higher education, personal initiatives and characteristics were found to have no significant effect on intention in the study (Tuğba Koç, Turan, & Okursoy, 2016).

The study was also researched in Turkish context and provided the same results (Tuğba Koç & Turan, 2014).

After removing the aforementioned items, the results of the SEM analysis showed that all of the hypotheses proposed in MSAM are supported (Table 18). The total variance explained in intention to use BS-MFIA (39%).

Table 18

Summary of the results

Hypotheses	Result
H1. Fitness participants' perceived ease of use will significantly and positively influence their intentions to use the BS-MFIA.	Accepted
H2. Fitness participants' perceived usefulness will significantly and positively influence their intentions to use the BS-MFIA.	Accepted
H3. Fitness participants' perception of trust will significantly and positively influence their intentions to use the BS-MFIA	Accepted
H4. Fitness participant' perception of context will significantly and positively influence their perceived usefulness of the BS-MFIA.	Accepted
H5. Fitness participant' perception of context will significantly and positively influence their perceived ease of use of the BS-MFIA.	Accepted
H6. Fitness participants perceived ease of use will significantly and positively influence their perceived usefulness of the BS-MFIA.	Accepted

Overall, the results of the SEM analysis showed that perceived ease of use, perceived usefulness, trust and context play an important role in participant's intentions to use the BS-MFIA. Perceived usefulness positively influences behavioral intention to use the BS-MFIA. Perceived ease of use positively influences perceived usefulness. At the same time, perceived ease of use indirectly influences intention to use the BS-MFIA through its direct influence on perceived usefulness and intention. Trust positively influences behavioral intention to use the BS-MFIA. Context indirectly influences intention to use the BS-MFIA through its direct influence on perceived ease of use and perceived usefulness. The following part discusses the results related to each hypothesis in a detailed way.

Research Hypothesis 1: Fitness participants' perceived ease of use will significantly and positively influence their intentions to use the BS-MFIA.

The findings indicated that the perceived ease of use (PEOU) significantly and positively influenced fitness participants' intention towards using the BS-MFI. In other words, system needs to be easy to use so that fitness participants have more confidence to use it. Likewise, in similar studies, PEOU also affects intention to use in the mobile government system (Osman, 2013). Perceived ease of use or flexibility to use has also positive impact on the behavioral intention of the consumers to mobile internet (Das, 2011). Practicality is also another preference of the system and can affect fitness participants' acceptance decisions significantly. Therefore, this study supports the claim that easy interaction between user and mobile application in the BS-MFIA may improve the participants' intention towards using it. In short, the developers of the application or similar systems should pay attention to make the interface simple since the easier users find the usage of application, the more they tend to use it.

Research Hypothesis 2: Fitness participants' perceived usefulness will significantly and positively influence their intentions to use the BS-MFIA.

Study findings suggested that perceived usefulness (PU) influences intention to use BS-MFIA, which is also similar with the literature. A study which searched information technology also found that PU mainly influences the intention (Hu, Chau, Sheng, & Tam, 1999).

When users find the application good for their benefits, their intentions to use it directly increases. Therefore, PU was stated to be an important predictor in researches that study technology acceptance was also confirmed in previous studies, as well. A study which tested Technology Acceptance Model for the acceptance of the internet banking confirmed the PU as significant (T. Ramayah, Ma'ruf, Jantan, & Mohamad, 2002). The ease of use was also studied on electronic mail system longitudinally, and the study supported the idea that Technology Acceptance Model could be accepted as a beneficial instrument to predict intentions to use an information system (Szajna, 1996). Another study searched the effect of PU on ticket purchase for the 2010 FIFA Soccer World Cup™. The study found that PU of the Internet had a significant and positive effect on the attitude of using it for buying tickets (Dhurup, Surujlal, & Mahlangu, 2011).

As both this study and previous studies supported, perceived usefulness is very important for intention to use the BS-MFIA. Users should be convinced that to use this mobile system will be fruitful for them in order to start and go on using it. It should be taken into consideration that items below PU include things as increasing efficiency or keeping tracks of weekly fitness tasks, so using the technology in fitness sector will be likely to indirectly increase not only the efficiency but also amount of going on doing fitness. Unless users find a system useful, they may give up using it, but after feeling that it is beneficial, they will go on, and it may even make them more conscious fitness participants, which may yield many positive results. Hence, if technological systems provide the increase of PU, productivity and performance of the systems are more likely to increase.

Research Hypothesis 3: Fitness participants' perception of trust will significantly and positively influence their intentions to use the BS-MFIA.

This study showed that trust factor influenced intention to use the system more. Trust is described as a crucial factor, and recommended to build consumer trust if an investment in Beacon technology, which is also defined as innovative opportunity, is intended (Moody, 2015).

Kaasinen (2005) found trust as a factor that affects the acceptance of mobile services and described it as specific and important. Similarly, Keat & Mohan (2004) defined trust as a mixture of familiarity, fame, and experience. Therefore, trust is seen as one of the most important factor that companies should have. Indeed, users need to trust the application in terms of being safe or risk-free and include reliable data. Trust factor is one of the most notable factor that influence the intention not only in sports sector but also in other fields. For instance, in health sector, trust was found to be significant. In their study, Oliver & Müller (2013) stated that trust plays an important role in the adoption process of mobile health application.

It can be stated that if users do not trust the system, they will avoid using it because as examined before, trust affects decision, and trust is a need (Gefen, Karahanna & Straub, 2003). Since the effect of trust is the most significant on the intention of using the application, it is the thing that developers pay the most attention. Users would like to rely on the application they are using and the data it offers. They should know that the information of the data is approved by the authority, and the application is not a thing they need to be worried about.

In short, trust factor is really important for fitness participants' preference to use the system, so each part of the system, which are mobile applications and Beacon, should help fitness participants build trust, and system developers need to more concentrate on this factor.

Research Hypothesis 4: Fitness participant' perception of context will significantly and positively influence their perceived usefulness of the BS-MFIA.

Perception of context was found to be a higher determinant for perceived usefulness, and influence intention. When users feel to be encouraged to use the system or feel that people around them use it, their intention to use it increases. The application should offer pleasant experiences to the users and be easy to obtain and install. Also, being a popular application may have an effect. Especially when the authority supports to use the system, the tendency significantly rises.

The importance of context was highlighted in the literature. A study searching for mobile ticketing service pointed out that context is an important determinant for the intention of consumers to use the system (Mallat, Matti, Tuunainen & Öörni, 2009). Therefore, it can be concluded that perception of context has a significant effect on perceived usefulness.

Research Hypothesis 5: Fitness participant' perception of context will significantly and positively influence their perceived ease of use of the BS-MFIA.

As stated before, context is a significant factor, and it is also an important determinant for perceived ease of use and influence intention.

A study which proposed and tested an adoption model of mobile gaming found that context is the most powerful predictor of mobile game adoption. Context has a significant effect on perceptions of mobile gaming (Liu & Li, 2011).

In addition, context can also define the usage behavior, and describe more than personal characteristics (van de Wijngaert & Bouwman, 2009). Therefore, context is very important for both mobile applications to be preferred and Beacon' s customized messages, so users can understand and be eager to continue to follow.

In sum, the use of a mobile service is also dependent on the context. When integrated in certain contexts, users tend to value the mobile services (Verkasalo, 2009). With the significant result of the study, it can be concluded that users are apt to use the Beacon technology in fitness centers.

Research Hypothesis 6: Fitness participants' perceived ease of use will significantly and positively influence their perceived usefulness of the BS-MFIA.

The results indicate that if people perceive the system components as easy-to-use, more participants become users of the BS-MFIA as they perceive the BS-MFIA useful and prefer to use it in fitness centers.

Also, perceived ease of use indirectly influences fitness participants' intention to use the BS-MFIA through perceived usefulness.

Similarly in previous researches, PU, PEOU, trust and security were found to have a directly influence on the intention to use mobile services in other contexts as in health context in the United Arab Emirates (Alloghani, Hussain, Al-Jumeily, & Abuelma'atti, 2015).

In another study, learners' intention to use a new learning environment was searched, and the study concluded that perceived usefulness has a significant effect on the behavioral intention to use (Balog & Pribeanu, 2010).

In a different context, a study showed that perceived usefulness, perceived ease of use, and attitude were determinants of the acceptance of the Electronic Performance Support System (Sumuer & Yildirim, 2015).

After the analysis of the results and examining the hypothesis, it can be concluded that the findings of the study are important due to providing a theoretical background for Beacon technology in fitness industry and paving the way for

mobile fitness application developers who could better understand the consumers' intention to use a mobile service. To understand users' intention whether to use this technology for their fitness development or not will provide valuable information for technological developments in this field. This study contributes to the field since there are only a limited number of researches on Beacons- using Beacons in fitness industry, specifically. By identifying challenges and opportunities of the technology, it helps to get the attention of researchers to make further researches using the technology, and of developers who may have questions whether to use it.

Besides, this study provides specific suggestions to the industry about how to provide engaging experiences using the technology in this dissertation. This study has integrated the Beacon technology to the mobile app to serve the needs of fitness participants.

Beacons can still be counted as 'new', so they still need to be studied. The study has the aim of contributing to fill this gap. It is not surprising to get attention from different fields since they are markedly efficient in many ways. First of all, they are small and low-cost. Therefore, they are reachable and reasonable for many people. Second of all, they have a complicated system with sensors because of being a product of a recent high technology, but their usage is simple which can make them attractive for a wide variety of people –from businessmen to educators. Therefore, it is supposed to be used in fitness sector, as well. Third of all, while providing a different experience to users, they do not create a more difficult environment for users as many technological systems are claimed to do. They are easy to install, but enjoyable to use. When all these qualities are taken into consideration, Beacons have a promising future, and the users will probably highly increase in number soon. In fact, in 2015, approximately four million Beacons were in use, and around four hundred million Beacons are estimated to be in use by 2020 (Statler, 2016).

Furthermore, as technology is growing by leaps and bounds, people's lives in modern world are getting smarter. Smart technologies are spreading very fast, and smart technology is getting engaged in almost all areas. The usage of smart technology is spreading in not only homes, but also other social places. With that, location services are widely used. However, location services are mostly available in bigger places like showing the place the user in. Beacon technology helps here by contributing the 'smart lives' and providing the indoor location of users (Huh & Seo, 2017). Using this indoor location system in fitness centers may give a not only familiar but also charming experience to users.

Using the Beacon technology has a bright future in fitness sector. It will help fitness centers to track their members through their smart phones, and this may help them to understand if members follow a regular and suitable pattern. Plus, they will have the opportunity to determine the most and least used equipment in centers. With that data, they may adjust their financial and business plans since they can decide the purchases and maintenance plans accordingly. What is more, data about members' behaviors can give a clue about the needs of fitness center about a variety of topics.

CHAPTER VI

CONCLUSION

6.0 Presentation

This chapter has to give a brief summary of what the purpose of this study was, how it was conducted and what were the major findings of this study. It closes with a discussion of some important implications and limitations of the study. The chapter closes with suggestions for further studies.

6.1 A Summary of the Scope and Methodology of the Study

The scope of the main study is to understand if the Beacon technology can be used and integrated in the fitness context in Turkey. Figure 11 summarizes the research methodology used in the study.

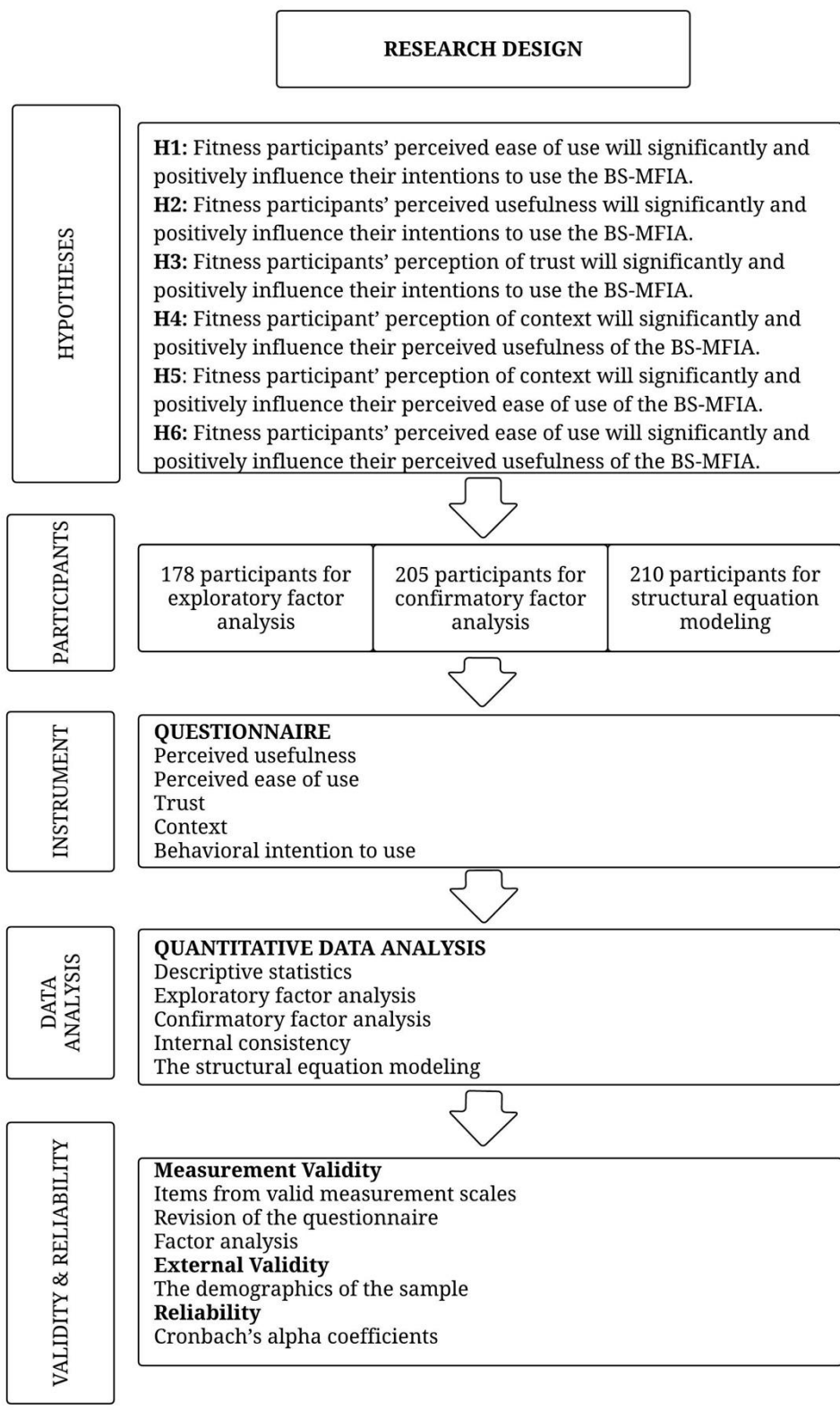


Figure 11 Summary of the methodology

6.2 Implications of the Study

This study makes a contribution to understand the effect of perceptual beliefs (perceived ease of use, perceived usefulness, trust and context) on the intention to use BS-MFIA. The study has used the modified MSAM in sports field, fitness specifically, and the findings have revealed evidences for the fact that it is a valid model. Most importantly, the findings have showed that perceived ease of use, perceived usefulness and trust have a significant effect on intention, but trust has the most direct significant effect on the intention. Also, context has an indirect significant effect on the intention to use BS-MFIA. It is important to state that there are few studies that researched MSAM in sports area; hence it could be considered that the study has made a significant contribution to the technology adaptation researches.

This study examined the Beacon technology with the mobile application in the fitness environment by fitness participants. It is good idea that to use Beacon technology with different samples in exercise and fitness would be fruitful. For example, sedentary people could be invited to fitness centers by the mean of Beacon and mobile applications by providing them healthy life style's invitations, tips and information while passing near the fitness center.

With the help of Beacon technology, smartphones can be used as a personal trainer and mobile application may help to plan and apply workout programs more effectively. This may help to decrease high labor costs in gyms and fitness centers to provide automated, pre-configured training programs' suggestions, and also may provide a specific workout plan for members within the application. Beacon technology has an ability of tracking fitness member routines and frequency of their visits. These features will be likely to provide fitness centers have an opportunity to organize their staff more efficiently.

It is known that fitness centers may have the problem of overcrowding, and because of this, the staff may have problems of reaching every single member in

the center at the same time. Beacon technology could help members by providing fitness station's exercise routine to them easily. By tracking the location of members, Beacons also provide fitness centers newer tools to deal with a lot of members.

Beacons can effortlessly collect information about fitness members with the application on their smartphones and provide members valuable insights about the fitness center such as more frequently used areas or how frequently people use an equipment which are kinds of information that mostly wanted and asked.

Some may find sharing the results in public motivating for fitness participants. Beacon and content management system can make it available to provide and present the collected information. With the help of this technology, the results of every member can be reflected on a screen as well as their mobile phones.

6.3 Limitations of the Study

The study aims to look for and analyze the determinants of users' intention to use the Beacon technology supported application, but it has its own limitations just like any other research.

To start with, the findings of the study were based on data collected from the university students who do fitness in METU. The participants were selected with convenience sampling technique which may limit generalizability of the results, and since the study has focused on one specific group, university students in Turkey, it needs to be searched with wider groups and different population to make the generalizability of the model stronger.

Secondly, this study focused on the fitness participants' behavioral intentions to use the BS-MFIA rather than actual use, and the questionnaire was administered after using the BS-MFIA in the fitness center only after they had downloaded it. This was proper to the nature of quantitative studies; however, it still might

partially reflect the participant's long-term thoughts and perceptions regarding the BS-MFIA.

In addition, the data were collected only based on the participants' responds they gave to the questionnaire. Therefore, the self-report could be stronger via adding a qualitative aspect.

Also, there may be some other factors that possibly have an impact on the intention to use the system. For instance, personalization and personal innovativeness in information technology have a significant effect on the intention to use (Kwak, 2014). However, this study included perceived ease of use, perceived usefulness, context and trust with the aim of sticking to the model the study based on.

Moreover, the Beacon technology is location-based, which means that it might be open to be affected by the environmental factors or obstacles. Therefore, the centers need to pay attention to the places they locate the Beacons.

Lastly, users' physical activity experience was not evaluated as a variable in the study, but it may have an effect on intention, as well.

6.4 Suggestions for Further Studies

This dissertation has tried to search the determinants which affect the intention to use a mobile system; however, the topic still needs to be studied more in order to understand the intention to use of mobile services and Beacon technology deeply. This section of the study aims to point out several suggestions for future studies.

First of all, this study has tried to apply the Mobile Service Acceptance Model by using the Beacon technology in fitness area; however, it was based on only one system and studied with a specific group, so it can be applied with different areas and people belonging to different groups.

Second of all, the study was conducted quantitatively and provided statistical data; however, adding a qualitative aspect may help gain another aspect about the application.

Moreover, although the study tested the efficiency of the system and made an interpretation about the possible effects of it on people, more studies could be done to see whether Beacon technology in fitness centers will promote and increase the physical activity participation significantly.

In addition, although no other factor was added to the Mobile Service Acceptance Model in this study, other factors such as enjoyment, motivation or cost could be added to the model which might make a difference. To illustrate, in previous studies motivation, price and habit were added the model used (Mohammad, 2014), and similar factors can be studied. This may particularly be significant since the models need to be developed, and they may become less accurate when the service is getting newer and more innovative (Martignoni et al., 2008). Another recommendation could be compatibility as it was found to have a significant influence on mobile service acceptance (Wu & Wang, 2005).

Also, adding some social features to the application and connecting it with users' social media accounts, for instance, may make a difference on the intent of the usage of the application. Being enjoyable can be a factor that may affect the intention to use the mobile service. In fact, playfulness was found to be a factor that influenced users' attitudes towards using a technological system (Moon & Kim, 2001). Similarly, creating apps which might offer enjoyment was another recommendation in recent studies (Yuan et al., 2015). Therefore, enjoyment factor should not be underestimated and be added in future studies.

To conclude, the findings of the study discuss the potential positive sides of Beacon technology and highlight the need of more researches that can be done in the future. Beacon-based location aware system with the integration of mobile fitness instructor application was proposed and tested in this study. As the

development of technology and commerce progress, the location-aware services like fitness and healthy lifestyle intervention systems can be improved more, and smart fitness and gym centers will probably become more popular.

REFERENCES

- Ajzen, I., Fishbein, M., Atomic, I., Agency, E., Federal, T., & Commission, T. (1980). Theory of Reasoned Action / Theory of Planned Behavior. *Social Psychology*, 2007, 67–98.
- Alloghani, M., Hussain, A., Al-Jumeily, D., & Abuelma'atti, O. (2015, December). Technology Acceptance Model for the Use of M-Health Services among health related users in UAE. In *Developments of E-Systems Engineering (DeSE), 2015 International Conference on* (pp. 213-217). IEEE.
- Altun, Ö & Koçak S. (2013). *Ağırlık Egzersizleri Kılavuzu*, Ankara: (n.p.).
- Balog, A., & Pribeanu, C. (2010). The role of perceived enjoyment in the students' acceptance of an augmented reality teaching platform: A structural equation modelling approach. *Studies in Informatics and Control*, 19(3), 319–330.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215.
- Bandura, A. (1986). The Explanatory and Predictive Scope of Self-Efficacy Theory. *Journal of Social and Clinical Psychology*, 4(3), 359–373.
- Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71-81). New York: Academic Press. (Reprinted in H. Friedman [Ed.], *Encyclopedia of mental health*. San Diego: Academic Press, 1998).
- Bandura, A. (1997). *Theoretical perspectives*. In *Self-efficacy: The exercise of control* (Vol. 50, p. 604), New York: Freeman.

- Barki, H., & Hartwick, J. (1994). Measuring user participation, user involvement, and user attitude. *MIS quarterly*, 59-82.
- Barki, H., & Hartwick, J. (1994). User participation, conflict, and conflict resolution: the mediating roles of influence. *Information Systems Research*, 5(4), 422-438.
- Barki, H., & Hartwick, J. (2004). Conceptualizing the construct of interpersonal conflict. *International journal of conflict management*, 15(3), 216-244.
- Benbasat, I., & Barki, H. (2007). Quo vadis TAM?. *Journal of the association for information systems*, 8(4), 7.
- Bieber, G., & Giersich, M. (2001). Personal mobile navigation systems—design considerations and experiences. *Computers & Graphics*, 25(4), 563-570.
- Browne, M. W., & Cudeck, R. (1993). *Alternative ways of assessing model fit*. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162). Newbury Park, CA: Sage.
- Bull, F. C., Kreuter, M. W., & Scharff, D. P. (1999). Effects of tailored, personalized and general health messages on physical activity. *Patient education and counseling*, 36(2), 181-192.
- Buttussi, F., & Chittaro, L. (2008). MOPET: A context-aware and user-adaptive wearable system for fitness training. *Artificial Intelligence in Medicine*, 42(2), 153-163.
- Byrne, B. M. (2010). *Structural equation modeling with AMOS : basic concepts, applications, and programming* NJ: Lawrence Erlbaum Associates.

- Chaffey, D. (2017). *Mobile marketing statistics compilation*. Retrieved from <http://www.smartinsights.com/mobile-marketing/mobile-marketing-analytics/mobile-marketing-statistics/>.
- Chávez, E., Ide, R., & Kirste, T. (1999). Interactive applications of personal situation-aware assistants. *Computers and Graphics (Pergamon)*, 23(6), 903–915.
- Cherry, K. (2014). Id, Ego, and Superego: Freud's 3 Parts of Personality.
- Cheverst, K., Davies, N., Mitchell, K., Friday, A., & Efstratiou, C. (2000). Developing a context-aware electronic tourist guide. In *Proceedings of the SIGCHI conference on Human factors in computing systems - CHI '00* (pp. 17–24).
- Consolvo, S., Everitt, K., Smith, I., & Landay, J. A. (2006). Design requirements for technologies that encourage physical activity. In *Proceedings of the SIGCHI conference on Human Factors in computing systems - CHI '06* (p. 457).
- Das, C. (2011). *A study on validity of modified technology acceptance model of mobile*. Nagpur, India: RTM Nagpur University.
- Davis, F. D. (1985). *A technology acceptance model for empirically testing new end-user information systems: Theory and results* (Doctoral dissertation, Massachusetts Institute of Technology).
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 319-340.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35, 982-1003.

- Davis, K. A. (1995). Qualitative theory and methods in applied linguistics research. *Tesol Quarterly*, 29(3), 427-453.
- Dekker- Van Weering, M. G. H., Vollenbroek-Hutten, M. M. R., & Hermens, H. J. (2012). Do personalized feedback messages about activity patterns stimulate patients with chronic low back pain to change their activity behavior on a short term notice? *Applied Psychophysiology Biofeedback*, 37(2), 81–89.
- DeVellis, B. M. (1983). Self-efficacy theory. *Patient Education Newsletter*, 6(2), 4–6.
- Dey, A. K. (2001). Understanding and using context. *Personal Ubiquitous Computing*, 5(1), 4–7.
- Dhurup, M., Surujlal, J., & Mahlangu, A. B. (2011). Application of the Technology Acceptance Model (TAM) in electronic ticket purchase for the 2010 FIFA World Cup™. *African Journal For Physical, Health Education, Recreation & Dance*, 202-215.
- Altun, Ö & Koçak S. (2010). *Egzersiziz Kılavuzu*, Ankara: ODTÜ
- Fano, A.E. (1998). Shopper's Eye: Using location-based filtering for a shopping agent in the physical world. In: *Proceedings of the Second International Conference on Autonomous Agents*, 416–421.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior*. Reading, MA: Addison-Wesley.
- Fraenkel, J.R., & Wallen, N.E., (2000). *How to Design & Evaluate Research in Education* (4th Ed.). New York: McGraw-Hill Higher Education.

- Fukuoka, Y., Gay, C. L., Joiner, K. L., & Vittinghoff, E. (2015). A novel diabetes prevention intervention using a mobile app: a randomized controlled trial with overweight adults at risk. *American journal of preventive medicine*, 49(2), 223-237.
- Fukuoka, Y., Vittinghoff, E., Jong, S. S., & Haskell, W. (2010). Innovation to motivation-pilot study of a mobile phone intervention to increase physical activity among sedentary women. *Preventive Medicine*, 51(3-4), 287-289.
- Gabbiadini, A., & Greitemeyer, T. (2018). Fitness mobile apps positively affect attitudes, perceived behavioral control and physical activities. *The Journal of Sports Medicine and Physical Fitness*. <https://doi.org/10.23736/S0022-4707.18.08260-9>
- Gao, S., Krogstie, J., & Gransæther, P. A. (2008, August). Mobile services acceptance model. In *Convergence and Hybrid Information Technology, 2008. ICHIT'08. International Conference on* (pp. 446-453). IEEE.
- Gao, S., Krogstie, J., & Siau, K. (2011). Developing an instrument to measure the adoption of mobile services. *Mobile Information Systems*, 7(1), 45-67.
- Gao, S., Krogstie, J., & Siau, K. (2014). Adoption of mobile information services: An empirical study. *Mobile Information Systems*, 10(2), 147-171.
- Gao, S., Moe, S. P., & Krogstie, J. (2010, June). An empirical test of the mobile services acceptance model. In *Mobile Business and 2010 Ninth Global Mobility Roundtable (ICMB-GMR), 2010 Ninth International Conference on* (pp. 168-175). IEEE.
- Geddes, O. (2014). *A Guide to Bluetooth Beacons*. 1st ed. (ebook) pp.20-31. Retrieved from: <https://www.gsma.com/digitalcommerce/wp-content/uploads/2013/10/A-guide-to-BLE-Beacons-FINAL-18-Sept-14.pdf>

- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS quarterly*, 27(1), 51-90.
- Graham, J. M., Guthrie, A. C., & Thompson, B. (2003). Consequences of not interpreting structure coefficients in published CFA research: A reminder. *Structural Equation Modeling*, 10(1), 142–153.
- Greenberg, S. (2001). Context as a dynamic construct. *Human-Computer Interaction*, 16(2), 257-268.
- Haggerty, J. L., Lévesque, J. F., Santor, D. A., Burge, F., Beaulieu, C., Bouharaoui, F., Beaulieu MD, Pineault R & Gass, D. (2011). *Accessibility from the patient perspective: Comparison of primary healthcare evaluation instruments. Healthcare Policy*, 7(SPEC. ISSUE), 94–107.
- Hale, J. L., Householder, B. J., & Greene, K. (2002). Theory of reasoned action. In J. P. Dillard & M. Pfau (Eds.), *The persuasion handbook: Developments in theory and practice* (pp. 259–286). Thousand Oaks, CA: Sage.
- Hamper, A. (2015, January). A Context Aware Mobile Application for Physical Activity Promotion. In *System Sciences (HICSS), 2015 48th Hawaii International Conference on* (pp. 3197-3206). IEEE.
- Harries, T., Eslambolchilar, P., & Stride, C. (2013). Walking in the wild: Using an always-on smartphone application to increase physical activity. *Human-Computer Interaction*, 8120, 19–36.
- Hartwick, J., & Barki, H. (1994). Explaining the role of user participation in information system use. *Management Science*, 40(4), 440–465.
- Hartwick, J., & Barki, H. (1994). Hypothesis testing and hypothesis generating research: An example from the user participation literature. *Information Systems Research*, 5(4), 446–449.

- Hofacker, C. F., De Ruyter, K., Lurie, N. H., Manchanda, P., & Donaldson, J. (2016). Gamification and mobile marketing effectiveness. *Journal of Interactive Marketing*, 34, 25-36.
- Hu, L., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1e55.
- Hu, P. J., Chau, P. Y., Sheng, O. R. L., & Tam, K. Y. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of management information systems*, 16(2), 91-112.
- Huh, J.-H., & Seo, K. (2017). An Indoor Location-Based Control System Using Bluetooth Beacons for IoT Systems. *Sensors*, 17(12), 2917.
- Hur, Y., Ko, Y. J., & Claussen, C. L. (2012). Determinants of using sports web portals: An empirical examination of the Sport Website Acceptance Model. *International Journal of Sports Marketing and Sponsorship*, 13(3), 169–188.
- Jaccard, J., & Wan, C. K. (1996). *LISREL approaches to interaction effects in multiple regression*. Thousand Oaks, CA: Sage Publications.
- Jang Yul, K. (2014). *Determinants of users' intention to adopt mobile fitness applications: An extended technology acceptance model approach* (Doctoral dissertation). Retrieved from: http://digitalrepository.unm.edu/educ_hess_etds/16
- Kaiser, H. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31-36.
- Keat, T. K. and Mohan, A. (2004) Integration of TAM based electronic commerce models for trust. *The Journal of American Academy of Business*, 5(1/2), pp. 404-410.

- King, A. C., Hekler, E. B., Grieco, L. A., Winter, S. J., Sheats, J. L., Buman, M. P., Banny, B., Thomas, N. R., & Cirimele, J. (2016). Effects of three motivationally targeted mobile device applications on initial physical activity and sedentary behavior change in midlife and older adults: a randomized trial. *PLoS One*, *11*(6), e0156370.
- King, A. C., Jeffery, R. W., Fridinger, F., Dusenbury, L., Provence, S., Hedlund, S. A., & Spangler, K. (1995). Environmental and policy approaches to cardiovascular disease prevention through physical activity: issues and opportunities. *Health Education Quarterly*, *22*(4), 499-511.
- Koç, T., & Turan, A. H. (2014). Mobil Sabis kabul ve kullanımı: Sakarya Üniversitesi'nde ampirik bir değerlendirme. *Bilgi Ekonomisi ve Yönetimi Dergisi*, *9*(II), 163–175.
- Koç, T., Turan, A. H., & Okursoy, A. (2016). Acceptance and usage of a mobile information system in higher education: An empirical study with structural equation modeling. *International Journal of Management Education*, *14*(3), 286–300.
- Kwak, D. H., & McDaniel, S. R. (2011). Using an extended Technology Acceptance Model in exploring antecedents to adopting fantasy sports league websites. *International Journal of Sports Marketing and Sponsorship*, *12*(3), 43–56.
- Kline, R. B. (2004). *Principles and practice of structural equation modeling 2nd ed.* New York: Guildford.
- Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., Katzmarzyk, P. T., & Lancet Physical Activity Series Working Group. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *The lancet*, *380*(9838), 219-229.

- Lee, T., & Jun, J. (2005). Contextual perceived usefulness? Toward an understanding of mobile commerce acceptance. In *4th Annual International Conference on Mobile Business, ICMB 2005* (pp. 255–261).
- Legris, P., Ingham, J., & Colletette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management*, *40*(3), 191–204.
- Liu, Y., & Li, H. (2011). Exploring the impact of use context on mobile hedonic services adoption: An empirical study on mobile gaming in China. *Computers in Human Behavior*, *27*(2), 890–898.
- MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, *1*, 130-149.
- Mallat, N., Rossi, M., Tuunainen, V. K., & Öörni, A. (2009). The impact of use context on mobile services acceptance: The case of mobile ticketing. *Information and Management*, *46*(3), 190–195.
- Martignoni, R., Stanoevska-Slabeva, K., Mueller, D., & Hoegg, R. (2008, June). Evaluation of Future Mobile Services Based on the Technology Acceptance Model. In ECIS (pp. 1190-1203).
- Maruyama, G. M. (1998). *Basics of structural equation modeling*. Thousand Oaks, CA: Sage.
- Moody, M. (2015). Analysis of promising Beacon technology for consumers. *Elon Journal of Undergraduate Research in Communications*, *6*(1).
- Moon, J. W., & Kim, Y. G. (2001). Extending the TAM for a World-Wide-Web context. *Information and Management*, *38*(4), 217–230.

- Monroe, C. M., Thompson, D. L., Bassett Jr, D. R., Fitzhugh, E. C., & Raynor, H. A. (2015). Usability of mobile phones in physical activity–related research: a systematic review. *American Journal of Health Education*, 46(4), 196-206.
- Morrow Jr, J. R., Krzewinski-Malone, J. A., Jackson, A. W., Bungum, T. J., & Fitzgerald, S. J. (2004). American adults' knowledge of exercise recommendations. *Research quarterly for exercise and sport*, 75(3), 231-237.
- Murray, C. E. (2009). Diffusion of innovation theory: A bridge for the research-practice gap in counseling. *Journal of Counseling & Development*, 87(1), 108-116.
- Napolitano, M. A., Fotheringham, M., Tate, D., Sciamanna, C., Leslie, E., Owen, N., Bauman, A., & Marcus, B. (2003). Evaluation of an internet-based physical activity intervention: a preliminary investigation. *Annals of Behavioral Medicine*, 25(2), 92-99.
- Neville, L. M., O'Hara, B., & Milat, A. (2009). Computer-tailored physical activity behavior change interventions targeting adults: a systematic review. *The International Journal of Behavioral Nutrition and Physical Activity*, 6(30), 30–42.
- Norman, G. J., Zabinski, M. F., Adams, M. A., Rosenberg, D. E., Yaroch, A. L., & Atienza, A. A. (2007). A review of eHealth interventions for physical activity and dietary behavior change. *American journal of preventive medicine*, 33(4), 336-345.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill
- Oliver, & Müller. (2013). *Erasmus School of Economics What Drives the Adoption of Mobile Health Applications ? Drivers in the Adoption of Mobile Health Applications*. Erasmus School of Economics.

- Osman, N. B. (2013). Extending the Technology Acceptance Model for Mobile Government Systems. *The International Arab Conference on Information Technology*, 1–8.
- Preacher, K. J., & MacCallum, R. C. (2003). Repairing Tom Swift's electric factor analysis machine. *Understanding statistics: Statistical issues in psychology, education, and the social sciences*, 2(1), 13-43.
- Purpura, S., Schwanda, V., Williams, K., Stubler, W., & Sengers, P. (2011). Fit4life: The design of a persuasive technology promoting healthy behavior and ideal weight. *Proceedings of the 2011 Annual Conference on Human Factors in Computing Systems - CHI '11*, (p. 423). New York, New York, USA: ACM Press
- Quintana, S. M., & Maxwell, S. E. (1999). Implications of recent developments in structural equation modeling for counseling psychology. *Counseling Psychologist*, 27, 485–527
- Rao, S., & Troshani, I. (2007). A conceptual framework and propositions for the acceptance of mobile services. *Journal of Theoretical and Applied Electronic Commerce Research*, 2(2), 61–73.
- Rogers, E. M. (1995). *Diffusion of Innovation Theory. Elements of Diffusion*.
- Santor, D. A., Haggerty, J. L., Lévesque, J. F., Burge, F., Beaulieu, M. D., Gass, D., & Pineault, R. (2011). An overview of confirmatory factor analysis and item response analysis applied to instruments to evaluate primary healthcare. *Healthcare Policy*, 7(Spec Issue), 79.
- Schnohr, P. (2009). Physical activity in leisure time: impact on mortality. Risks and benefits. *Danish Medical Bulletin*, 56(1), 40–71.

- Schumacker, R. E., & Lomax, R. G. (1996). *A beginner's guide to structural equation modeling*. NJ: Lawrence Erlbaum Associates Publishers.
- Schumacker R.E., Lomax R.G., (2004), *A beginners guide to Structural Equation Modelling*, Second Edition, Lawrence Erlbaum Associates, Inc., Mahwah, NJ.
- Schunk, D. H., & Pajares, F. (2009). Self-efficacy theory. *Handbook of motivation at school*, 35-53.
- Shevlin, M. E., & Lewis, C. A. (1999). The revised social anxiety scale: exploratory and confirmatory factor analysis. *The Journal of Social Psychology*, 139(2), 250–252.
- Statler, S. (2016). Understanding Beacon Networks. In *Beacon Technologies* (pp. 211–253). Berkeley, CA: Apress.
- Steiger, J. H. (2007). Understanding the limitations of global fit assessment in structural equation modeling. *Personality and Individual Differences*, 42, 893-898.
- Sumner, E., & Yildirim, S. (2015). Exploring User Acceptance of an Electronic Performance Support System. *Performance Improvement Quarterly*, 27(4), 29-48
- Szajna, B. (1996). Empirical evaluation of the revised technology acceptance model. *Management science*, 42(1), 85-92.
- Ramayah, T., Ma'ruf, J. J., Jantan, M., and Mohamad, O. (2002). Technology acceptance model: is it applicable to users and non users of internet banking. *The Proceedings of the International Seminar*, Indonesia-Malaysia, Banda Aceh, Indonesia, 14–15th October.

- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA, : Allyn & Bacon/Pearson Education.
- Tabachnick, B. G., & Fidell, L. S. (2012). *Using Multivariate Statistics* (6th ed.). New York, NY: Pearson Education.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). New York, NY: Pearson Education
- Tabak, M., Op den Akker, H., & Hermens, H. (2014). Motivational cues as real-time feedback for changing daily activity behavior of patients with COPD. *Patient Education and Counseling*, 94(3), 372–378.
- Thompson, D. (2013). iBeacon and Bluetooth LE: An Introduction.
- Thorsteinsen, K., Vittersø, J., & Svendsen, G. B. (2014). Increasing physical activity efficiently: an experimental pilot study of a website and mobile phone intervention. *International journal of telemedicine and applications*, 2014, 8.
- Townsend, S., Larsen, M. E., Boonstra, T. W., & Christensen, H. (2015). Using Bluetooth Low Energy in smartphones to map social networks. arXiv:150803938 ArXiv.Org, cs.SI, 1–6. Retrieved from <http://arxiv.org/abs/1508.03938v1%5Cnpapers3://publication/uuid/CCB06A70-269B-4755-B2B4-53E4B6D1F1C0>
- Van de Wijngaert, L., & Bouwman, H. (2009). Would you share? Predicting the potential use of a new technology. *Telematics and Informatics*, 26(1), 85-102.
- Van Teijlingen, E., & Hundley, V. (1998). The importance of pilot studies. *Nursing Standard: Official Newspaper of the Royal College of Nursing*, 16(40), 33–36.

- Vandelanotte, C., Spathonis, K. M., Eakin, E. G., & Owen, N. (2007). Website-delivered physical activity interventions: A review of the literature. *American journal of preventive medicine*, 33(1), 54-64.
- Verkasalo, H. (2009). Contextual patterns in mobile service usage. *Personal and Ubiquitous Computing*, 13(5), 331–342.
- Weston, R., & Gore, P. A., Jr. (2006). A brief guide to structural equation modeling. *The Counseling Psychologist*, 34, 719-751.
- Who, W. H. O. (2010). Global recommendations on physical activity for health. *Geneva: World Health Organization*.
- Wonglimpiyarat, J., & Yuber, N. (2005). In support of innovation management and Roger's Innovation Diffusion theory. *Government Information Quarterly*, 22(3), 411–422.
- Wu, J.-H., & Wang, S.-C. (2005). What drives mobile commerce?: An empirical evaluation of the revised technology acceptance model. *Information & Management*, 42(5), 719–729.
- Yu, C. S. (2012). Factors affecting individuals to adopt mobile banking: Empirical evidence from the UTAUT model. *Journal of Electronic Commerce Research*, 13(2), 104.
- Yuan, S., Ma, W., Kanthawala, S., & Peng, W. (2015). Keep using my health apps: Discover users' perception of health and fitness apps with the UTAUT2 model. *Telemedicine and e-Health*, 21(9), 735-741.
- Zaichkowsky, J. L. (1985). Familiarity: Product use, involvement or expertise? *Advances in Consumer Research*, 12(1), 296–299.

Zaichkowsky, J. L. (1986). Conceptualizing involvement. *Journal of Advertising*, 15(2), 4-34.

APPENDICES

A: MIDDLE EAST TECHNICAL UNIVERSITY HUMAN SUBJECTS ETHICS COMMITTEE APPROVAL FORM (TURKISH)

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
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08 MART 2017

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgili: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof. Dr. Settar KOÇAK;

Danışmanlığını yaptığınız doktora öğrencisi Özkan ALTUN' un "*Kullanıcıların Beacon Teknoloji Destekli Mobil Fitness Danışmanı Uygulamasını Kullanma Niyetini Belirleyen Etkenler: Teknoloji Kabul Modeli Uygulaması*" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay 2017-EGT-038 protokol numarası ile 20.03.2017 – 31.12.2017 tarihleri arasında geçerli olmak üzere verilmiştir.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Canan SUMER

İnsan Araştırmaları Etik Kurulu Başkanı

Prof. Dr. Mehmet UTKU

İAEK Üyesi

Prof. Dr. Ayhan SOL

İAEK Üyesi

Prof. Dr. Ayhan Gürbüz DEMİR

İAEK Üyesi

Doç. Dr. Yaşar KONDAKÇI (4.)

İAEK Üyesi

Yrd. Doç. Dr. Pinar KAYGAN

İAEK Üyesi

Yrd. Doç. Dr. Emre SELÇUK

İAEK Üyesi

B: THE QUESTIONNAIRE (TURKISH)

BEACON DESTEKLİ MOBİL FITNESS DANIŞMANI UYGULAMASI SİSTEMİ (MFDUS) KULLANIM ANKETİ

MFDUS kullanmayı tercih ettiğiniz için TEŞEKKÜRLER.

BEACON Destekli Mobil Fitness Danışmanı Uygulaması Sistemini akıllı telefon aracılığıyla kullanımız ile ilgili aşağıdaki ifadelere hangi oranda katılıp katılmadığınızı belirtiniz.

Aşağıdaki ifadelere katılım derecenizi (X) olarak işaretleyiniz.	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
BS-MFDUS'ni kullanmak günlük Fitness programımın verimini arttırabilir					
BS-MFDUS spor merkezindeki egzersiz uygulama alanlarını bulmama imkan verebilir					
BS-MFDUS haftalık Fitness görevlerimi takip etmemi kolaylaştırabilir					
BS-MFDUS zamanımı daha iyi yönetmeme imkan verebilir					
BS-MFDUS Fitness merkezi kullanıcıları olarak bana faydalı olabilir					
BS-MFDUS'ni kullanmayı öğrenmek benim için kolaydır					
BS-MFDUS'ni kullanarak aradığım bilgilere kolaylıkla ulaşabilirim					
BS-MFDUS'nin kullanıcı ara yüzünü açık ve kolay anlaşılır buluyorum					
BS-MFDUS'ni kolaylıkla etkileşim kurabilecek kadar esnek buluyorum					
BS-MFDUS'nin kullanımının kolay olduğunu düşünüyorum (kullanıcı dostu)					
BS-MFDUS kullanıcılarının güvenliğini ve mahremiyetini koruyabiliyorsa, Bu sistemi kullanırım					
BS-MFDUS'ni kontrol altında tutabildiğime dair kendimi güvende hissedersen, Bu sistemi kullanırım					
Eğer BS-MFDUS'nin sağladığı verilerin güvenilir olduğunu hissedersen, Bu sistemi kullanırım					
Eğer BS-MFDUS'ni kullanmamın risksiz olduğuna inanırsam, Bu sistemi kullanırım					
Eğer BS-MFDUS'ni kullanmamın güvenli olduğuna inanırsam, Bu sistemi kullanırım					
Eğer çevremdeki çoğu insan kullanıyorsa, BS-MFDUS'ni kullandım					
Eğer daha önceden mobil servis kullanmaya ilişkin olumlu bir deneyimim varsa, BS-MFDUS'ni kullanırım					
Eğer üniversite BS-MFDUS kullanma konusunda destekliyorsa, sistemi kullanırım					
Eğer sistemi elde etmek ve gerekiyorsa cep telefonuma yüklemek kolaysa, BS-MFDUS'ni kullanırım					

**BEACON DESTEKLİ MOBİL FİTNESS DANIŞMANI UYGULAMASI SİSTEMİ
(MFDUS)
KULLANIM ANKETİ**

MFDUS kullanmayı tercih ettiğiniz için TEŞEKKÜRLER.

BEACON Destekli Mobil Fitness Danışmanı Uygulaması Sistemini akıllı telefon aracılığıyla kullanımınız ile ilgili aşağıdaki ifadelere hangi oranda katılıp katılmadığınızı belirtiniz.

Aşağıdaki ifadelere katılım derecenizi (X) olarak işaretleyiniz.	Kesniikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesniikle Katılıyorum
BS-MFDUS'ni kullanmak günlük Fitness programımın verimini arttırabilir					
BS-MFDUS spor merkezindeki egzersiz uygulama alanlarını bulmama imkan verebilir					
BS-MFDUS haftalık Fitness görevlerimi takip etmemi kolaylaştırabilir					
BS-MFDUS zamanımı daha iyi yönetmeme imkan verebilir					
BS-MFDUS Fitness merkezi kullanıcısi olarak bana faydalı olabilir					
BS-MFDUS'ni kullanmayı öğrenmek benim için kolaydır					
BS-MFDUS'ni kullanarak aradığım bilgilere kolaylıkla ulaşabilirim					
BS-MFDUS'nin kullanıcı ara yüzünü açık ve kolay anlaşılır buluyorum					
BS-MFDUS'ni kolaylıkla etkileşim kurabilecek kadar esnek buluyorum					
BS-MFDUS'nin kullanımının kolay olduğunu düşünüyorum (kullanıcı dostu)					
BS-MFDUS kullanıcılarının güvenliğini ve mahremiyetini koruyabiliyorsa, Bu sistemi kullanırım					
BS-MFDUS'ni kontrol altında tutabildiğime dair kendimi güvende hissedersen, Bu sistemi kullanırım					
Eğer BS-MFDUS'nin sağladığı verilerin güvenilir olduğunu hissedersen, Bu sistemi kullanırım					
Eğer BS-MFDUS'ni kullanmamın risksiz olduğuna inanırsam, Bu sistemi kullanırım					
Eğer BS-MFDUS'ni kullanmamın güvenli olduğuna inanırsam, Bu sistemi kullanırım					
Eğer çevremdeki çoğu insan kullanıyorsa, BS-MFDUS'ni kullanırdım					
Eğer daha önceden mobil servis kullanmaya ilişkin olumlu bir deneyimim varsa, BS-MFDUS'ni kullanırım					
Eğer üniversite BS-MFDUS kullanma konusunda destekliyorsa, sistemi kullanırım					
Eğer sistemi elde etmek ve gerekiyorsa cep telefonuma yüklemek kolaysa, BS-MFDUS'ni kullanırım					

C: INVITATION LETTER (TURKISH)

ARAŞTIRMAYA GÖNÜLLÜ KATILIM FORMU

Bu araştırma, ODTÜ Beden Eğitimi ve Spor Bölümü öğrencisi Özkan ALTUN tarafından Prof. Dr. Settar KOÇAK danışmanlığındaki doktora tezi kapsamında yürütülmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır.

Çalışmanın Amacı Nedir?

Araştırmanın amacı, kullanıcıların fitness salonlarında teknoloji kabul modeliyle Beacon teknolojisi destekli mobil fitness danışmanı uygulaması sistemi (BD-MFDUS) edinme niyetini araştırmak amacıyla bilgi toplamaktır.

Bize Nasıl Yardımcı Olmanızı İsteyeceğiz?

Araştırmaya katılmayı kabul ederseniz, sizden LIVEBEACON adlı telefon uygulamasını telefonunuza indiririz beklenmektedir. Bu uygulamayı indirdikten sonra Fitness Salonu içinde yer alan ESNEKLİK ve/veya AĞIRLIK EGZERSİZİ bölgelerinde telefonunuza gelecek olan egzersizleri incelemeniz olacaktır. Daha sonra bu sistemin kullanımını değerlendirmek amacıyla telefonunuza gelecek olan çevrimiçi soruları doldurmanız beklenmektedir.

Sizden Topladığımız Bilgileri Nasıl Kullanacağız?

Araştırmaya katılımınız tamamen gönüllülük temelinde olmalıdır. Çalışmada sizden kimlik veya kurum belirleyici hiçbir bilgi istenmemektedir. Cevaplarınız tamamıyla gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir. Katılımcılardan elde edilecek bilgiler toplu halde değerlendirilecek ve bilimsel yayımlarda kullanılacaktır.

Katılımınızla ilgili bilmeniz gerekenler:

Telefon uygulaması, genel olarak kişisel rahatsızlık verecek sorular veya uygulamalar içermemektedir. Ancak, katılım sırasında sorulardan ya da herhangi başka bir nedenden ötürü kendinizi rahatsız hissederseniz uygulamayı kullanmamakta serbestsiniz. hamile olanlar, kalp – damar hastalığı olanlar, göğüs ağrısı bulananlar, yüksek tansiyon hastaları ve fiziksel aktivite yaptığında durumu kötüye gidebilecek olanlar çalışmaya katılamazlar.

Riskler:

Bu araştırmaya katılmanın bilinen bir riski olmamasına rağmen; fitness salonunda egzersiz yaparken ya da uygulamanın size gösterdiği egzersizleri uygularken bazı semptomlar (nefes alışverişinde zorluk, göğüs ağrısı, göz kararması, mide bulantısı, tansiyon yükselmesi, vb) hissederseniz egzersiz yapmayı sonlandırmanız ve sağlık personelini bilgilendirmeniz gerekir.

Araştırmayla ilgili daha fazla bilgi almak isterseniz:

Uygulama sonunda, bu çalışmayla ilgili sorularınız cevaplanacaktır. Bu çalışmaya katıldığınız için şimdiden teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için Beden Eğitimi ve Spor Bölümü öğretim üyelerinden Prof. Dr. Settar KOÇAK (E-posta: settar@metu.edu.tr) ya da doktora öğrencisi Özkan ALTUN (E-posta: sporhocam@gmail.com) ile iletişim kurabilirsiniz.

Yukarıdaki bilgileri okudum ve bu çalışmaya tamamen gönüllü olarak katılıyorum.

(Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

İsim Soyad

Tarih

İmza

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D: POSTER (TURKISH)



ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

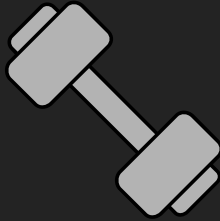


MOBILE PERSONAL TRAINER

LIVE BEACON

1. LIVEBEACON Uygulamasını indirin
2. Bu posterin önünde uygulamayı açın ve FITNESS Hareketlerini Öğrenin

ODTÜ BEDEN EĞİTİMİ ve SPOR BÖLÜMÜ



ÖZKAN ALTUN

0505 228 79 84

sporhocam@gmail.com

LIVEBEACON

MOBILE PERSONAL TRAINER



E: VITA

ÖZKAN ALTUN

Address : 6487 Silk Leaf Lane Jacksonville,
Florida. 32244, USA

Phone Numbers : +1 786 616 2391

E-Mail Address : sporhocam@gmail.com

Date of Birth : 11 / 27 / 1978

Place of Birth : Ankara, TURKEY

Marital Status : Married



EDUCATION

Doctorate : Sports Management, Middle East Technical University
(METU), 2018.

Graduate : Master's degree in the Sports Management, Middle East
Technical University (METU), 2010.

Undergraduate : Physical Education and Sport Department (High Honour
Student),
METU, 2002.

WORK HISTORY

2015 - 2017 : Health, Fitness & Wellness Director and Master Trainer at
“Sporhocam Hybrid Personal Training Center”.

2012 – 2017 : Founder Manager and Quality Nominee, European Fitness
& Wellness Training Academy, PEARSON-BTEC.
Pearson accredited training provider, center number:
91009. As a quality nominee, I was responsible to ensure
center was adhering to the quality systems set out by
PEARSON for all BTEC qualifications in sports, fitness,
wellness and outdoor. Also, I was developing curriculum
in sports sector.

2005 – 2011

- Founder Sports and Recreation Manager, METU Northern Cyprus Campus (METU NCC). I was responsible from all of the business, organization and management process of sports center and sports facilities from the beginning of the buildings development until the management process. I was also manager of Science and Technology Museum and Radio METU.
- Course Coordinator: Team work, leadership, low rope training programs for employee motivation, training and development.
- *Children's Summer* Camp Coordinator: Summer camps for the children between the ages of 7 and 14 years old. Full day camp program including sports (soccer, basketball, tennis, dance, etc.), art, music, English lessons, computer courses organized.

2002 – 2005

- Research Assistant in Physical Education and Sport Department at METU.
- Exercise Specialist in METU
 - Applying and assessing exercise tests (clinic and field tests).
 - Applying and planning exercise prescription.
 - Healthy Life Style and Fitness Lecturer.
- Fitness & Pilates Exercise Instructor, ODTUKENT Sports Center.
Teaching Pilates mat-work and machine exercises to adults and dance students and some disabled people.

ACADEMIC PROJECTS

- 2012 - Book : Author: “Ağırlık Egzersiz Kılavuzu” Weight Training
Exercise Guidance
book in Turkish which is about how to do weight training
programs.
- 2010 – Book : Author: “Egzersiz Kılavuzu” Exercise Guidance book in
Turkish which is
about how to write an exercise prescription for yourself.
- 2010 – Article: : Altun, Ö, & Koçak, S. The Effect of Participant Centered
Physical Activity Counseling on The Physical Activity Level of
Sedentary Working
Women. Gazi Journal of Physical Education and Sports
Sciences, 15-2,
pp. 29-39, April-2010.
- 2010 – Congress : Altun, Ö, & Koçak, S. Participant centered physical activity
counseling
program followed by phone and e-mail. Bogazici
University. 10.
International Education Technology Congress, TOJET,
(Congress
Proceeding, pp. 1164-1171)
- 2007 – Article : Sekendiz, B., Altun, Ö., Korkusuz, F., and Akın, S. Effects
of Pilates
exercise on trunk strength, endurance and flexibility in
sedentary adult females. Journal of Bodywork and
Movement Therapies,
11, 318-326, 2007.
- 2005 – Congress : Coskun, O.O., Ozberk, Z.N., Salci, Y., Celik, O., Altun, O.,
Akin, S.,
Bayramoglu, A. Korkusuz, F. Evaluation of physiological
characteristics
of elite basketball players. 46th ICHPER. SD Aniversary
World Congress,
November 9-13, İstanbul, 2005, (Congress Proceeding,
pp.437-438).
- 2004 – Congress : Sözeri, Barış, Altun, Özkan, Tüzün, Macide, Korkusuz,
Feza, Atımtay,
Aysel. 10. ICHPER-SD Europe Congress and 8. SBD
International Sport

Science Congress. The acute physical effects of active and passive smoking on sedentary male students aged 18-25. Page 94, 2004.

2003 - Project Education : Designing online “Training Theory” Lesson for Physical and Sport Department, BAP Project, METU.

2001 – Project people : Designing interactive web programs to make sedentary more active and promote healthy lifestyle, BAP Project, METU.

SKILLS PROFILE

- I am a team player, trustworthy, diligent and hard-working person.
- Well-rounded background in exercise physiology, fitness training and Pilates exercise system.
- Excellent experience in developing exercise programs and applying Pilates exercises with Pilates exercise apparatus.
- Skilled in planning and developing exercise prescription.
- Experienced in writing and delivering presentations for health and fitness meetings.
- Shiatsu Practitioner.

COMPUTER SKILLS

- Microsoft Office
- Adobe Photoshop
- Internet, Communication

MEMBERSHIP and CERTIFICATION

- American Red Cross First Aid, CPR/AED Certification ID: 12QH4H (June, 2018)
- Personal Training Level III certification– PEARSON-BTEC (2015)
- Accredited Bootcamp and Outdoor Group Training Instructor– BOOTCAMP ALLIANCE (2014)
- Personal Trainer Certification, Action
- First-Aid Certification, Turkish Red Cross
- 2005 FitnessTurk Istanbul Dance & Fitness Festival and 2. International Health, Fitness Step & Aerobik Convention Certificate of Attendance
- Lecturer Award, “Health, Diet, Exercise and You” in Ankara.

F: TURKISH SUMMARY/ TÜRKE ÖZET

Bu çalıřma, Beacon teknolojisi destekli fitness mobil uygulamasını geliřtirerek ve bu uygulamanın güçlü ve etkili yönlerini belirterek, insan sađlıđına olduđu kadar fitness sektörüne de katkıda bulunmak amacıyla modern teknoloji ve insanların fiziksel fitness davranıřları arasındaki iliřkiyi yeniden tanımlamayı amaçlamaktadır.

Bu çalıřmanın ilk bölümü olan giriş bölümü dört kısımdan oluřmaktadır. İlk bölüm, bu çalıřmaya giden yolu açan tarihsel geliřmeleri belirten artalan çalıřmalardan bahsetmektedir. Bu artalan bilgisinden sonra, ikinci kısım bu çalıřmaya neden gereklilik olduđunu belirten sorunu ifade etmeye ayrılmıřtır. Üçüncü kısım ise çalıřmanın zihinsel haritasının çizilemek için çalıřmanın amacını ve kapsamını belirtmektedir. Sonrasında, arařtırma dünyasında dođru yere konumlandırabilmek için çalıřmanın önemi açıklanmaktadır. Çalıřmanın yöntemi açıklandıktan sonra veri analizi verilmiřtir ve sonuçlar rapor edilerek tartıřılmıřtır.

Otuz yıldan kısa bir süre öncesine kadar, interneti bir milyondan az insan kullanmaktaydı. İlk yıllarda, internet kullanımını daha çok, hala çok yaygın amaçlardan biri olan, ađ sađlayıcısı aracılıđıyla sađlanmaktaydı. Ancak, son yıllarda, mobil telefon teknolojisi gibi mobil cihazların hayata girmesi ve bunların son derece hızlı geliřimi ile internet mobil uygulamalar için kullanılmaya bařlandı ve bu da internetin kullanım amacı ve řekli ile ilgili büyük deđiřiklikleri tetikledi.

İnsanların internete bađlanma řekilleri ve kullandıkları cihazlar internete girme sebeplerini de etkiledi. İnsanlar, mobil uygulamaları sadece internette dolařmanın bir yedeđi olarak deđil, ayrıca pek çok temel günlük aktivitelerin parçası olarak da kullanmaya bařladılar. Mobil uygulamalar, diřlerin ne kadar iyi firçalandıđını kontrol etmek (diřleri firçalarken aynaya asılan bir telefon ile) veya kullanıcıya belirli zamanlarda su içmeyi hatırlatmak gibi pek çok alanda kullanılmaya bařlandı. Mobil cihazlar ve yazılım uygulamaları kullanımındaki giderek artan

eğilim, en nihayetinde bu teknolojinin iyi bir şekilde kullanılabileceği ve yararlanılabileceği bir sektör olan sağlık ve fitness sektöründe de gelişmeye yol açtı.

Yarım yüzyıldan daha fazla bir süredir, kısmen yoğun fiziksel aktivitenin insan sağlığı üzerindeki etkisini anlamak, göstermek ve dile getirmek için bilimsel ve epidemiyolojik çalışmalar yürütülmektedir. Bu yoğun çalışmalara ve fitness ve sağlık arasında bulunan önemli pozitif korelasyonlara rağmen, hareketsizlik giderek daha çok yaygınlaşmakta ve pek çok kronik hastalıkların ana sebebi haline gelmektedir. Dünyanın yaşlanan nüfusuyla beraber, kronik hastalıkları önlemek, dolayısıyla, insanların fiziksel aktivite düzeyini artırmak, üzerine düşünülmesi gereken önemli bir nokta haline gelmiştir.

Sonuç olarak, fiziksel aktivitenin, sağlıklı her insanın varlığının temelinde olduğu kabul edilmiş bir gerçektir. Ancak, modern ulaşımın konforu ve şehirleşme süreci insanların daha uzun süreler çalıştıkları ofis işlerine yol açmış, bu da insanların planlanmış fitness programları hazırlamasını ve egzersiz yapmasını gerekli kılmıştır. Fiziksel aktivite, insanların vücut ve fiziksel zindeliklerine olumlu bir etki yaratmakla kalmayıp, ruh halini iyileştirerek ve yaşlanma sürecini yavaşlatarak bireylerin psikolojisini de olumlu yönde etkilemektedir.

Sonuç olarak, iyi ayarlanmış bir fiziksel egzersiz rutini bireyin sağlığını artırmada önemli rol oynamaktadır ve toplumun tüm kesimlerinin fiziksel aktiviteye ulaşımını artırmak, sağlık ve iş dünyasını geliştirmek kadar önemli bir sosyal gereklilik ve yeniliktir. Bu nedenle teknolojinin ve dolayısıyla internetin ve mobil cihazların bu ihtiyacı karşılamak amacıyla kullanılması kaçınılmaz bir gelişmedir.

Her yeni gün hayatın bir parçasında devrim yaratan teknoloji, son birkaç on yılda ivmesini yükseltmiştir. Özellikle, mobil telefonlarla birlikte bilgi teknolojisi, insanların konuşma, alışveriş yapma ve hatta kendini tanımlama şekillerini değiştirerek günlük hayata yayılmıştır. ‘Telefon’ ise artık ‘konuşma cihazı’ olarak değil, çok daha karmaşık bir tanıma sahiptir. Telefonlar artık yol tarifi

verebilmekte, yürünen adımları sayabilmekte ve hava koşulları hakkında kullanıcıyı bilgilendirebilmektedir. Böyle bir dünyada, insanların ‘akıllı’ telefonları ve benzer teknolojileri mümkün olduğunca çok açıdan yararlanacak şekilde hayatlarıyla nasıl bütünleştireceklerini düşünmeye başlamaları kaçınılmaz olmuştur. Başka bir deyişle, insanlar, özellikle spor alanındaki profesyoneller, konu fiziksel egzersize geldiğinde insanların cep telefonlarından nasıl daha fazla yararlanacakları üzerinde düşünmeye başlamışlardır.

Cep telefonu uygulamaları, insanların hayatının her hücresine nüfuz ettikçe, fitness aktiviteleri için de umut vaat edici hale gelmektedirler. Daha önce yapılan çalışmalarda kanıtlandığı gibi, fitness davranışında bir değişim yaratmayı amaçlayan mobil uygulamalar, üzerine çalışılmayı hak etmektedir.

Akıllı telefon uygulamalarının fitness egzersizleri alanındaki kullanımının gelişimine bakıldığında, mobil uygulamalardan dahi önce, fitness koçluğu amacıyla kısa mesaj hatırlatmalarının kullanıldığı görülmektedir. Bu kısa mesajların amacı bir yönlendirmeye yol açmaktır. Bu yönlendirme, web siteleri ve e-postalar aracılığıyla sağlanmaktaydı. Özel hazırlanmış mesajlar veya koçluk bile bu yeni teknolojiler yardımıyla sağlanmaktaydı. Ancak, bu noktadaki en önemli güçlük, yönlendirmenin etkisini uzun dönemde sürdürmeyi sağlayabilmektir. Daha önce yapılmış çalışmalar da göz önünde bulundurulduğunda, bugün yaşanan güçlük, kullanıcıları çekici ve uzun süreli etkisi olan spor yönlendirmelerine maruz bırakabilmektir. Buna ulaşmaktaki önemli bir adım ise kullanıcıların bu yönlendirmelere olan seçimini ve katılımını nelerin etkilediğini anlamaktır.

Bir grup katılımcıyı fiziksel aktiviteye teşvik etmek ve izlemek amacıyla en son mobil teknolojisine ve Beacon teknolojisine dayanmayı hedefleyen bu çalışma, yeni nesil yönlendirme olarak kabul edilebilir. Bu doktora tezi, bu yeni nesil yönlendirmenin nasıl ve hangi yollarla geliştirebileceğini, desteklenebileceğini ve geçerli hale getirileceğini anlamayı amaçlamaktadır.

Mobil fitness uygulamaları ve Beacon teknolojisi, kendilerini profesyonel veya amatör olarak fitness ve spora adanmış insanların hayatlarında önemli bir yer edinmeye başlamıştır. Bu çalışmanın ana amacı birkaç bölümde analiz edilebilir. İlki insanların neden bu uygulamaları kullandığını anlamaktır. İkinci ana amaç, insanların bu uygulamaları nasıl kullandıklarını anlamaktır. Bu bilgiyle, çalışmanın ana ve esas amacı, kullanıcı eğilimlerini anlamak ve Beacon destekli mobil uygulamaların geliştirilmesi için yöntemler önererek bu bilgiyi pratik kullanıma çevirmektir.

Kullanıcı eğilimlerini ve etkililiği anlamak için, Beacon Destekli Mobil Fitness Danışmanı Uygulaması Sistemi (BD-MFDUS) adlı Beacon destekli bir sistem geliştirilmiştir. Bu sistem, mobil uygulama kabulünü tasvir eden daha güvenilir ve geçerli veri sağlamak amacıyla geliştirilmiş ve uygulanmıştır. Bu veri, Beacon destekli mobil uygulamaların geliştirildiği ve uygulandığı yolları anlamaya ve geliştirmeye yardımcı olabilecektir.

Mobil fitness uygulamaları hem fiziksel aktivite hem de egzersiz eğitimi yöntemlerini geliştirmeye yardımcı olabilecektir. Bu bilgi göz önünde bulundurulduğunda, bu doktora tezi, beden eğitimi alanyanarına olduğu kadar, mobil teknoloji aracılığıyla yaygın eğitime de zaman ve yer sınırlıklarını yok etmek için etkili bir yöntem bilimsel bulgu sağlayarak uzaktan eğitim alanına da değerli katkılar bulunmayı amaçlamaktadır.

Bu çalışma, ayrıca, müşteri seçimleri ve ihtiyaçları ile ilgili daha iyi bir kavrayış sağlamayı umduğu için, Beacon teknolojisi ve mobil fitness uygulaması geliştiricilerine bazı yönetsel bulgular da sağlamaktadır. Bu büyük ihtimale pazarda ve büyüyen piyasada her geçen gün artan taleplere daha iyi karşılıkla sonuçlanacaktır.

Bu çalışma, Beacon teknolojisinin ve mobil uygulamaların, kişiselleştirilmiş ve özelleştirilmiş fitness çalışmalarındaki etkililiğini anlamayı amaçlamaktadır. Çalışmanın ilk teorik çıkarımı, özelleştirilmiş fitness programlarının bireyler

üzerindeki psikolojik etkisini ve bu uygulamaların gücünü anlayabilmektir. Bu bireysel amacın yanı sıra, çalışmanın kapsamı, fiziksel aktivite eksikliğinin neden olduğu bazı ciddi sağlık problemlerini azaltmak ve daha iyi bir sosyal sağlıktır.

Giderek artan talebi koruyarak ve Beacon teknolojisini, mobil cihazları ve sağlık ve fitness gibi çeşitli amaçlar için bu teknoloji ve cihazlarda kullanılan uygulamaları geliştirerek, bu araştırma, mobil uygulamaları neyin tetiklediğini, geliştirdiğini ve bu uygulamaların edinimini anlamaya yardımcı olmak için umut vaat edici bir potansiyele sahiptir.

Son, fakat eşit derecede önemli olarak, bu çalışma, spor yönetimi akademik çevresine spor ve fitness ile alakalı alanlarda teknolojinin edinimi hakkında ampirik bulgular sunarak da katkıda bulunmayı amaçlamaktadır.

Çalışmanın genel hedefi ise insanların neden ve nasıl BD-MFDUS'u edindiklerini ve kullandıklarını öğrenmeye katkıda bulunmaktır. Ayrıca çalışmanın amacı, BD-MFDUS'un edinimi ve kabulünü anlayabilmek adına teorik bir modeli test etmektir

Çalışmada, BD-MFDUS'un kullanıcı edinimi davranışını anlamak için, Teknoloji Kabul Modelini (TAM: Davis, 1989; Davis, Bagozzi & Warshaw, 1989) temel alan Mobil Hizmetler Kabul Modeli (Gao, Krogstie and Siau, 2011) kullanılmıştır.

Taşınabilir ve giyilebilir cihazlarda kullanılan mobil uygulamalar her geçen gün daha çok ilgi çekse de, bu uygulamaların uzun dönem etkililiğini anlamak için yalnızca birkaç çalışma yürütülmüştür ve bu çalışma alanın öncü çalışmalarından biri olmayı hedeflemektedir.

Başka bir ifadeyle, bu çalışma spor ile alakalı teknoloji edinimine ampirik bir örnek sağlayarak katkıda bulunmaktadır. Bu tarihe kadar, spor yönetimi alanında, spor ile ilgili Beacon destekli teknolojinin edinimi davranışıyla alakalı sınırlı sayıda yapılmış çalışma bulunmaktadır.

Giyilebilir mobil cihazların ve Beacon teknolojisinin fitness ve sağlık alanında yaygın olarak kullanılmakta ve geliştirilmekte olduğu iyi bilinen bir gerçektir ve

bu çalışma diđer mobil sađlık ve fitness teknolojilerinin edinimini anlamada bir rehber görevi gorebilecektir.

BD-MFDUS, fitness idman ve koluđuna da yardım eder; bu nedenle, bu alıřma hem spor teknolojisi ve spor ile alakalı teřvike, hem de fitness, egzersiz ve sađlıklı yařam tarzı ipularını mobil teknoloji aracılıđıyla yaygın renmede nasıl renileceđine dair ilgili ampirik bir rnek sađlayarak literatre katkıda bulunma potansiyeline sahiptir.

Son olarak, BD-MFDUS kullanıcılarının edinim davranıřını etkileyen faktrleri daha iyi anlamayı sađlayarak, gncel mobil hizmet řirketleri ve potansiyel geliřtiriciler, mřterilerin ihtiyalarını sađlayacak daha iyi rnler retebilecekleridir. Ek olarak, Beacon firmalarının piyasacıları, bu alıřmanın bulguları ile daha etkili bir strateji geliřtirmek iin daha derin ngrler edinebileceklerdir.

Bu kısım, bu doktora tezinde yer alan literatrdeki bazı nemli kavramlardan, anahtar teorilerden ve bilimsel bulgulardan bahsetmeyi planlamaktadır. alıřmada kullanılan teorilerle ilgili net bir ereve izebilmek iin, Beacon teknolojisi, onun spor ve egzersizle iliřkisi ve mobil uygulamalarından bahsedilecektir.

Tarih boyunca insan davranıřı pek ok farklı aıdan alıřılmıřtır. zellikle iř sektrnde, insan davranıřının tahmin edilebilirliđini alıřmak nemli bir alıřma alanı olmuřtur nk birinin fikirlerini neyin tahmin edebileceđini anlamak iř alanında neyin arařtırılacađını ve geliřtirileceđini ve bu yeni geliřmelerin nasıl sunulacađını ve tanıtılacađını ynlendirebilecektir.

Psikolojide, Mantıklı Eylem Teorisi (MET) adlı insan davranıřı ile nceki inanları ve tutumları bađlayan olduka etkili bir teoridir. MET, algılanan davranıř kontrol yardımıyla inanlar ve davranıřlar arasındaki bađı gsteren temel nclleri sađlayan olduka umut verici bir teoridir. Bir davranıřın kararı, o davranıřın niyetidir; bu nedenle MET'nin ardındaki temel anlayıřı řekillendirir.

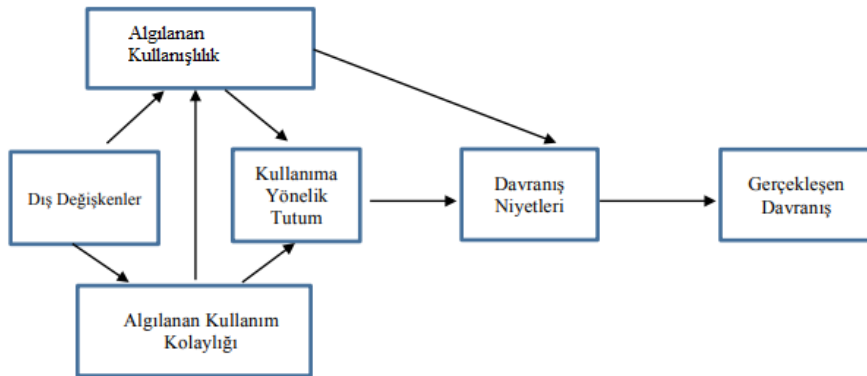
Fishbein & Ajzen (1975) MET'nin temellerini kurmuşlardır ve devam eden yıllarda yaptıkları ardıl çalışmalar ile teoriyi geliştirmişlerdir. Niyet ve davranışa odaklanan daha önceki çalışmalardan farklı olarak bu teori, özellikle davranışa ve tutumun bu davranışlar üzerindeki etkilerine odaklanmaktadır.

Bu teori bu doktora tezi için kritik önem taşımaktadır çünkü bu çalışmanın bel kemiği olan Teknoloji Kabul Modeli (TKM), MET'nin öne sürdüğü öncüllerden doğmuştur. MET davranışsal niyetleri anlamaya yardım edecektir.

Fishbein & Ajzen (1975) MET'nden bahsettikten sonra Davis (1985), yeni teknolojiyi göz önünde bulundurarak ve bazı teknolojilerin diğerlerinden daha önce kabul edilmesinin nedenlerini anlamaya çalışarak, bu teoriye dayanan TKM'ni öne sürmüştür.

TKM mobil uygulamalar, e-postalar ve cep telefonları gibi modern teknolojinin sonucu olarak tartışılmaya başlanmıştır. Kullanıcıların neden bazı stratejileri diğerlerinden daha çok edindikleri anlayışını geliştirmiştir.

TKM aşağıdaki diyagram ile özetlenebilir:



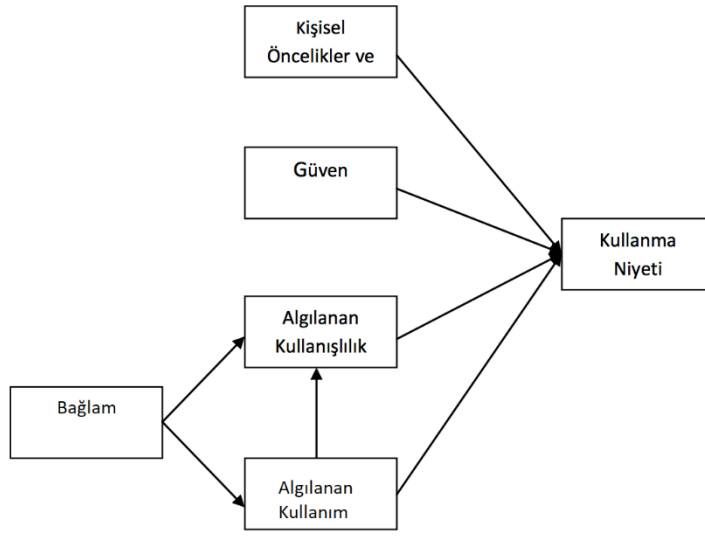
Şekil 1 Teknoloji Kabul Modeli

Şekilde gösterildiği gibi, MET'nin ana amacı inançlar, inançların etkileri, tutumlar, niyetler ve eylemlerdir. Ancak, TKM niyetin ve asıl davranışın ne olduğunu değerlendirmek için algılanan kullanılabilirlik ve algılanan kullanım kolaylığı üzerine odaklanır. TKM'ne göre, bir sistemin kullanımı direkt olarak eylemin niyetine bağlı iken bu niyet göreceli olarak algılanan kullanılabilirliğe dayanır.

TKM, bugünün teknoloji dünyasında kullanıcı tepkilerini ve yeni bir sistemi kullanma olasılıklarını anlamak için bir ihtiyaçtır. Bu nedenle, sağlık ve fitness sektörü için geliştirilenler dahil tüm teknolojiler TKM'nin önerdiği biçimde değerlendirilmelidir. Algılanan kullanılabilirlik ve algılanan kullanım kolaylığı teknoloji geliştiricilerine, sağlık ve fitness sektöründekilere ve teknoloji kullanıcılarına yardım edecektir.

TKM yeni teknolojilerin kullanıcı edinimlerini anlamada ve ölçmede önemli öngörüler sağlasa da müşteri ve kullanıcı seçimlerini anlamak için giyilebilir ve taşınabilir teknolojiler daha derin, belirlenmiş ve özelleştirilmiş ölçü araçları gerektirmektedir.

Araştırma dünyasındaki böyle önemli bir ihtiyaca karşılık verebilmek için, Gao, Krogstie, & Gransæther (2008) mobil servislerin edinimi ve kabulünü değerlendirmek amacıyla bir ölçek geliştirmişlerdir. Hali hazırda var olan TKM'nden ve mobil uygulamalar üzerine araştırmadan yararlanarak, Mobil Hizmetler Kabul Modeli (MHKM) yaratılmıştır. Bu modelde, TKM'nin öngörülerini olan algılanan kullanılabilirlik, algılanan kullanım kolaylığı ve kullanma niyeti kullanılmıştır. Dahası, bağlam, güven, kişisel özellikler ve girişimler de mobil teknolojinin kabulünde etkisi olduğuna inanıldığı için eklenmiştir (Gao et al., 2011; Gao, Krogstie, & Siau, 2014; Gao, Moe, & Krogstie, 2010).



Şekil 2
Mobil Hizmetler Kabul Modeli

Yukarıda verilen şekil, MHKM'nin maddeleri arasındaki ilişkiyi göstermektedir. Bu modele göre, her bir madde kullanma niyetiyle doğrudan ilgilidir. Bağlam, algılanan kullanılabilirlik ve algılanan kullanım kolaylığı üzerinde etkili olan tek madde olsa da, dört madde de mobil servisleri kullanma niyetinde önemli etkiye sahiptir.

Beacon ise herhangi bir yüzeye veya cihaza tutturulabilen ve Bluetooth teknolojisini kullanarak konum tespit edebilen ve çevredeki diğer cihazlara istenilen bilgiyi iletebilen küçük bir cihazdır. Mobil cihazların Bluetooth özellikleri aktif hale getirildiğinde Beacon tarafından gönderilen mesajları alabilirler. Düşük enerji modunun bir parçası olduğu için, Beaconlar aynı zamanda Bluetooth Düşük Enerji Beaconları olarak da adlandırılmaktadır.

Bu teknoloji özellikle pazarlamada, potansiyel müşterilerin çevresinde ürün tanıtımlarında kullanılmaktadır. Bir örnek olarak, eğer bir aday müşteri kıyafet satan bazı mağazaların veya bu mağazaların reklamların etrafında dolaşıyorsa, aday müşterinin cep telefonuna yeni ürünlerin veya indirimlerin reklamları

gönderilir. Bu şekilde, ürünün aday müşterinin ilgisini çekmesi ve satın alması beklenir.

Beaconların pek çok avantajı vardır. İlk olarak, Beacon düşük maliyetli bir cihazdır. Uzun ömürlüdür ve pahalı değildir. İkinci avantaj ise kullanılabilirliğidir. Beacon özellikleri neredeyse her akıllı telefonla kullanılabilirdiği için, bulundurulması ve kullanılması kolaydır. Cihazın içindeki yayın yapma gücü pek çok cihaza uydurulabilir.

Beacon'ın çalışma prensibi kısa bir biçimde özetlenebilir. Hedef cihazlara mesajlar gönderme amacıyla belirli bir konuma Beacon yerleştirilir. Hedef cihaz Beacon'a fiziksel olarak yaklaştığı zaman, Beacon sinyaller gönderir. Hedef cihaz (bu bağlamda katılımcının cep telefonu) sinyali alır. Sonra, Beacon bir bulut sistemini kullanarak online platforma sinyali gönderir. Online platform, daha öncesinde belirlenmiş eylemi gerçekleştirmesi için uygulamayı tetikler. Daha sonra, uygulama, bu sistemin temel amacı olan bilgiyi biçimlendirir ve gönderir. Katılımcı da uyarlanmış bilgiyi alır.

Yakın zamana kadar, teknoloji ve fitness arasındaki tek birleştirici etkenin fitness için kullanılan makinalardan ibaret olduğu düşünülüyordu. Ancak, akıllı telefonlar fitness ile teknolojiyi her bir fitness deneyimi anında pek çok farklı biçimde birleştirmeyi mümkün kıldı.

Diğer pek çok sektör gibi, spor merkezleri de Beaconları müşterilerinin fitness merkezi ekipmanlarını, tesisi ve diğer olanakları kullanımı analiz etmek için kullanabilmektedir. Bir örnek olarak, Beaconlar fitness merkezi yöneticilerine hangi egzersiz makinesinin en sık olarak kullanıldığını anlamada yardımcı olabilir. Bu sayede, spor merkezini ve ekipmanları bu buna göre ayarlayabilirler. Beaconlar, müşteri talepleri ile ilgili istatistiksel veri sağlayarak, fitness merkezi yöneticilerine daha iyi olanaklar sağlamalarına yardımcı olurlar. Fitness merkezlerindeki Beacon teknolojisinin bazı yararları, yakınlık pazarlaması, ayarlanmış ve özelleştirilmiş mesajlar ve otomatik geliş veya kayıt bildirimini olarak listelenebilir. İlk yarar olan yakınlık pazarlamasına, müşteriler oradan

geçerken reklamı yapılan meyve suyu büfesi bir örnek olarak verilebilir. Beaconlar, cep telefonlarını özellikle potansiyel müşteriye tanıtım yapan reklam panolarına dönüştürebilirler ve spor salonunda egzersiz yapan herkes meyve suyunun potansiyel müşterisi olabilir. İkinci muhtemel kullanım ise özelleştirilmiş ve kişiselleştirilmiş mesajlardır. Mesela, eğer bir kullanıcı düzenli olarak bazı derslere katılıyorsa, benzer gelecek derslerle ilgili bilgilendirilebilir. Kişisel diyet programları, grup dersi davetleri veya kişisel koçluk Beacon teknolojisi ile sağlanabilir. Bir başka mümkün kullanımsa otomatik giriş bildirimidir. Bu teknoloji müşterilerin fitness merkezinde hiçbir çaba göstermeden giriş bildirimini yapmasına da olanak sağlar. Bu bölümde çalışmayı yürütürken kullanılan yöntem anlatılacaktır. Çalışmanın iki ana amacı bulunmaktadır. İlk olarak, çalışma, Mobil Hizmetler Kabul Modeline geçerli bir ölçeği test etmek için tasarlanmıştır. İkinci olarak, BD-MFDUS'nin gerçek edinilmesi ve kabulünü anlamak için teorik bir modeli sınamaktır. Bu bakımdan, çalışmanın yöntemi, araştırma tasarımı, araştırma soruları, katılımcıların demografik bilgileri, veri toplanırken kullanılan araç ve veri toplama prosedürleri anlatılacaktır. Bu çalışma, fitness bağlamında teknolojinin benimsenmesine ampirik bir örnek sağlayarak akademik dünyanın spor yönetimi bölümüne katkıda bulunacaktır.

Çalışmanın iki temel amacı BD-MFDUS'nin edinilmesini ve kabulünü anlamak için bir teorik modeli test etmek ve geçerliği ve güvenilirliği ispatlanmış olan seçilmiş ölçeği fitness bağlamına uyarlamaktır. Hipotezler ise, (a) algılanan kullanım kolaylığı, (b) algılanan kullanışlılık, (c) güven, (d) bağlam ve (e) kullanım niyeti arasındaki ilişkiyi keşfetmeyi amaçlamaktadır. Bu bağlamda, çalışma BD-insanların MFDUS'nin kullanımı ve niyetini ortaya çıkarma amacıyla tasarlanmıştır. Bu çalışmanın temelinde BD-MFDUS'ni kullanma eğilimlerini anlama amacı olduğu için, aşağıda belirtilen hipotezlerin test edilmesi amaçlanmaktadır:

H1. Fitness katılımcılarının algılanan kullanım kolaylığı BD-MFDUS'ni kullanma niyetlerini anlamlı ve olumlu şekilde etkiler.

H2. Fitness katılımcılarının algılanan kullanılışlıđı BD-MFDUS'ni kullanma niyetlerini anlamlı ve olumlu şekilde etkiler.

H3. Fitness katılımcılarının güven algısı BD-MFDUS'ni kullanma niyetlerini anlamlı ve olumlu şekilde etkiler.

H4. Fitness katılımcılarının bağlam algısı BD-MFDUS'nin algılanan kullanılışlıđını anlamlı ve olumlu şekilde etkiler.

H5. Fitness katılımcılarının bağlam algısı BD-MFDUS'nin algılanan kullanım kolaylıđını anlamlı ve olumlu şekilde etkiler.

H6. Fitness katılımcılarının algılanan kullanım kolaylıđı BD-MFDUS'nin algılanan kullanılışlıđını anlamlı ve olumlu şekilde etkiler.

Çalıřma; algılanan kullanım kolaylıđı, algılanan kullanılışlılık, güven, bağlam ve kullanım niyeti arasındaki iliřkileri arařtırmak üzerine kurulmuřtur; bu nedenle bu çalıřma iliřkisel bir çalıřmadır. Hem pilot hem de ana çalıřma için uyarlanıř ölçek aracılıđıyla veri nicel bir biçimde toplanmıřtır. Nicel yöntem, istatistik veya kapalı uçlu sorular içeren anket araçları kullanarak büyük sayısal veri toplamaya yardım etmesi ve çıkan sonuçların popülasyonu temsil edebilecek geniş bilgi sağlayabilmesi gerçeđi sebebiyle tercih edilmiřtir. Ayrıca nicel çalıřma sayısal veriyi kullanarak arařtırmacıların daha güvenilir sonuçlar elde etmesine de olanak sağlar. Bu çalıřma, etkili bir şekilde veri toplamaya yardım ettiđi ve iyi tasarlandıđı zaman dođru ve düşük maliyetli sonuçlar elde etmeye yardım ettiđi için ölçek yaklařımını edinmiřtir. Ölçek yaklařımının uygulanmasına karar verildiđi için, kapsam geçerliđi de sağlayabilecek bir ölçek seçilmesi amaçlanmıřtır. Bu amaçla, çalıřma için seçilen ölçek Mobil Hizmetler Kabul Modelinde kullanılan orijinal ölçekten uyarlanmıřtır.

Ölçekleri kullanabilmek için, ölçeđin geliřtiricilerinden izin alınmıřtır. Sonra, ODTÜ İnsan Arařtırmaları Etik Kurulu (İAEK)'ndan gerekli izinleri alabilmek için bařvurular yapılmıřtır. Pilot çalıřma için 178 katılımcıdan veri toplanmıř iken 210 katılımcı veri analizi için ana çalıřmaya dahil edilmiřtir.

BD-MFDUS (Beacon Destekli Mobil Fitness Danışmanı Uygulaması Sistemi) adı verilen sistem çalışma için geliştirilmiştir. BD-MFDUS dört ana kısımdan oluşan bir sistemdir. Sistemin ilk kısmı Beaconlardır. Beaconlar temel olarak yaklaşıldığında uygulama ve veri tabanı aracılığıyla yer tespiti yapıp mobil cihazlara içerik gönderen Bluetooth temelli küçük cihazlardır. Bu çalışmada kullanılan Beaconlar LiveBeacon firması tarafından üretilmiştir ve fitness merkezine önceden yerleştirilmiştir. Sistemin ikinci kısmı LiveBeacon isimli uygulamadır. Bu uygulama LiveBeacon şirketi tarafından üretilmiştir ve App Storelarda ve Play Storelarda ücretsizdir. Katılımcılar, fitness merkezine girmeden önce cep telefonlarına bu uygulamayı yüklemişlerdir. Sistemin üçüncü kısmı, mobil cihazlara bilgi gönderen bir sistem olan LiveBeacon Bulut Portalıdır. Typeform ise sistemin dördüncü ve son kısmıdır. Temel olarak, verilen yüklendiği bir veri tabanıdır. Bu çalışmadaki bilgi –video, talimat ve içerik- Typeform’a yüklenmiştir. Kısaca özetlemek gerekirse, katılımcılar LiveBeacon’ın alanlarına yaklaştığında, LiveBeacon Bulut Portalı, Typeform üzerindeki bilgiyi katılımcıların cep telefonlarına yüklemiş oldukları LiveBeacon uygulamasına iletmiştir.

Fitness bağlamındaki bir Türk örneğinde ölçeğin faktör yapısını belirlemek amacıyla, ilk olarak 178 katılımcıyla Açıklayıcı Faktör Analizi (AFA) yürütülmüştür. İkinci olarak, tanımlanan faktör yapısı, bir ölçek modeli sağlamak ve ölçülen değişkenlerin madde sayılarını ne kadar iyi temsil ettiğini test etmek amacıyla Doğrulayıcı Faktör Analizi (DFA) ile 205 katılımcıdan oluşan başka bir örneklem üzerinden, değerlendirilmiştir. Nihayetinde, ana çalışma olarak, seçilen model 210 katılımcı ile test edilmiştir. Örnekleme tekniği olarak ise kolay ulaşılabilir durum örnekleme tekniği seçilmiştir.

Homojen bir grup sağlayabilmek için, veriler üniversitenin spor merkezlerinde spor yapan üniversite öğrencilerinden toplanmıştır çünkü yaş, meslek ve ilgi olarak öğrenciler daha homojen bir grubu temsil edebilmektedir. Ana çalışma örnekleminin betimsel istatistik sonuçları aşağıda verilmiştir.

Aşağıda verilen tablo çalışmanın katılımcılarına ait demografik bilgiyi göstermektedir.

Tablo 1

Fitness Katılımcılarının sayısı

Değişkenler	Kategori	Sayı	%
Cinsiyet	Kadın	86	41
	Erkek	124	59
Toplam		210	100

Çalışmaya 210 kişi katılmıştır. Katılanların 86 kişisi kadındır ve bu da toplam katılımcılarının %41'ne denk gelmektedir. Erkek katılımcılar ise sayı olarak 124 kişidir ve bu da toplam katılımcıların %59'una denk düşmektedir.

Tablo 2

Haftalık fitness katılım sıklığı

Ziyaret sıklığı	Katılımcı sayısı	Katılımcı yüzdesi
Hiç	5	2.4%
Haftada bir kez	67	31.9%
Haftada 2 veya 3 kez	108	51.4%
Haftada 4 veya 5 kez	22	10.5%
Haftada 6 veya 7 kez	5	2.4%
Haftada 7'den fazla kez	3	1.4%
Toplam	210	100

Katılımcıların düzenli antrenman alışkanlıklarına da dikkat edilmiştir. Tablo 2'de görülebileceği üzere, en yüksek katılımcı sayısı fitness merkezini haftada en az 2 veya 3 kez ziyaret eden gruptadır (n=108). Bu grup katılımcıların yaklaşık olarak

yarısından fazlasına denk düşmektedir. İkinci en büyük grubu ise spor merkezini haftada bir ziyaret edenler oluşturmaktadır. Bu katılımcıların yüzdesi %31,9'dur. En az katılımcı sayısı ise fitness merkezini yedi veya daha fazla kez ziyaret eden gruptadır.

Çalışma, Likert ölçeği ile tasarlanmış bir anket kullanan nicel bir araştırma olarak yürütülmüştür. Çalışmada kullanılan ve 1 (kesinlikle katılmıyorum) ile 5 (kesinlikle katılıyorum) arasında değişen beşli Likert ölçeği, Mobil Hizmetler Kabul Modelinde kullanılan orijinal ölçekten uyarlanmıştır. Bu modelin seçilmesindeki ana neden ise modelin Teknoloji Kabul Modelinin bir uzantısı olmasıdır. Orijinal ölçeğin yanı sıra, katılımcıların demografik bilgisi ve fitness katılım sıklıkları hakkındaki bilgi de toplanmıştır.

Mobil Hizmetler Kabul Modelinde, modeli çalışmak için gerekli olan güven, bağlam, kişisel özellikler ve girişimler gibi yeni maddeler eklenmiştir. Çalışmaya uygunluğunu kanıtlamak için, modelde kullanılan ölçek çalışmada yeniden kullanılmıştır. Ölçek sonrasında, Sakarya Üniversitesi Bilgi Sistemleri Bölümü'nde geliştirilen bir teknoloji platformu için Türkçe bağlamında uygulanmıştır (Koç & Turan, 2014). Sözü edilen çalışmada kullanılan ölçek Türkçe dilinde olduğu için, o çalışmada kullanılan ölçek, bazı uyarlamalar ve BD-MFDUS'nin bağlamına uyması için gerekli sözcük değişikliklerinden sonra kullanılmıştır.

Pilot çalışmanın analizinden sonra, ölçme aracının son hali ortaya çıkmıştır. Sonrasında, ana veriyi toplama süreci gerçekleşmiştir. Veriler hem kağıt üzerinden hem de çevrimiçi anket olarak toplanmıştır. Anketin çevrimiçi versiyonu için *Typeform* platformu kullanılmıştır. Görünüş geçerliğini her iki araçta da yüksek ve eşit tutmasına özellikle dikkat edilmiştir. Katılımcılar anketi online veya kağıt üzerinden dolduracaklarına kendileri karar vermişlerdir.

Veri toplama süreci 10 Nisan 2017'den 27 Kasım 2017'ye kadar iki aydan fazla bir sürede gerçekleşmiştir. Veriler, Orta Doğu Teknik Üniversitesi'nin ana kampüsünde yer alan iki fitness merkezinde üniversitenin öğrencileri olan

katılımcılardan toplanmıştır. Çalışmanın etik kurul onayı ODTÜ İnsan Araştırmaları Etik Kurulu'ndan 8 Mart 2107'de alınmıştır. Tüm katılımcılardan gönüllü katılım formu alınmıştır. Katılımcılar verilerin araştırmada kullanılacağı hususunda bilgilendirilmiş, katılımcılara uygulamayı yükletmek dışında hiçbir müdahalede bulunulmamıştır.

Çalışmada kullanılan Beaconlar, çalışma hakkında bilgi verildikten sonra LiveBeacon firması tarafından sağlanmıştır. İki adet Beacon fitness merkezindeki alanlara (fitness egzersizleri için dambıl ve halter alanı ile esmene egzersizleri için mat alanlarına) yerleştirilmiştir. BD-MFDUS ile ilgili bilgi fitness merkezlerinin duvarlarına asılan posterlerde açıklanmıştır. Posterler fitness merkezlerinde bir tanıtım ve bildirim amaçlı kullanılmıştır. Fitness merkezlerinde spor yapmaya gelen öğrenciler çalışma hakkında bilgilendirilmiş ve çalışmaya katılmaya gönüllü katılımcılara çalışmanın amacını, çalışma sürecinin açıklamasını ve bireysel cevapların gizliliği bilgisini de içeren Beacon destekli mobil fitness danışmanı uygulaması daveti gönderilmiştir. Kullanımla ilgili bilgilendirildikten sonra, kağıt veya online anketin internet linki katılımcının isteğine göre sağlanmıştır. Katılımcılar araştırmaya katılmayı kabul ettikten sonra, telefonlarına hem Android hem de iOS sistemlerinde ücretsiz yer alan LiveBeacon uygulamasını indirmeyi de kabul etmişlerdir. Bu sayede, katılımcılar fitness merkezindeki LiveBeaconlara yaklaştıkça LiveBeaconlar kullanıcıların cep telefonlarındaki uygulamayı tetikleyebilmiştir.

Beaconlara yaklaşan katılımcıların cep telefonuna Beaconlar bildirim göndermiştir. Katılımcının konumunu, dolayısıyla da ihtiyaçlarını anlayan program bazı egzersiz alternatifleri önermiştir. Katılımcı istediği seçeneği seçtikten sonra, belirli fiziksel egzersizler yeniden sunulmuştur. Katılımcı yeniden ihtiyacına uygun olan egzersizi seçmiştir. Belirli bir egzersiz seçildikten sonra, mobil uygulama egzersizlerin nasıl yapılacağına dair detaylı bir tanımlama göndermiştir. Uygulamanın gönderdiği içerikler arasında videolar, görseller ve egzersizin nasıl doğru yapılacağına dair açıklamalar bulunmaktadır.

Bu çalışmanın genel amacı, BD-MFDUS'u edinme davranışı bilgisine ve fitness ile egzersiz alanında Beacon teknolojisinin gelişimine katkıda bulunmaktır. Çalışmanın başka bir hedefi ise toplanan verilerle teorik bir model olan Mobil Hizmetler Kabul Modelini ampirik olarak test etmek ve model ile ölçeğinin geçerliğini değerlendirmektir.

Bilindiği gibi, cep telefonları modern 21.yy insanının hayatında oldukça önemli bir yer tutmaktadır. Pek çok insan cep telefonlarını her yerde yanlarında taşımakta ve nerdeyse bir on yıldır, oldukça kullanışlı olması sebebiyle akıllı telefonları kullanmaktadır. Benzer şekilde, fitness merkezlerinde de sporu ve cep telefonlarını ayrı tutmak imkansızdır. Bu nedenle, cep telefonlarından faydalanmak amacıyla, daha pragmatik bir yaklaşım kullanılmıştır.

Burada belirtmek önemli olacaktır ki, sadece cep telefonları değil, ayrıca uygulamalar da insanların yaşam tarzları üzerinde etkilidir. Her yerde kullanılması nedeniyle, fitness merkezlerinde de kullanılması desteklenmelidir. Buradaki önemli nokta, uygulamaları kullanışlı hale getirmek için teşvik edilmesidir. Pek çok çalışma cep telefonu uygulamalarının yaşam tarzı üzerinde olumlu bir etkisi olduğunu göstermiştir ve fitness uygulamaları da buna bir araç olabilecektir. Bu nedenle, hem cep telefonları hem de uygulamalar spor sektöründe önem kazanmıştır ve faydalarını artırmak için alanda kullanılmalıdır.

Beacon teknolojisinin fitness merkezlerinde test edilmesi ihtiyacı nedeniyle, çalışma için BD-MFDUS adı verilen bir uygulama geliştirildi. BD-MFDUS'nde işleyen beslemeler konum nedenlidir ve bu nedenle, gerekli olduğunda fitness ile ilgili belirli ve destekleyici bilgi sağlanabilmektedir. Bu özelliklerle, BD-MFDUS fitness ve spor sektöründeki diğer mobil bilgi sistemlerinden farklıdır. Düşük maliyetli Bluetooth cihazlarının yeni nesli olan Beacon, fitness merkezlerine mobil cihazları aracılığıyla üyelerin tam konumlarını izlemelerini sağlayan bir cihazdır ve bu özellik, üyelerin konumunu sağladığı için fitness merkezlerine, sağlık ve egzersiz ile ilgili ipuçları gibi bilgileri sağladığı için de üyelere kullanışlıdır.

Bu çalışma, mobil cihazları tetikleyerek ve yönlendirme, teşvik etme ve doğru egzersiz tekniğini gösterme ile ilgili egzersiz bilgilerini sağlayarak, Beacon teknolojisinin fitness merkezlerinde nasıl çalıştığını göstermiştir.

Bu bölümde ise çalışmanın sonuçları tartışılacaktır. Pilot çalışmanın analizinden sonra çıkan sonuçlar kişisel özellikler ve girişimlerin çıkarılması fikrini literatürde de desteklediği gibi desteklemiştir. Belirtilen maddeler çıkarıldıktan sonra, Yapısal Eşitlik Modellemesi (YEM) analizleri Mobil Hizmetler Kabul Modelinde önerilen tüm hipotezlerin desteklendiğini göstermiştir (Tablo 3). Toplam değişken, BD-MFDUS'ni kullanma niyetini (%39) açıklamıştır.

Tablo 3

Sonuçların özeti

Hipotezler	Sonuç
H1. Fitness katılımcılarının algılanan kullanım kolaylığı BD-MFDUS’ni kullanma niyetlerini anlamlı ve olumlu şekilde etkiler.	Kabul edildi
H2. Fitness katılımcılarının algılanan kullanılabilirliği BD-MFDUS’ni kullanma niyetlerini anlamlı ve olumlu şekilde etkiler.	Kabul edildi
H3. Fitness katılımcılarının güven algısı BD-MFDUS’ni kullanma niyetlerini anlamlı ve olumlu şekilde etkiler.	Kabul edildi
H4. Fitness katılımcılarının bağlam algısı BD-MFDUS’nin algılanan kullanılabilirliğini anlamlı ve olumlu şekilde etkiler.	Kabul edildi
H5. Fitness katılımcılarının bağlam algısı BD-MFDUS’nin algılanan kullanım kolaylığını anlamlı ve olumlu şekilde etkiler.	Kabul edildi
H6. Fitness katılımcılarının algılanan kullanım kolaylığı BD-MFDUS’nin algılanan kullanılabilirliğini anlamlı ve olumlu şekilde etkiler.	Kabul edildi

Genel olarak, Yapısal Eşitlik Modellemesi analizleri, algılanan kullanım kolaylığı, algılanan kullanılabilirlik, güven ve bağlamın, katılımcıların BD-MFDUS'ni kullanmasında önemli bir rol oynadığını göstermiştir. Algılanan kullanılabilirlik, davranışsal BD-MFDUS'ni kullanma niyetini olumlu etkilemektedir. Aynı zamanda algılanan kullanım kolaylığı, algılanan kullanılabilirlik ve niyet üzerindeki doğrudan etkisi yoluyla, dolaylı olarak BD-MFDUS'ni kullanma niyetini etkilemektedir. Güven, davranışsal BD-MFDUS'ni kullanma niyetini olumlu etkilemektedir. Bağlam, algılanan kullanım kolaylığı ve algılanan kullanılabilirlik üzerindeki doğrudan etkisi aracılığıyla BD-MFDUS'ni kullanma niyetini dolaylı olarak etkilemektedir. Her bir hipotezin sonuçları detaylı olarak tartışılacaktır.

Araştırma Hipotezi 1: Fitness katılımcılarının algılanan kullanım kolaylığı BD-MFDUS'ni kullanma niyetlerini anlamlı ve olumlu şekilde etkiler.

Sonuçlar algılanan kullanım kolaylığının fitness katılımcılarının BD-MFDUS'ni kullanma niyetine anlamlı ve olumlu etkisi olduğunu göstermiştir. Başka bir deyişle, fitness katılımcılarının kullanmaya güvenlerinin ve isteklerinin olması için sistemin kullanımı kolay olması gerekmektedir. Uygulanabilirlik de bir sistemi kullanmak için başka bir tercih sebebidir ve fitness katılımcılarının kabul kararlarını önemli ölçüde etkileyebilir. Bu nedenle, bu çalışma, kullanıcı ve BD-MFDUS'daki mobil uygulamanın arasındaki kolay etkileşimin katılımcıların uygulamayı kullanma niyetini geliştirebileceği görüşünü desteklemektedir. Kısacası, uygulama veya benzer sistemleri geliştirenlerin ara yüzü basit ve kullanıcı dostu bir şekilde dizayn etmeye dikkat etmesi kullanıcıların uygulamayı ne kadar kolay bulurlarsa o kadar kullanma eğiliminde olmaları nedeniyle önemlidir.

Araştırma Hipotezi 2: Fitness katılımcılarının algılanan kullanılabilirliği BD-MFDUS'ni kullanma niyetlerini anlamlı ve olumlu şekilde etkiler.

Çalışmanın sonuçları, algılanan kullanılabilirliğin BD-MFDUS'ni kullanma niyetini etkilediğini göstermiştir. Kullanıcılar, uygulamanın kendi yararlarına iyi

olduğunu düşündüklerinde, o uygulamayı kullanma niyetleri de doğrudan yükselir. Bu nedenle algılanan kullanılabilirlik BD-MFDUS'ni kullanma niyeti açısından oldukça önemlidir. Kullanıcıların bir mobil sistemi kullanmaya başlayıp sürdürmesi için, o sistemin kendilerine faydalı olduğuna ikna olmaları gerekmektedir. Algılanan kullanılabilirliğin altında verimliliğin artması ya da haftalık fitness görevlerinin takibi gibi maddeler bulunmaktadır; bu nedenle bu teknolojiyi fitness sektöründe kullanmak sadece verimliliği değil aynı zamanda fitness yapmaya devam etmeyi de artırma olasılığı bulunmaktadır. Kullanıcı bir sistemi yararlı bulmadığı sürece kullanmayı bırakabilir, fakat faydalı olduğunu hissettikten sonra devam edecektir ve hatta bu onu daha bilinçli bir fitness katılımcısı yapabilir ki bunun da pek çok olumlu sonucu vardır. Bu nedenle, eğer bir teknoloji sistemi algılanan kullanılabilirlik da artış sağlayabilirse, sistemin üretkenliği ve performansı da muhtemelen yükselecektir.

H3. Fitness katılımcılarının güven algısı BD-MFDUS'ni kullanma niyetlerini anlamlı ve olumlu şekilde etkiler.

Çalışma, güven faktörünün sistemi daha çok kullanmaya etkisi olduğunu göstermiştir. Eğer kullanıcılar sisteme güvenmezlerse, kullanmaktan da kaçınacaklardır çünkü güven kararı etkiler ve güven bir ihtiyaç olarak tanımlanabilir. Güven, uygulamayı kullanma niyeti üzerindeki en önemli etki olduğu için mobil sistem geliştiricilerinin en çok dikkat etmesi gereken etkidir. Kullanıcılar kullandıkları uygulamaya ve onun sunduğu verilere güvenmek isterler. Kullanıcıların verilerdeki bilginin yetkili merci tarafından onaylandığını ve uygulamanın endişelenmeyi gerektirecek bir şey olmadığını bilmeleri gerekmektedir.

Kısacası, güven faktörü fitness katılımcılarının bir sistemi kullanma tercihlerinde son derece önemli bir faktördür, bu nedenle sistemin her bir parçası (Beaconlar ve mobil uygulama) fitness katılımcısının güven inşasına yardımcı olmalıdır. Mobil sistem geliştiricileri bu etkene daha çok odaklanmalıdır.

H4. Fitness katılımcılarının bağlam algısı BD-MFDUS'nin algılanan kullanılabilirliğini anlamlı ve olumlu şekilde etkiler.

Bağlam algısı, algılanan kullanılabilirlik için yüksek belirleyici olarak bulunmuştur ve niyeti etkiler. Kullanıcılar sistemi kullanmaya teşvik edildiklerini hissettiklerinde veya etraflarındaki insanların kullandığını hissettiklerinde, sistemi kullanma niyetleri de yükselir. Uygulama, kullanıcılara hoş bir deneyim sunmalı ve edinmesi ve yüklemesi kolay olmalıdır. Ayrıca, popüler bir uygulama olmanın da bir etkisi olma ihtimali bulunmaktadır. Özellikle otorite sistemi kullanmayı desteklediğinde, eğilim önemli biçimde artar. Bu nedenle, bağlam algısının algılanan kullanılabilirlik üzerinde önemli etkisi olduğu sonucuna varılabilir.

H5. Fitness katılımcılarının bağlam algısı BD-MFDUS'nin algılanan kullanım kolaylığını anlamlı ve olumlu şekilde etkiler.

Daha önce de belirtildiği gibi, bağlam önemli bir faktördür ve ayrıca bağlam, algılanan kullanım kolaylığı için önemli bir etken olup, niyeti etkiler. Bunun yanında, bağlam ayrıca kullanıcı davranışını belirleyebilir. Bu nedenle hem mobil uygulamanın tercih edilmesi için hem de Beaconların özelleştirilmiş mesajları için bağlam çok önemlidir; böylelikle kullanıcılar birbirlerini anlayabilir ve takibe devam etmeye hevesli olabilirler.

Özet olarak, mobil hizmetlerin kullanımı bağlamın üzerinde bir etkidir. Çalışmanın anlamlı sonuç verdiği göz önüne alınacak olursa, Beacon teknolojisinin fitness merkezlerinde kullanılabileceği sonucuna erişilebilir.

H6. Fitness katılımcılarının algılanan kullanım kolaylığı BD-MFDUS'nin algılanan kullanılabilirliğini anlamlı ve olumlu şekilde etkiler.

Çalışmanın sonuçları göstermiştir ki eğer insanlar sistemin bileşenlerini kullanımı kolay olarak algılıyorsa, sistemi yararlı olarak algıladıkları için daha çok katılımcı BD-MFDUS kullanıcısı olacaktır ve fitness merkezlerinde kullanacaklardır.

Ayrıca algılanan kullanım kolaylığı algılanan kullanılabilirlik aracılığıyla fitness katılımcılarının niyetini dolaylı yoldan etkileyebilmektedir.

Hipotezlerin analizlerinden sonra söylenebilir ki, çalışmanın bulguları, hem fitness sektöründe Beacon teknolojisine teorik bir zemin hazırladığı için hem de mobil hizmet geliştiricilerinin tüketicilerin bir mobil hizmeti kullanma niyetini daha iyi anlayabilmelerine yardımcı olabileceği için son derece önemlidir. Kullanıcıların fitness gelişimi için bu teknolojiyi kullanıp kullanmayacağını anlayabilmek bu alandaki teknolojik gelişmelere kıymetli bilgiler sağlayacaktır. Bu çalışma, Beaconlar üzerinde -özellikle fitness sektöründe Beaconları kullanma üzerinde- sınırlı sayıda çalışma olması nedeniyle, alana da katkıda bulunacaktır. Bu teknolojinin güçlüklerini ve imkanlarını tanımlayarak, araştırmacıların dikkatini çekerek bu teknolojiyi kullanarak daha çok araştırma yapmasına, geliştiricilerin dikkatini çekerek de bu teknolojiyi kullanıp kullanmamaya dair sorularına yanıt bulmasına yardımcı olacaktır.

Ayrıca çalışma, bu tezdeki teknolojiyi kullanarak nasıl birleştiren deneyimler sağlanabileceğine dair de belirli önerilerde bulunmaktadır. Fitness katılımcılarının ihtiyaçlarına hizmet edebilmesi için Beacon teknolojisini mobil uygulamayla bütünleştirebilmiştir.

Beaconlar hala yeni bir teknoloji olarak sayılmaktadır, dolayısıyla hala üzerinde çalışılmaya ihtiyaç duyulmaktadır. Bu çalışma ise bu alandaki boşluğu doldurmaya katkıda bulunmayı amaçlamaktadır. Beaconların başka alanlarda da ilgi çekmesi, pek çok yönden etkili olması sebebiyle hiç de şaşırtıcı değildir. İlk olarak, Beaconlar küçük ve düşük maliyetlidir. Bu nedenle pek çok insan için ulaşılabilir ve makul olarak kabul edilebilir. İkinci olarak, yeni ve yüksek teknolojinin ürünü olması nedeniyle sensörlü karmaşık bir sisteme sahiptir, ancak kullanımı son derece basittir ve bu da iş adamlarında eğitimcilere kadar pek çok insan için Beaconları çekici hale getirmektedir. Bu nedenle, fitness sektöründe de kullanılması beklenmektedir. Üçüncü olarak, kullanıcılara farklı bir deneyim sunarken, pek çok teknoloji ürününe iddia edildiği gibi kullanıcılara zor bir ortam da yaratmamaktadır. Yüklemesi kolay ve kullanımı eğlencelidir. Bütün bu özellikler dikkate alındığında, Beaconların umut vaat eden bir geleceği bulunmaktadır.

Dahası, teknoloji hızla ilerledikçe, modern dünyada insanların yaşamı da giderek daha akıllı hale gelmektedir. Akıllı teknolojiler oldukça hızlı yayılmakta ve akıllı teknoloji hemen hemen her alanla bütünleşmektedir. Akıllı teknolojilerin kullanımı yalnızca evlerde değil, aynı zamanda diğer sosyal alanlarda da giderek yaygınlaşmaktadır. Bununla birlikte, konum hizmetleri de yaygın olarak kullanılmaktadır. Ancak, konum hizmetlerinin kullanımı çoğunlukla kullanıcının nerede olduğunu gösteren uygulamalarda olduğu gibi büyük alanlarda mümkün olmaktadır. Beacon teknolojisi burada, bu akıllı hayatlara katkıda bulunarak kapalı ve küçük alanlarda da Bluetooth teknolojisi sayesinde konum belirlemeye imkan sağlamaktadır. Bu kapalı alanlarda konum hizmetlerini fitness merkezlerinde kullanmak kullanıcılara hem tanıdık hem de çekici bir deneyim sunabilir.

Beacon teknolojisini kullanmanın fitness sektöründe parlak bir geleceği vardır. Fitness merkezlerine, üyelerini cep telefonları aracılığıyla izleme imkanı tanıyacak ve bu da üyelerin sistemli ve uygun bir egzersiz düzeni takip edip etmediklerini anlamalarına yardımcı olacaktır. Ayrıca, merkezlerdeki en sık ve en nadir kullanılan ekipmanları belirleme fırsatları olabilecektir. Bu veri yardımıyla, satın alma ve bakım planlarını buna göre ayarlayabilecek, böylelikle mali ve iş planlarında düzenlemeler veya değişiklikler yapabileceklerdir. Dahası, üye davranışlarıyla ilgili veri pek çok konuda fitness merkezlerinin ihtiyaçları hakkında ipucu verebilecektir.

Sonuç olarak, söz konusu tez çalışması teknolojinin spor ve fitness alanında kullanımı ile ilgili öncül bir çalışma sunmaktadır. Gerek teknolojinin hızla gelişmesi, gerekse fitness alanına her geçen gün artan talep bu alanda daha fazla çalışma yapılmasını zorunlu kılmaktadır; bu çalışma alanyazında yer alan sınırlı sayıda çalışmaya katkı sunmakla birlikte daha fazla çalışma yapmanın gerekliliğinin de altını çizmektedir.

G: TEZ FOTOKOPİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü

Sosyal Bilimler Enstitüsü

Uygulamalı Matematik Enstitüsü

Enformatik Enstitüsü

Deniz Bilimleri Enstitüsü

YAZARIN

Soyadı :

Adı :

Bölümü :

TEZİN ADI (İngilizce) :

.....

.....

.....

.....

TEZİN TÜRÜ : Yüksek Lisans Doktora

1. Tezimin tamamı dünya çapında erişime açılsın ve kaynak gösterilmek şartıyla tezimin bir kısmı veya tamamının fotokopisi alınsın.
2. Tezimin tamamı yalnızca Orta Doğu Teknik Üniversitesi kullanıcılarının erişimine açılsın. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.)
3. Tezim bir (1) yıl süreyle erişime kapalı olsun. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.)

Yazarın imzası

Tarih