GREEN IT BEHAVIOR OF YOUNG GENERATION

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GREEN IT BEHAVIOR OF YOUNG GENERATION

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DECLARATION OF ORIGINALITY

I, Ahmet Fatih Özkul, certify that

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ABSTRACT

Green IT Behavior of Young Generation

As IT's role in the world tremendously has been increasing each day, its effects on the environment has been becoming more crucial for our daily lives. Green IT has been investigated in the literature for almost 15 years since it was first mentioned. It focuses on IT's role in the environment in regard to sustainable practices for both organizations and individuals. This study aims to provide a comprehensive understanding on the precedent effects of Green IT Behavior of students living in Turkey. In this study, a theoretical model was developed to understand the Green IT Behavior with several variables. Moreover, a relevant questionnaire was developed for each variable and surveyed through universities anonymously. Based on the data collected from 242 respondents, it is concluded that the higher pro-environmental behaviors and higher Green IT awareness lead to a much higher statistical significant relationship with Green IT Attitude of students. In addition, Green IT Attitude is positively, statistically and significantly associated with Green IT Behavior. However, the General IT Usage Level does not have a similar relationship as others have. Moreover, although students vary in the areas they study as whether they study in IT related or not, their Green IT Attitude does not differ from each other just as their age differences do not differ statistically explaining their Green IT Attitude as well. For students, this study demonstrates that the more pro-environmental and the more aware in Green IT leads higher Green IT practices overall.

ÖZET

Genç Neslin Yeşil Bilgi Teknolojileri Davranışı

Bilgi teknolojilerinin rolünün dünyada yadsınamayacak ölçüde artmasına paralel olarak çevre üzerindeki etkisi de günlük yaşamımızda önemli hale gelmektedir. Yeşil bilgi teknolojileri ilk ele alındığından bu yana 15 yıldır birçok çalışmada bahsedilmiştir. Bu konsept hem kurumlar hem de bireyler için sürdürülebilir uygulamalar açısından bilgi teknolojilerinin çevre üzerindeki etkisine dikkat çekmektedir. Bu çalışma, Türkiye'de yaşayan üniversite öğrencilerinin Yeşil Bilgi Teknolojileri davranışlarına açıklama getirmek amacını gütmektedir. Bu çalışmada, Yeşil Bilgi Teknolojileri Davranışını çeşitli değişkenlerle anlamak için teorik bir model oluşturulmuştur. Aynı zamanda, modeldeki her değişken için bir anket hazırlanmış ve anonim bir şekilde üniversite öğrencileri tarafından cevaplanmıştır. 242 katılımcıdan toplanan veriler doğrultusunda, yüksek çevre yanlısı davranışlar ve yüksek yeşil bilgi teknolojileri farkındalığının, Yeşil Bilgi Teknolojilerine olan tutumu istatiksel ilişki ile etkilediği görülmüştür. Ayrıca, Yeşil Bilgi Teknolojilerine olan tutumunun ise pozitif, istatiksel ve kayda değer ölçüde yeşil bilgi teknolojileri davranışını etkilediği görülmüştür. Öte yandan, Genel Bilgi Teknolojileri kullanım düzeyinin diğer değişkenlerin aksine istatiksel bir etkisi görülmemiştir. Bunun haricinde, öğrencilerin bilgi teknolojileri ile ilgili bir bölüm okuyup okumamasının, tıpkı yaş farklılıklarında olduğu gibi, Yeşil Bilgi Teknolojileri tutumlarını istatiksel olarak farklı etkilemediği görülmüştür. Bu çalışma ile genç neslin yüksek çevre bilinci ve yüksek yeşil bilgi teknolojileri farkındalığı ile yüksek oranda yeşil bilgi teknolojileri davranışlarının ilişik olduğu görülmüştür.

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CHAPTER 1

INTRODUCTION

The adoption, penetration, and general usage of IT have been increasing tremendously over the last decade. At the same time, the problems of global climate change, carbon dioxide emissions, and environmental catastrophes have been becoming more crucial issues than ever. An early report indicates that the IT sector could be responsible for 20% of the global energy consumption by the end of 2025 as well as affecting 14% of global carbon emissions by 2040 (Vidal, 2017). To cope with these existential problems, IT's role has been investigated over the last 20 years.

Green IT was firstly mentioned back in 2007 in a non-academic CIO business report (Sedera, Lokuge, Tushi & Tan, 2017). It generally points out the financial as well as environmental implications of human efforts, with a focus on forms of decrease in energy waste, measures in cost-cutting, reduction in carbon emission, dealing with poor e-waste management, and contamination of environmental effects of hazardous IT devices (Linehan & Fisher, 2018; Przychodzen, Gómez Bezares, & Przychodzen, 2018a). A broader definition of Green IT is: "the study and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems—such as monitors, printers, storage devices, and networking and communications systems—efficiently and effectively with minimal or no impact on the environment." (Murugesan, 2008, p.2). [1]

[1] Murugesan, S. (2008). Harnessing Green IT: Principles and Practices. In IT Professional (Vol. 10, Issue 1, pp. 24–33).

In this manner, related to young generation; it is questioned the following:

- What are the factors affecting green IT behavior?
- What factors influence the overall green IT attitude?
- What is the general level of awareness of green IT?

This thesis aims to provide answers to those questions. Not only were there fewer green IT studies focused on individuals' green IT behavior but also green IT practices within universities have been less investigated in emerging countries (Hernandez, 2019). Hence, university students in Turkey were chosen as the appropriate subject for this study.

A survey was conducted to analyze the current factors that affect the green IT behavior of university students. It is hypothesized that a higher level of green IT awareness, general IT usage, environmental behavior, and green IT attitude will eventually lead to a greater green IT behavior of university students.

In Chapter 2, the existing literature on green IT is presented in three different aspects of settings: organizational, individual, and student-oriented. In Chapter 3, the theoretical model and its hypotheses are demonstrated. In Chapter 4, the research methodology is explained. In Chapter 5, the findings of the study are illustrated. Lastly, in Chapter 6, the results will be discussed.

CHAPTER 2

LITERATURE REVIEW

In this chapter, the literature in regard with green IT studies was summarized based on two aspects. Firstly, organizational and individual-level setting studies were examined. Later, student-level studies were summarized.

2.1 Organizational setting and individual level studies

In the literature, many studies related to green IT were conducted on an organizational level (Asadi, Hussin, Dahlan & Yadegaridehkordi, 2015). Molla, Abareshi, and Cooper (2014) identified the pro-environmentalist norms in computing of IT professionals and how their green IT attitudes, beliefs, ability to acquire information and organizational fields affect the adoption. Gholami, Ainin, Ramayah, and Molla (2013) studied green IT behavior in senior IT professionals in organizations with the belief-action-outcome (BAO) structure (Melville, 2010). It was found that attitude and thinking about the outcomes of the future illustrated the adoption behavior perfectly. Not only IT professionals in companies but also organizations themselves were also studied in terms of green IT behavior and governance. Molla and Abareshi (2012) explores motivational factors affecting green IT behavior by 176 organizations, which resulted in that eco-efficiency and eco-effectiveness intentions affect the adoption of technologies that contribute to the energy saving of IT infrastructure. Opitz, Krüp, and Kolbe (2014) drew a contingency model for green IT governance that illustrates the convenience between contingencies and the organization-specific manual of green IT. Nishant, Teo and

Goh (2013) studied 115 global organizations' data on green IT and performance capacities to detect the effect of green IT behavior on organizational performance. It was found that green IT adoption had a favorable correlation with market valuation and originality but not with profitability. In addition, Zheng (2014) challenged the role of business strategies in the adoption of green IT and allocated them as proactive or reactive strategies. By applying technology-organization-environment framework to conceptualize a green IT behavior model that contains business approach factors and three forms of green IT motivations (regulations, competitiveness, and ecological responsibility), they studied the crucial elements that might be able to affect the green IT behavior. Furthermore, Esfahani, Abdul, and Zakaria (2015) pointed out how processes of external influences -such as persuasion- affect the practice of Green IT among both organizations and individuals by an elaboration-likelihood model. Chou, Chou (2012) proposed a green IT value model to illustrate the relationship among several components that affect the ways organizations determine the green IT value to provide a scheme for the IT companies to go after the ambition of reaching high environmental sustainability. Kim, Kim, Han, Jackson, and Ployhart (2014) illustrated that psychological and social conditions and processes such as conscientiousness and moral reflectiveness were associated to construct voluntary workplace green behavior in organizational settings.

Moreover, several studies, characterizing green IT behavior on an individual level, were put forward in the literature by using 80's behavior models. Technology Acceptance Model - TAM (Davis,1989) has usually been one of the most primer models that relate the usage of IT with the desired individual behavior. (Ma & Liu, 2004). In addition, because of the fact that TAM has been widely adopted in

predicting determinants of behavior -adoption- and technology usage in a variety of settings (Lim, Lim, & Heinrichs, 2008), green IT behavior can also be applied with TAM. Akman and Mishra (2014) investigated green IT behavior differences among public and private sector professionals by using TAM, which resulted in the diversities caused by the effect of Perceived Ease-of-Use (PEU) on Perceived Usefulness (PU) and the Attitude Towards Use (ATU) in TAM model. Furthermore, the green IT behavior of individuals is measured with various models in the literature (Sedera et al. 2017). For example, Akman and Mishra (2014) and Chow and Chen (2009) used the Theory of reasoned action - TRA in the green IT adoption of individuals. Apart from that, the Theory of Planned Behavior - TPB (Ajzen, 1991) has been widely applied and is still predominantly used in the domain of environmental science in assessing an individual's end behavior (Si, Shi, Tang, Wen, Miao and Duan, 2019); thereby, many individual-level of green IT behavior studies lay on that model. For example, Pollard (2015) examined IT users' beliefs and adoption of green computing. Busse, El Khatib, Brandt, Kranz, and Kolbe (2013) investigated the effect of cultural backgrounds on the behavior of eco-innovations by using TPB; which clearly demonstrated that there exist considerable differences in the adoption of eco-innovations among Chinese and Germans. Chugh, Wibowo, and Grandhi (2016) examined the level of awareness of environmentally sustainable behaviors of IT professionals in India. The results illustrated that people older than 35 are more aware of sustainable energy resources and e-waste management as well as they contribute to a more solid individual obligation to seek more in making a difference on environmental problems.

2.2 Student level setting studies

There are also studies that are conducted on the student level regarding green IT in general.

Ahmad, Din, and Haron (2013) investigated Malaysian State University students' knowledge of green IT. The results indicated a general lack of knowledge on different perspectives of green computing, especially with respect to the policy of Green Technology of the Malaysian government, printer types and their power consumption, energy-efficient behaviors, and hazardous materials existing in computer hardware. Dalvi-Esfahani (2020) studied assessing green IT behavior of students with TPB along with moderating variables through a survey given to university students. It was found that perceived behavioral control, attitude towards green IT, and personal norms greatly affected the intention to practice green IT behavior along with the following moderating variables: openness to experiences, conscientiousness, and agreeableness. Dezdar (2017) broadened TPB by applying the personality norms of openness and consideration of future outcomes to investigate the green IT practice behavior of students. It was reported that students' adoption of green IT behavior can be clearly defined by TPB and personality traits. Bulut, Kökalan, and Doğan (2017) studied the sustainable consumption behavior difference among several generations in Turkey. The results indicated that generation is linked with excessive consumption as an aspect of sustainable consumption adoption. Moreover, the Y generation has the highest level of awareness for energy-efficient equipment among the other concepts in terms of green IT (Doğan, 2016). In a university in UAE, university students were given surveys to be evaluated on their green computing knowledge and assessment. (Abugabah and Abubaker 2018)

investigated the level of green computing awareness of university students in the UAE based on quantitative research that data were collected through a survey. The findings indicated that students' level of knowledge of green computing is high whereas their daily behavior of green computing is not enough. Hernandez (2019) investigated the level of green IT awareness and green IT practices of university students in the Philippines. The results from the distributed survey showed that there is an average level of green IT awareness whereas lack of green IT practices among higher education students.

CHAPTER 3

THEORETICAL MODEL AND HYPOTHESES DEVELOPMENT

3.1 Overview of the theoretical model

Having highlighted the importance of green IT adoption in the previous chapters, this study aims to further investigate the factors that affect the green IT behavior of the young generation.

Independent variables consist of environmental behavior, green IT awareness, level of general IT usage, and demographics that affect green IT attitude which in the end influences the dependent variable, green IT behavior. In early studies, it was demonstrated that the green IT attitude along with green IT knowledge were important factors affecting green IT adoption (Ojo, Raman & Downe, 2019). Moreover, Esfahani et al. (2015) put forward that green IT attitude as the single direct factor affecting green IT behavior. Furthermore, consideration of future consequences (CFC), which was linked with environmental behavior (Dezdar, 2017), was used as an independent variable that influences green IT behavior. CFC relates how individuals are taking consideration of future perspective in making decisions on their current behavior. A theoretical model is provided in Figure 1 below.

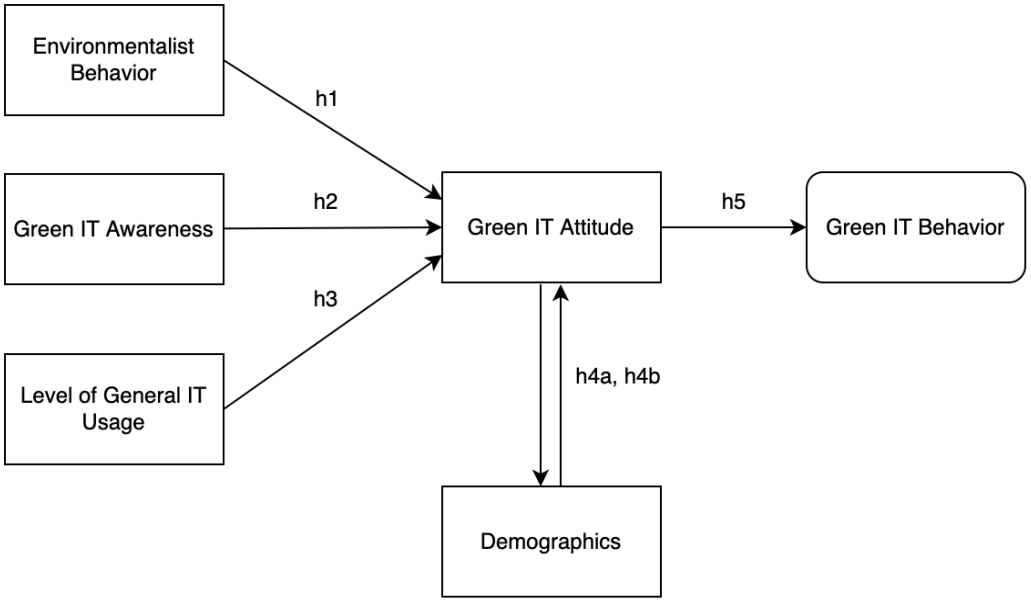

Figure 1. Theoretical Model

3.2 Hypothesis development

There are 6 hypotheses developed to demonstrate how these variables affect each other. The existing literature performed as the basis for the expected results. The general IT usage, environmental awareness, environmental behavior and demographics were taken as the independent variables, green IT attitude was taken as the intermediary variable and the green IT behavior was taken as the dependent variable. It is expected to have positive correlation between all of these variables

H1**:** Pro-environmentalist behavior is positively associated with Green IT Attitude

There are not sufficient studies focused on the study of IT users' beliefs and behavior about green IT (Gholami et al., 2013; Tushi, Sedera & Recker, 2014). Because of the nature of green IT, it is assumed that the level of environmental responsibility will significantly affect the individual acceptance of green IT (Yoon, 2018). Moreover, it has been stated that the lack of environmental awareness results from cognitive

limitations, which can be related to the pace of ecological problems in general (Kollmuss & Agyeman, 2002). Thus, environmental knowledge can change a person's cognition and emotional state on sustainable practices (Ojo & Fauzi, 2020). Furthermore, it is seen that ecological knowledge is important in determining young consumers' green engagement and their purchase behaviors (Kanchanapibul, Lacka, Wang & Chan 2014). Therefore, the pro-environmental behaviors of young generations should also be questioned in assessing green IT behavior. Moreover, it is seen that pro-environmental individual practices of IT professionals along with green IT beliefs and attitudes significantly influence their green IT behavior (Molla et al, 2014). Therefore, since pro-environmental behavior is likely to affect attitudes toward green IT, it is put forward as an input variable along with others in the given research model Figure 1.

H2**:** Green IT Awareness is positively associated with Green IT Attitude

Green IT attitude describes people's opinions on environmental sustainability with the effect of IT (Molla & Abareshi, 2011), which include awareness of IT's effect on ecological sustainability. Furthermore, green IT awareness leads to recognition of practical policies, acceptance of required regulations, and the total benefits and positive results stemming from green IT development. (Ansari, Ashraf, Malik, and Grunfeld, 2010; Chou & Chou, 2012). An early study by Hernandez (2019) indicates that higher education students demonstrated an average level of green IT awareness but have insufficient green IT behavior practices. It is important to put forward that green IT awareness might have a positive impact on green IT attitude.

H3**:** General IT Usage is positively associated with Green IT Attitude

Although Yoon (2018, p4) states that “Green IT, an information technology for protecting the environment, does not have hedonic characteristics or require compulsory use of the technology.”, the general IT usage level of students is important in assessing the green IT behavior. In this study, it is questioned whether there is a difference among students’ green IT attitude concerning their general IT usage level.

H4A: There is a statistical significant difference between age groups in affecting Green IT Attitude

H4B: There is a statistical significant difference between students’ areas of study in affecting Green IT Attitude

Earlier studies not only addressed the role of external (institutional, geographical, etc.) and internal (e.g., attitudes, awareness) factors in regard to ecological sustainability but also pointed out the role of demographics played as well (age, etc.) (Csutora, 2012). Therefore, demographics including age groups and faculties of students are considered as an input in influencing green IT attitude.

H5: Green IT Attitude is is positively associated with Green IT Behavior

Ojo and Fauzi (2020) investigated the factors of IT professionals’ green IT beliefs and attitudes toward green IT practices for environmental performance with the belief action and outcome (BAO) groundwork of (Melville, 2010). It is seen that there is a significant effect of environmental consciousness in influencing IT professionals’ attitudes towards green IT. In addition, their attitude was a crucial

mediator in practicing green IT behavior. (Ojo & Fauzi, 2020). Moreover, earlier studies demonstrated that employees in the IT sector with positive green IT attitudes tend to realize green IT behaviors more than others. (Molla et al., 2014; Ojo et al., 2019). Furthermore, people with more positive attitudes regarding green IT are more likely to embrace such behaviors and technologies (Sadaf, Newby & Ertmer., 2012). Therefore, green IT attitude is selected as an immediate antecedent variable before green IT behavior.

CHAPTER 4

RESEARCH METHODOLOGY

This chapter illustrates the research design, parts of the questionnaire and data collection methodology used in the study to test the hypothesis that were demonstrated in the previous chapter.

4.1 Research design

Aiming to test the hypotheses of the theoretical model, a digital questionnaire was developed using Google Forms. For each variable in the research model, except Demographics, multi-item scales were constructed and illustrated in the survey with a 5-point Likert Scale which is ranged either between “Strongly Disagree” and “Strongly Agree” or “Never” and “Always”. The questions in the questionnaire were not only inherited from the existing studies but also developed uniquely for this study. At first, all questions were written in English and then translated to Turkish. It is distributed in Turkish because the target audience of the study’s native language is Turkish. All questions in both languages were agreed upon during the consultation of the thesis advisor. Moreover, additional consultations regarding area-specific terminology usage were discussed with the related area academicians at Bogazici University.

4.2 Questionnaire elements

The survey starts with demographic questions. At first, it is asked about the current university degree that students are studying in. Later, their area of study, age, and gender are asked.

After the demographics, the component of the general IT usage level scale is given with a 5-point Likert Scale ranging between “Never” and “Always”. To understand the general IT Usage level of students, all items were self-developed but were based on an earlier OECD survey ICT FAMILIARITY QUESTIONNAIRE FOR PISA 2018 (OECD, 2018). Respondents were asked at what level they are engaged with IT in general.

Later on, students were asked to fill the pro-environmental behavior subscale, again based on a 5-point Likert Scale ranging between “Strongly Disagree” and “Strongly Agree”. The items were captured from the self-developed pro-environmental questionnaires analyzed in a literature review study (Lange & Dewitte 2019). Some adjustments were made for specific questions such as “I support pro-environmental NGOs such as [name of the NGO]” was filled with familiar Turkish NGOs such as “TEMA, TURMEPA, WWF”.

Moreover, the subscale part of green IT awareness is surveyed on a 5-point Likert Scale ranging between “Strongly Disagree” and “Strongly Agree” as well. Below you see the list of the questions and their sources from several earlier studies. Green IT awareness tries to understand the green awareness level of students for IT acceptance. It also aims to understand students’ overall willingness to cede private and financial resources in their technology shopping (Ashiq, Chrysoulas & Banissi 2019). Therefore, statements such as “Printing on both sides of the paper contributes to the environment.” and “I am aware that I can reduce my personal carbon footprint

by decreasing my own energy consumption." were put along with others into the subscale. In addition, since green IT means the use of IT equipment in an energy-efficient and cost-effective way (Bose & Luo, 2011), the question of "Green IT reduces the cost of treating waste" was put on the awareness scale. Moreover, the question related to screen savers' lower energy consumption was asked just as Tan and Ibrahim (2017) asked in a green IT awareness questionnaire to university students.

Green IT attitude was surveyed with the same 5-point Likert Scale ranging between "Strongly Disagree" and "Strongly Agree" type of questions. Green IT attitude is very much related to both green IT awareness and green IT attitude in terms of questions' similarity, however, it is more inclined to strong personal dedication statements such as "I am willing to learn more about green IT" and "Using green IT could be my chosen way to contribute to environmental protection."

Lastly, the green IT behavior was again surveyed through a 5-point Likert Scale ranging between "Strongly Disagree" and "Strongly Agree". In this step, actual green IT practices of students were intended to be understood from various aspects. Several questions in this part were analyzed and added through existing literature. For example, printing both sides of the paper, turning off the computer screen during a long break, recycling unwanted hardware, and purchasing green it devices were all asked in a green it behavior subscale from the research of Tan and Ibrahim (2017) in assessing university students green it behaviors in Malaysia.

4.3 Data collection and preparation

The data were collected within 10 months between April 2021 and February 2022. To reach out to as many university students as possible in Turkey, convenience

sampling was used. More than 10 universities' academicians were asked through email to distribute the questionnaire to their students. Moreover, the QR code belonging to the questionnaire link was only shared within university campuses. In addition, apart from email, the link was only shared digitally within university students' chat groups in a chatting mobile app, Whatsapp.

In total 252 students filled out the survey. 10 of them were deleted later because incomplete questions were detected in the answers. Hence, only the reliable correspondents (n=242) were left to proceed with the further analysis.

CHAPTER 5

ANALYSIS OF FINDINGS

This chapter demonstrates the findings of the study. First, the descriptive statistics in regard with the data set will be illustrated. Later, the multi-item scales will be demonstrated. After that, several exploratory analyses will be performed for the research questions before hypothesis testing. Lastly, the test results of the hypotheses will be presented. Microsoft Excel and IBM SPSS Statistics Software are used to perform the analyses in the study.

Moreover, it is significant to state the research questions in this part once again; hence, the analyses and hypotheses tend to focus on them.

- What are the factors affecting the green IT behavior of the young generation?
- What factors influence the overall green IT attitude of the young generation?
- What is the general level of awareness of green IT of the young generation?

5.1 Descriptive statistics

Firstly, the respondents were not targeted based on their area of study. Hence, university departments of students differ from each other. The departments were grouped based on the faculties they belong to and their course context. It is worth mentioning that only 45 students out of 242 (18,6%) of the respondents were studying in IT-related departments such as Management Information Systems, Computer Engineering, and Computer Education Technology. It is seen that although this study is related to IT terminology to some extent, the majority of the sample is not from IT students. Moreover, the majority of the respondents (n=60) are from the

Arts and Sciences departments whereas the minority was (n=22) from Medicine. A detailed area of the study of the valid sample can be seen in Table 1.

Table 1. Areas of the Study Breakdown of the Sample

Area of the Study	**Number**	**Percentage**
Information Technology	45	18.6%
Education Sciences	49	20.2%
Arts and Sciences	60	24.8%
Economics and Administrative Sciences	42	17.4%
Engineering	24	9.9%
Medicine	22	9.1%
Total	**242**	**100.0%**

University students are also not targeted based on their academic degrees. Therefore, there were respondents from each academic degree available in Turkey. It can detailly be seen from Table 2 that the majority was from Bachelor's (n=144) holding the share from the total as 59,5%. The minority was from Ph.D. students (n=6) accounting for 2,5% of the total. However, the graduate students (master's + doctoral) account for 22,2% making them the second majority (n=54) after Bachelor's because prep students (n=44) consist only 18,2% of the total sample.

Table 2. Academic Degree of the Sample

Academic Degree	**Number**	**Percentage**
Prep School	44	18.2%
Bachelor's	144	59.5%
Master's	48	19.8%
Doctoral	6	2.5%
Total	**242**	**100.0%**

Investigating the ages indicates that the majority of students are ranging from 20 to 22 (n=90). This holds up 37,2% of the total sample. Table 3 demonstrates that a normal distribution exists among age groups. This also leads to possible further analysis investigating the differences among the age groups.

Table 3. Age Groups of the Sample

Age Groups	**Number**	**Percentage**
17 - 19	50	20.7%
20 - 22	90	37.2%
23 - 24	47	19.4%
> 24	55	22.7%
Total	**242**	**100.0%**

Furthermore, the average time spent on mobile phones during a day was asked. The majority with 161 people (66%) defined themselves as they use their phones more than 3 hours in a day regularly. Table 4. indicates that only 81 (34%) of the respondents engage with their phones less than 3 hours in a day.

Table 4. Time Spent on Mobile Phones During a Day

Time spent on mobile phones during a day	**Frequency**	**Percentage**
Less than 1 hour	8	3.3%
1-3 Hours	73	30.2%
More than 3 Hours	161	66.5%
Total	242	100.0%

It is seen from Table 5 that 55% of the respondents (N=134) are female, which constitutes the majority but in the meantime, indicates a normal distribution with the males (N=97).

Table 5. Gender Statistics

Gender	**N**	**Percentage**
Female	134	55.4%
Male	97	40.1%
Didn’t specify	11	4.5%
Total	242	100.0%

5.2 Multi-item scales and reliability

After the illustration of descriptive statistics, a reliability test was performed for the multi-item scales for all the variables of the study, including both independent and dependent variables. Therefore, Cronbach's alpha values were analyzed for each subscale in the questionnaire. It is known that if the Cronbach's alpha value is above the limit of 0.70, it can be put forward that the scale can be accepted as reliable. Table 6. illustrates each variable scale's Cronbach's Alpha Value. The more detailed reliability analysis for each subscale can be found in the following subchapters. All questions can be seen from APPENDIX A and B at the end of the document.

Table 6. Cronbach's Alpha Values for each Variable

Scale	Cronbach's Alpha
General IT Usage	0.830
Green IT Awareness	0.904
Environmentalist Behavior	0.861
Green IT Attitude	0.888
Green IT Behavior	0.921

5.2.1 General IT usage

The general IT usage scale consists of 12 items. The reliability test resulted in Cronbach's Alpha value being 0.830. This means that the scale is reliable and can be accepted without any changes. The item with the highest mean score was "social media applications usage" with 4.31. In addition, the most frequent usage is seen in social media applications as it has the most frequent "4" and "5" scores from the

respondents (N=203). Moreover, the least mean score was “online travel services/reservations adoption” with 2.55. In addition, students tend to use social media applications more often than for academic or career reasons. These results indicate that students engage with online and mobile uses for various purposes.

Table 7. General IT Usage Scale Item Statistics

Item	Mean	Std. Deviation
Email applications for communication purposes	3.81	1.02
Social media applications	4.31	0.93
Online education platforms	3.56	1.07
Virtual meetings	3.32	1.28
Online music platforms	4.1	1.03
Online newspapers	3.31	1.17
Internet-Mobile banking	3.69	1.07
E-Commerce platforms	3.2	1.28
Online travel services/reservations	2.55	1.16
Online-Mobile entertainment platform (Netflix, Spotify, Blog)	4.05	1.05
E-Government applications	3.09	0.94
Office softwares	3.51	1.28

Table 8. General IT Usage Scale Item - Frequency Statistics

Item	1	2	3	4	5
Email applications for communication purposes	5	28	39	106	64
Social media applications	4	10	25	71	132
Online education platforms	7	37	62	86	50
Virtual meetings	25	47	45	76	49
Online music platforms	4	20	33	77	108
Online newspapers	18	46	61	77	40
Mobile banking	9	30	43	106	54
E-Commerce platforms	32	41	57	71	41
Online travel services/reservations	50	76	62	40	14
Online-Mobile Entertainment platform (Netflix, Spotify, Blog)	8	14	36	84	100
E-Government applications	10	52	100	66	14
Office softwares	23	33	48	73	65

5.2.2 Green IT awareness

The Green IT Awareness section consists of 14 items illustrated in Table 9. below. When data was examined, Cronbach's Alpha was found to be .904, which points out that the questions and answers are reliable.

The highest mean in this section was “Printing two sides of the paper contributes to the environment”, which has a value of 4.39. On the other hand, “Screen savers save energy” is the item that has the lowest mean value, that is, 3.44. It can be deduced that university students mostly agree that the efficient use of materials leads to positive results on the environment while they do not tend to agree that screensavers or related programs lead to less energy consumption.

Table 9. Green IT Awareness Scale Item Statistics

Item	Mean	Std. Deviation
I am aware that old hardwares, non-working electronic devices should be put into e-waste recycling bins for licensed organization for collection	4.09	1.06
I know that recycling electronic devices contributes to resource conservation	4.35	0.92
I am aware that I can reduce personal carbon footprint by decreasing my own energy consumption	4.24	1.03
I believe that using electric or hybrid cars is important for climate change	4.21	1.04
Using ICT, such as artificial intelligence would contribute to environment in terms of less energy consumption	3.76	1.01
I am aware that using ICT, such as data analytics, Machine Learning, AI and IoT methods or decision support systems in logistics would lead less energy consumption	3.61	1.11
Sleep mode and smart charging of PC's provides energy saving	4.13	0.94
I would avoid printing as much as I can in support of climate change	3.91	1.20
Printing two sides of paper contributes to environment	4.39	0.89
Screen savers save energy	3.44	1.20
Shutting down a PC saves more energy than using it in sleep mode	4.13	1.08
Green IT decreases fee for waste treatment	3.67	1.02
Policy on the use of Green IT encourages people to reduce energy consumption	3.81	0.98
I am aware of the data centers impact on greenhouse gases	3.67	1.22

5.2.3 Environmentalist behavior

Pro-environmentalist behavior consisted of 10 items in total. Cronbach Alpha is determined as .861, which indicates that the reliability is appropriate for the study. Among 10 items with 242 responses, “I turn off lights and de-plug my electronic chargers when I do not use them” has the highest mean score, which is 4.42. On the other hand, 3.47 was determined as the item having the lowest mean score for the item “ I pay attention to source separation at home for paper, metal, glass and plastic wastes”. The scores from this section illustrate that the students pay attention to energy savings via electronic items while material separation is what has been underestimated.

Table 10. Environmentalist Behavior Scale Item Statistics

Item	Mean	Std. Deviation
I support for renewable energy developments, infrastructure and innovations whether it is supported by both public or government institutions	4.32	0.86
I tell people that carbon dioxide emission rate must be decreased for environmental sustainability	3.81	1.16
I protect the environment starting from my own life	4.36	0.85
I pay attention to source separation at home for paper, metal, glass and plastic wastes	3.47	1.19
I support or want to environmental NGOs such as TEMA, TURMEPA, WWF and others by either financially or voluntarily	3.70	1.10
I would regret if I am not doing something for the environment and future generations	4.13	1.07
I would feel ashamed of myself if I was doing nothing to help the environment	4.18	0.98
I organize my shopping list weekly in order not waste food in the kitchen	3.60	1.24
Energy saving household equipment is my priority during shopping	3.87	1.11
I turn off lights and de-plug my electronic chargers when I do not use them	4.42	0.94

5.2.4 Green IT attitude

With the fewest item number (N=5), green IT behavior has a high reliability that Cronbach's Alpha is .888. It is clear that the "I am willing to learn more information about Green IT issue" item has the highest mean score, which is 3.88 while "By using green technology, I take care of myself and, at the same time, I take care of the environment" has the lowest mean score, which is 3.11. The results point out that while students have a positive attitude towards learning Green IT, they seem not to agree that the current application makes a difference in their lives.

Table 11. Green IT Attitude Scale Item Statistics

Item	Mean	Std. Deviation
I am very concerned about ITs power consumption on greenhouse gases	3.26	0.98
I am willing to learn more information about Green IT issue	3.88	0.98
By using green technology, I take care of myself and, at the same time, I take care of environment	3.11	1.04
Using Green IT is a way I've chosen to contribute to protecting the environment	3.58	0.94
Using Green IT is a reasonable thing to do	3.77	0.93

5.2.5 Green IT behavior

The final and ultimate section of the methodology was Green IT behavior. As illustrated below, 20 items were included about the participants' manners in the subject. When examined, data indicates that "I send documents via email rather than post/hard copy" has the highest mean score, 4.33. On the contrary, the "I follow news about Green Information Technology" item has the second-lowest mean score of all sections in this study, which is 2.59. Having .921 as Cronbach's Alpha score, this section indicates that university students have some practices in green IT behavior, but they are not following the trend consciously.

Table 12. Green IT Behavior Scale Item Statistics

Item	Mean	Std. Deviation
I send my hardware and electronic devices for recycling and recovery	3.57	1.25
I drop all types of batteries especially the lithium ones in the red bins at the university	3.55	1.24
I spent time for printed paper disposal at recycling bins	3.67	1.17
I use cloud computing instead of computer based programs	3.33	1.29
If it means less energy consumption and obtains the same result, I would rather choose the green way of coding	3.97	1.05
I advice my friends and family to de-plug their chargers when they don't use their devices	3.81	1.19
Unless it's urgent, I would not use my electronic device such as mobile phone or computer when it is being charged	3.12	1.48
I use E-Devlet or E-Commerce websites to meet my needs instead of driving to physical places	4.22	1.08
I turn off entire computer system when out of a long break	3.86	1.26
I try to reduce amount of time spent using computers	3.03	1.37
I would rather use and support AI systems in organic agriculture for energy efficiency	3.97	1.01
Eco-labelled products and energy saving devices are my priority during shopping	3.81	1.10
I prefer recycled packaging for my electronic devices	3.52	1.16
I search for recyclable IT equipment during purchasing	3.07	1.16
I follow news about Green Information Systems	2.59	1.24
I advise software developed to manage coding in accordance to Green IT	3.01	1.25
I save documents on disk rather than printing on paper	4.15	0.98
I send documents via email rather than by post/hard copy	4.38	0.90
I print on paper only if necessary	4.33	0.93
I re-use printed papers for testing printers	4.26	1.08

5.3 Exploratory analysis

Before proceeding into hypothesis testing, there is a need to investigate the characteristics of the respondents deeply for enlightening answers to the research questions.

At first, it is asked how many hours in a day do our respondents use their mobile phones. Table 13 indicates the frequency of the results that illustrates the majority (N=161) 66.5% of the respondents use their mobile phones more than 3 hours in a day. Only a small number of people with 8 (3.3%) use their mobile phones below 1 hour in a day. Therefore, two groups can be generated as people who use their mobile phones more than 3 hours and below respectively. Then, the relationship among these groups can be investigated further with the research model's variables.

Table 13. Average Time Spend on Mobile Phones during a Day

Time spend on mobile phones during a day	Frequency	Percent
Less than 1 hour	8	3.3%
1-3 Hours	73	30.2%
More than 3 Hours	161	66.5%
Total	242	100.0%

To analyze independent samples t-tests are conducted between the following two groups of people who use mobile phones less than 3 Hours (N=81) and more than 3 hours (N=161) with the research model variables. For all variables, the p-value for homogeneity of variance of Levene's tests is higher than 0.05. The significance of t-test with equal variances assumed is greater than 0.05 for all variables. The corresponding *t* and *p* values for each variable are indicated Table 14. below. Hence, it can be said that there is no statistical significant difference among the two groups corresponding to the research model's variables.

Table 14. Independent Samples t-test Results for Time Spend on Mobile Phone Usage in a Day

Research Model Variables	Levene's Test P Value	*t*	*p*
Green IT Attitude Mean	0.230	0.385	0.701
Green IT Awareness Mean	0.644	-0.066	0.947
Environmentalism Mean	0.430	0.284	0.777
IT Usage Mean	0.580	-1.609	0.109
Green IT Behavior Mean	0.256	0.987	0.324

Furthermore, the genders of the respondents are asked as well. Females (N=134) consists of the majority group of students with 55.5%. Only 11 people didn't share information. Table 15 indicates the number of people and their frequency in terms of gender.

Table 15. Gender Information of the Respondents

Gender	**N**	**Percentage**
Female	134	55.4%
Male	97	40.1%
Not willing to share	11	4.5%
Total	242	100.0%

An independent sample t-test is conducted to understand the possible statistical difference among males and females in terms of their Green IT Attitude. It is found out that the significance value of Levene's Test is $p > 0.05$ which suggests assuming equal variances. The significance of t-test with equal variances assumed is greater than 0.05 with $t = 0.594$ and $p = 0.553$. This indicates that there is no

statistical significant difference among the two groups of genders in terms of Green IT attitude.

5.4 Hypothesis testing

In order to test the hypothesis mentioned in the beginning of this chapter, multiple linear regression and ANOVA analyses were conducted.

5.4.1 Linear regression and ANOVA

At first, in order to analyze how much of the variance of the intermediary variable can be attributed to the model, multiple linear regression was conducted among Green IT Awareness, General IT Usage and Environmentalism. From Table 16, it is seen that multiple correlation coefficient R is 0.60, which indicates a good level of prediction. R Square, the coefficient of determination, is however equal to 0.40 that it might have been expected to become much higher. By looking at the ANOVA part from Table 16, it is seen that F=52.342 and Significance F is below 0.05; therefore, it can be concluded that the overall regression model is a good fit for the data and that the independent variables statistically significantly predict the dependent variable, Green IT Attitude, in this case.

It is seen that h1: “Environmentalism (Pro) is positively associated with Green IT Attitude” cannot be rejected since P-value is lower than 0.05. It is statistically significantly and positively associated in predicting Green IT Attitude.

It is also seen that h2: “Green IT Awareness is positively associated with Green IT Attitude” cannot be rejected since P-value is lower than 0.05. It is statistically significantly and positively associated in predicting Green IT Attitude.

However, h3: “General IT Usage is positively associated with Green IT Attitude” can be rejected since P-value (0.33) is much higher than the threshold (0.05).

Table 16. Multiple Linear Regression among Independent Variables

Regression Statistics	
Multiple R	0.63
R Square	0.40
Adjusted R Square	**0.39**
Standard Error	0.63
Observations	242

ANOVA					
Model	df	SS	MS	F	Significance F
Regression	3	62.8	20.9	**52.342**	**0.000**
Residual	238	95.2	0.4		
Total	241	158.1			

Coefficients				
Predictors	Coefficients	Standard Error	t	P-value
Constant	0.26	0.29	0.90	**0.370**
General IT Usage	0.06	0.07	0.97	**0.334**
Environmentalism	0.30	0.08	3.72	**0.000**
Green IT Awareness	0.46	0.08	5.76	**0.000**

Predictors: (Constant), General IT Usage, Environmentalism, Green IT Awareness

Dependent: Green IT Attitude

To investigate the statistically significant differences between age groups in predicting Green IT Attitude, a one-way between-groups analysis of variance was performed. Students were divided into 4 age groups as indicated in Table 17. It is seen from Table 17 that the P-value between groups is much higher than 0.05, indicating that there is no statistically significant difference among age groups in predicting the Green IT Attitude. Hence, h4a: “There is a statistically significant difference between age groups in affecting green IT attitude” can be rejected.

Table 17. Age Groups' ANOVA Single Factor Results

SUMMARY				
Groups	N	Sum	Average	Variance
17 - 19	50	177.8	3.556	0.619
20 - 22	90	316.4	3.516	0.827
23 - 24	47	166.6	3.545	0.483
> 24	55	191	3.473	0.587

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.218	3	0.073	0.110	0.954	2.643
Within Groups	157.867	238	0.663			
Total	158.085	241				

Similarly, in order to investigate the statistical significant differences between students' areas of study in predicting Green IT Attitude, a one-way between-groups analysis of variance was conducted. Students were divided into 6 departmental tendencies as seen in Table 18. It is seen from Table 18 that there is no statistically significant difference of students' areas of study in predicting Green IT Attitude because the P-value for between groups is much higher than the threshold of 0.05. Hence, h4b: "There is a statistical significant difference between students' areas of study in affecting green IT attitude" can be rejected.

Table 18. Areas of Study's ANOVA Single Factor Results

SUMMARY				
Groups	N	Sum	Average	Variance
IT Related	45	165.6	3.680	0.490
Educational Sciences	49	166.6	3.400	0.743
Arts and Sciences	60	208	3.467	0.523
Economics and Administrative Scien	42	147.4	3.510	0.886
Engineering	24	85.2	3.550	0.627
Medicine Related	22	79	3.591	0.813

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	2.165	5	0.433	0.655	0.658	2.252
Within Groups	155.920	236	0.661			
Total	158.085	241				

In order to investigate the positive association between the median independent variable, Green IT Attitude, and the dependent variable, Green IT Behavior, single linear regression was performed. By looking at Table 19, it is seen that Multiple R is 0.60 indicating a good level of prediction. In addition, R Square is 0.36 and as seen from ANOVA part that Significance F is lower than 0.05 and F is 136.750 demonstrates that the overall model is a good fit in explaining statistically significant association of the dependent variable. Moreover, from Coefficients part of Table 19, it is also seen that Green IT Attitude has a P-value less than 0.05 indicating a proof of statistically significant association. Therefore, it can be concluded that Green IT Attitude is positively associated with Green IT Behavior, hence h5 can be accepted.

Table 19. Single Linear Regression between Intermediary and Dependant Variables

Regression Statistics	
Multiple R	0.60
R Square	0.36
Adjusted R Square	**0.36**
Standard Error	0.59
Observations	242

ANOVA					
Model	df	SS	MS	F	Significance F
Regression	1	47.9	47.9	**136.750**	**0.000**
Residual	240	84.0	0.4		
Total	241	131.9			

Coefficients				
Predictors	Coefficients	Standard Error	t	P-value
Intercept	1.72	0.17	10.15	**0.000**
Green IT Attitude	0.55	0.05	11.69	**0.000**

CHAPTER 6

CONCLUSION

6.1 Discussion of the results

This study was conducted to understand the precedents of green IT behavior of students. Since, each day IT's effect on the environment gets critical, it was considered important to investigate the young generation's pro-environmental IT behavior. Students in Turkey, which is an emerging country, were selected as an appropriate sample to be surveyed because in the literature, there are less green IT behavior studies focused on emerging countries. In addition, there was less green IT research focused on young generations than the IT professionals and organizational level settings.

Looking at the results in Chapter 5, it is demonstrated that General IT Usage level is not whatsoever positively, statistically and significantly associated with the predictions of green IT attitude. In addition, students' areas of study also do not statistically and significantly differ from each other. Therefore, whether a student studies in IT-related departments or has a quite high IT usage level does not necessarily make him/her a green IT adoption nor a person that has a high level of green IT attitude. Moreover, students' age groups are also not different from each other in affecting the green IT attitude.

Moreover, the genders do not differ corresponding to their Green IT Awareness, General IT Usage, Environmentalism and Green IT Attitude. In addition, their average mobile phone usage in a day also does not make a difference as well with the research model variables. These also put forward that demographics do not have a statistically proven effect on determining their behaviors.

It is also worth mentioning that pro-environmentalist behavior and green IT awareness have indeed a positive association with the green IT attitude. In other words, if a student, generally speaking, has a much higher pro-environmental attitude, it is seen that his/her attitude on IT could also be greener than the others despite the differences of areas of study and ages.

Lastly, it is seen that the more green IT attitude the more green IT behavior exists among students. Therefore, as also proved in early literature that intention can be the direct precedent of the behavior itself, this theory can be realized within the green IT attitude and green IT behavior in this study.

6.2 Managerial implications

The findings of the study clearly demonstrates that there is a certain pattern among students to adopt green IT behaviors. However, there are some facts that don't align with this pattern. Firstly, students' ages and departments they study at university does not make a difference in their green IT attitude. Therefore, it should be put forward that green IT adoption of the young generation does not rely on general demographic features that they belong to. Secondly, according to the model of the research and findings, students' general IT usage is not specifically and statistically related with their green IT attitude. In the early literature many green IT studies were focused on professionals and organizations related to IT context. Therefore, it is clearly indicated that green IT cannot be degraded just as to the level of IT usage or IT related departmental tendencies. Hence, there is no statistical requirement only to investigate green IT adoption of people in IT related departments in both academic and business contexts.

Lastly, it should be worth mentioning that the green IT behavior of the young generation is solely and statistically related to their green IT attitude, according to the research model. This demonstrates that academicians can focus on enriching the green IT attitude of students to have them adopt green IT practices by leading pro-environmentalist practices and enhancing green IT awareness in campuses.

6.3 Limitations and suggestions future research

The first limitation could be the amount of time to fulfill the questionnaire. It was around 7 minutes. By getting feedback in terms of the duration to fill the survey, it can be concluded that this study's self-developed scales can be shortened for future research for participants to be more focused on the survey.

Second limitation is in terms of the similarities among the terminology usage in green IT general. One can easily be confused or biased whether green IT behavior is an issue that is totally linked with a pro-environmentalist attitude in daily lives. As indicated in the results above, green IT behavior is not solely dependent on pro-environmentalism. Therefore, if another theoretical framework would be used in the future, the explanation of green IT terminology could be presented to the correspondents before starting the survey. In this study, green IT awareness was also investigated among students; hence, only a small amount of information related to green IT is given to respondents in the questionnaire.

The third limitation can be named that this study was only conducted in Turkey. Since there is a gap in emerging countries in dealing with green IT behavior of students, more comprehensive studies in several contexts can be developed at the same time. For example, the investigation of students' green IT behavior differences in several or similar emerging countries can be investigated. Therefore, by

conducting such a research, a gap in the literature related with emerging countries' and students' green IT behavior can extensively be filled.

APPENDIX A

QUESTIONNAIRE IN ENGLISH

Green IT Survey

This study is conducted for MIS Thesis in Management Information Systems Department of Bogazici University under the supervision Prof. Dr. Meltem Ozturan aims to reflect Green Information Technology (IT) Behavior of University Students.. Collected data will only be used for academic purposes, and will not be shared with any non-academic party.

* Gerekli

1. 1. For which degree and in which department do you study in your university? *

   Yalnızca bir şıkkı işaretleyin.

   - ◯ AA/AS
   - ◯ BA/BS
   - ◯ MA/MS
   - ◯ PhD

2. 2. In which department do you study?

3. 3. What is your Age?

4. 4. What is your gender? *

   Yalnızca bir şıkkı işaretleyin.

   - ◯ Female
   - ◯ Male
   - ◯ Prefer not to say

5. 5. Have you heard of Green Information Technologies (IT) before?

Yalnızca bir şıkkı işaretleyin.

- ◯ Yes
- ◯ No

6. 6. How much time do you spend using a smart phone in a day? *

Yalnızca bir şıkkı işaretleyin.

- ◯ less than a hour
- ◯ 1-3 hours
- ◯ more than 3 hours

7. 7. How often do you use computer / tablet in a week?

Yalnızca bir şıkkı işaretleyin.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Very Frequently

8. Please indicate your frequency of use for the below applications ranging from 1 to 5 corresponding to “never” and “very frequently” respectively *

Her satırda yalnızca bir şıkkı işaretleyin.

	Never	Very Rarely	Rarely	Occasionally	Very Frequently
Email applications for communication purposes	◯	◯	◯	◯	◯
Social media applications	◯	◯	◯	◯	◯
Online education platforms	◯	◯	◯	◯	◯
Virtual meetings	◯	◯	◯	◯	◯
Online music platforms	◯	◯	◯	◯	◯
Online newspapers	◯	◯	◯	◯	◯
Internet-Mobile banking	◯	◯	◯	◯	◯
E-Commerce platforms for shopping	◯	◯	◯	◯	◯
Online travel services/reservations	◯	◯	◯	◯	◯
Online-Mobile Entertainment platform (Netflix, Spotify, Blog)	◯	◯	◯	◯	◯
E-Government applications for requesting documents without going government buildings outside	◯	◯	◯	◯	◯
Office Programs	◯	◯	◯	◯	◯

9. Please indicate your level of agreement for the statements below ranging from 1 to 5 corresponding to “strongly disagree” and “strongly agree” respectively. *

Her satırda yalnızca bir şıkkı işaretleyin.

	Strongly Disagreee	Disagree	Undecided	Agree	Strongly Agree
I support for renewable energy developments, infrastructure and innovations whether it is supported by both public or government institutions					
I tell people that carbon dioxide emission rate must be decreased for environmental sustainability					
I protect the environment starting from my own life					
I pay attention to source seperation at home for paper, metal, glass & plastic wastes					
I support or want to environmental NGOs such as TEMA, TURMEPA, WWF and others by either financially or volunteerly					
I would regret if I am not doing something for the environment and future generations					
I would feel ashamed of myself if I was doing nothing to help the environment					
I organize my shopping list weekly in order not waste food in the kitchen					
Energy saving household equipment is my priority					

during shopping					
I turn off lights and de-plug my electronic chargers when I do not use them					

10. Please indicate your level of agreement for the statements below ranging from 1 to 5 corresponding to “strongly disagree” and “strongly agree” respectively. *

Her satırda yalnızca bir şıkkı işaretleyin.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I am aware that old hardwares, non-working electronic devices should be put into e-waste recycling bins for licensed organization for collection.	◯	◯	◯	◯	◯
I know that recycling electronic devices contributes to resource conservation	◯	◯	◯	◯	◯
I am aware that I can reduce personal carbon foot print by decreasing my own energy consumption	◯	◯	◯	◯	◯
Using electric or hybrid cars is important for climate change	◯	◯	◯	◯	◯
Using ICT, such as artificial intelligence would contribute to environment in terms of less energy consumption	◯	◯	◯	◯	◯
I am aware that using ICT, such as data analytics, Machine Learning, AI and IoT methods or decision support systems in logistics would lead less energy consumption.	◯	◯	◯	◯	◯
Sleep mode and smart charging of PC's provides energy saving	◯	◯	◯	◯	◯
I would avoid printing as much as I can in support of climate change	◯	◯	◯	◯	◯

Printing two sides of paper contributes to environment					
Screen savers save energy					
Shutting down a PC saves more energy than using it in sleep mode					
Green IT decrases fee for waste treatment					
Policy on the use of Green IT encourages people to reduce energy consumption					
I am aware of the data centers impact on greenhouse gases					

11. Please indicate your level of agreement for the statements below ranging from 1 to 5 corresponding to “strongly disagree” and “strongly agree” respectively. *

Her satırda yalnızca bir şıkkı işaretleyin.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I am very concerned about IT's power consumption on greenhouse gases					
I am willing to learn more information about Green IT issue					
By using green technology, I take care of myself and, at the same time, I take care of environment					
Using Green IT is a way I've chosen to contribute to protecting the environment					
Using Green IT is a reasonable thing to do					

12. Please indicate your level of agreement for the statements below ranging from 1 to 5 corresponding to “strongly disagree” and “strongly agree” respectively. *

Her satırda yalnızca bir şıkkı işaretleyin.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I send my hardware and electronic devices for recyling and recovery	◯	◯	◯	◯	◯
I drop all types of batteries especially the lithium ones in the red bins at the university	◯	◯	◯	◯	◯
I spent time for printed paper disposal at recycling bins	◯	◯	◯	◯	◯
I use cloud computing instead of computer based programs	◯	◯	◯	◯	◯
If it means less energy consumption and obtains the same result, I would rather choose the green way of coding	◯	◯	◯	◯	◯
I advice my friends and family to de-plug their chargers when they don't use their devices	◯	◯	◯	◯	◯
Unless it's urgent, I would not use my electronic device such as mobile phone or computer when it is being charged	◯	◯	◯	◯	◯
I use E-Government or E-Commerce websites to meet my needs instead of driving to physical places	◯	◯	◯	◯	◯
I turn off entire computer system when out of a long break	◯	◯	◯	◯	◯

I try to reduce amount of time spent using computers					
I would rather use and support AI systems in organic agriculture for energy efficiency					
Eco-labelled products and energy saving devices are my priority during shopping					
I prefer recycled packaging for my electronic devices					
I search for reyclable IT equipment during purchasing.					
I follow news about Green Information Systems					
I advise software developers to manage coding in accordance to Green IT					
I save documents on disk rather than printing on paper					
I send documents via e-mail rather than by post/hard copy					
I print on paper only if necessary					
I re-use printed papers for testing printers					

APPENDIX B

QUESTIONNAIRE IN TURKISH

Yeşil Bilgi Teknolojileri

Bu çalışma, Boğaziçi Üniversitesi Yönetim Bilişim Sistemleri Anabilim Dalı'nda Prof.Dr.Meltem Özturan gözetiminde YBS Tezi için yapılmıştır. Üniversite öğrencilerinin Yeşil Bilgi Teknolojileri (BT) davranışlarını yansıtmayı amaçlamaktadır. Akademik olmayan hiçbir tarafla paylaşılmayacaktır.

* Gerekli

1. a-) Şu anda üniversitede bulunduğunuz öğrenim seviyeniz nedir? *

   Yalnızca bir şıkkı işaretleyin.

   - ◯ Hazırlık
   - ◯ Lisans
   - ◯ Yüksek Lisans
   - ◯ Doktora

2. b-) Hangi bölümde öğrenim görüyorsunuz?

   _____

3. c-) Kaç yaşındasınız?

   _____

4. d-) Cinsiyetiniz nedir? *

   Yalnızca bir şıkkı işaretleyin.

   - ◯ Kadın
   - ◯ Erkek
   - ◯ Belirtmek İstemiyorum / gerek duymuyorum

e-) Daha önce Yeşil Bilgi Teknolojileri'ni (BT) duymuş muydunuz?

Yalnızca bir şıkkı işaretleyin.

- ◯ Evet
- ◯ Hayır

f-) Bir gün içerisinde telefonunuzda ne kadar zaman harcıyorsunuz? *

Yalnızca bir şıkkı işaretleyin.

- ◯ 1 Saatten Az
- ◯ 1-3 Saat
- ◯ 3 Saatten Fazla

g-) Bir haftada ne sıklıkla bilgisayar ya da tablet kullanıyorsunuz?

Yalnızca bir şıkkı işaretleyin.

	1	2	3	4	5	
Hiçbir Zaman	◯	◯	◯	◯	◯	Çok Sık

h-) Lütfen aşağıdaki uygulamalar için kullanım sıklığınızı 1 "hiçbir zaman" ve 5 "çok sık" olacak şekilde belirtiniz. *

Her satırda yalnızca bir şıkkı işaretleyin.

	Hiçbir Zaman	Çok nadir	Nadiren	Sıklıkla	Çok sık
İletişim amaçlı e-posta uygulamaları	◯	◯	◯	◯	◯
Sosyal medya uygulamaları	◯	◯	◯	◯	◯
Online eğitim platformları	◯	◯	◯	◯	◯
Sanal toplantılar	◯	◯	◯	◯	◯
Dijital müzik platformları	◯	◯	◯	◯	◯
Dijital haber kanalları	◯	◯	◯	◯	◯
Mobil bankacılık	◯	◯	◯	◯	◯
E-ticaret siteleri	◯	◯	◯	◯	◯
Dijital seyahat, online rezervasyon kanalları	◯	◯	◯	◯	◯
Dijital eğlence platformları (Netflix, Spotify, Blog)	◯	◯	◯	◯	◯
E-Devlet Uygulamaları	◯	◯	◯	◯	◯
Ofis yazılımları	◯	◯	◯	◯	◯

i) Lütfen aşağıdaki ifadelere ne ölçüde katıldığınız belirtiniz. 1 Kesinlikle Katılmıyorum - 5 Kesinlikle Katılıyorum. *

Her satırda yalnızca bir şıkkı işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
Kamuoyu veya devlet kurumları tarafından destekli veya değil, yenilebilir enerji gelişmelerini, altyapı kurulumunu ve inovasyon çalışmalarını desteklerim.	◯	◯	◯	◯	◯
Çevremdekilere çevresel sürdürülebilirliği devamlı kılmak için karbondioksit emisyon oranınının düşürülmesi gerektiğini söylerim.	◯	◯	◯	◯	◯
Kendi hayatımdaki davranışlarımdan başlayarak çevreyi korumaya özen gösteririm.	◯	◯	◯	◯	◯
Evde kağıt, metal, cam ve plastik atıklar için kaynak ayrılmasına dikkat ederim.	◯	◯	◯	◯	◯
TEMA, TURMEPA, WWF ve diğerleri gibi çevre STK'larını	◯	◯	◯	◯	◯

finansal veya gönüllü olarak desteklerim, desteklenmesini isterim.					
Çevre ve gelecek nesiller için bir şey yapmazsam pişman olurum.					
Çevreye yardım etmek için hiçbir şey yapmazsam kendimden utanırım.					
Mutfakta yemek israf etmemek için alışveriş listemi haftalık olarak düzenlerim.					
Enerji tasarrufu sağlayan ev aletleri alışveriş sırasında önceliğim olur.					
Kullanmadığım zamanlarda ışıkları söndürür ve elektronik şarj cihazların fişini çekerim.					

j) Lütfen aşağıdaki ifadelere ne ölçüde katıldığınız belirtiniz. 1 Kesinlikle Katılmıyorum - 5 Kesinlikle Katılıyorum. *

Her satırda yalnızca bir şıkkı işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
Lisanslı kuruluşların toplayabilmesi için eski donanımların, çalışmayan elektronik cihazların e-atık geri dönüşüm kutularına atılması gerektiğinin farkındayım.	◯	◯	◯	◯	◯
Elektronik cihazların geri dönüştürülmesinin doğal kaynakların korunmasına katkıda bulunduğunu biliyorum	◯	◯	◯	◯	◯
Kendi enerji tüketimimi azaltarak kişisel karbon ayak izimi azaltabileceğimin farkındayım	◯	◯	◯	◯	◯
Elektrikli veya hibrit araba kullanmanın iklim değişikliği için önemli olduğunu düşünürüm.	◯	◯	◯	◯	◯
Yapay zeka gibi BT kullanmak, daha az enerji tüketimi açısından çevreye katkı sağlar.	◯	◯	◯	◯	◯
Lojistik sektöründe veri analitiği, Makine	◯	◯	◯	◯	◯

Öğrenimi, AI ve IoT yöntemleri veya karar destek sistemleri gibi BT kullanmanın daha az enerji tüketimi sağlayacağının farkındayım.					
Uyku modu ve bilgisayarların akıllı şarj teknolojisi enerji tasarrufu sağlar	○	○	○	○	○
İklim değişikliğini desteklemek için elimden geldiğince yazıcılardan az çıktı almaya çalışırım.	○	○	○	○	○
Kağıdın iki yüzüne yazdırmak çevreye katkıda bulunur.	○	○	○	○	○
Ekran koruyucular enerji tasarrufu sağlar	○	○	○	○	○
Bir bilgisayarı kapatmak, uyku modunda kullanmaktan daha fazla enerji tasarrufu sağlar	○	○	○	○	○
Yeşil BT, atıkların arıtılma maliyetini düşürür.	○	○	○	○	○
Yeşil BT kullanımına ilişkin politikalar, insanları enerji tüketimini azaltmaya teşvik eder	○	○	○	○	○
Veri merkezlerinin	○	○	○	○	○

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k) Lütfen aşağıdaki ifadelere ne ölçüde katıldığınız belirtiniz. 1 Kesinlikle Katılmıyorum - 5 Kesinlikle Katılıyorum. *

Her satırda yalnızca bir şıkkı işaretleyin.

	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
BT'nin iklim üzerindeki güç tüketimi konusunda çok endişeliyim	◯	◯	◯	◯	◯
Yeşil BT konusu hakkında daha fazla bilgi edinmeye istekliyim	◯	◯	◯	◯	◯
Yeşil BT'yi kullanarak kendime ve aynı zamanda çevreye özen gösteriyorum.	◯	◯	◯	◯	◯
Yeşil BT'yi kullanmak, çevrenin korunmasına katkıda bulunmak için seçtiğim bir yol olabilir.	◯	◯	◯	◯	◯
Yeşil BT'yi kullanmak akıllıca bir fikirdir.	◯	◯	◯	◯	◯

I) Lütfen aşağıdaki ifadelere ne ölçüde katıldığınız belirtiniz. 1 Kesinlikle Katılmıyorum - 5 Kesinlikle Katılıyorum. *

Her satırda yalnızca bir şıkkı işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
Donanım parçalarını ve elektronik cihazlarımı geri dönüşüm veya tamir için gönderiyorum	◯	◯	◯	◯	◯
Üniversitede her türlü pili, özellikle lityum pilleri ayrılmış, özel kutulara atıyorum	◯	◯	◯	◯	◯
Geri dönüşüm kutularına gitmeye basılı kağıt imhası için zaman harcarım	◯	◯	◯	◯	◯
Bilgisayar tabanlı programlar yerine bulut bilişim kullanmayı tercih ederim	◯	◯	◯	◯	◯
Daha az enerji tüketimi anlamına geliyorsa ve aynı sonucu alıyorsa, yeşil kodlama yöntemini tercih ederim.	◯	◯	◯	◯	◯
Arkadaşlarıma ve aileme, BT cihazlarını kullanmadıklarında şarj cihazlarının fişlerini çekmelerini tavsiye ederim	◯	◯	◯	◯	◯

Acil olmadıkça cep telefonu veya bilgisayar gibi elektronik cihazlarımı şarj halindeyken kullanmam.					
Fiziksel yerlere gitmek yerine ihtiyaçlarımı karşılamak için E-Devlet veya E-Ticaret sitelerini kullanırım.					
Uzun bir araya çıktıysam tüm bilgisayar sistemlerini kapatırım.					
Bilgisayar kullanımına harcadığım zamanı azaltmaya çalışırım.					
Enerji verimliliği için organik tarımda yapay zeka sistemlerini kullanmayı ve desteklemeyi tercih ederim					
Eko etiketli ürünler ve enerji tasarrufu sağlayan cihazlar alışveriş sırasında önceliğim olur.					
Elektronik cihazlarım için geri dönüştürülmüş ambalajı tercih ederim.					
Alışveriş esnasında geri dönüştürülebilir BT ekipmanı ararım					

Yeşil Bilgi Teknolojileri ile ilgili haberleri takip ederim.					
Yazılımcılara yeşil BT'ye uygun kodlama yapmalarını öneririm.					
Belgeleri kağıda yazdırmak yerine dijital olarak kaydederim.					
Belgeleri posta / basılı kopya yerine e-posta ile gönderirim.					
Yalnızca gerektiği zamanlarda kağıda çıktı alırım.					
Yazıcıları test etmek gerekirse önceden kullanılmış kağıtları tercih ederim.					

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