

ERASMUS UNIVERSITY ROTTERDAM  
Erasmus School of Economics  
Bachelor Thesis  
International BSc Economics and Business Economics (IBEB)

# The main incentive to implement a Hybrid Work Environment: An example from Turkey

Name student: Doga Hürigel  
Student ID number: 525378  
Supervisor: Victor Gonzalez Jimenez  
Second Assessor:

**Erasmus  
University  
Rotterdam**



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**Abstract**

Due to the COVID-19 pandemic, telework became the new normal in management practices. The popularity of the Hybrid Work Environment (HWE) remained constant even after the COVID-19 restrictions were lifted. Among others, the existing literature indicates that increased worker productivity, increased worker satisfaction, and reduced costs are prominent factors that incentivize managers to implement a HWE. Consequently, this paper examines these three main factors and aims to define the main determinant of HWE implementation, focusing on the manager's perspective. The data was collected by means of a survey, and the sample consists of managers working in Turkey. Binary logistic regression is used as the method of regression. The findings propose that increased worker satisfaction and reduced costs are associated with an increased preference for HWE implementation.

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## Section 1: Introduction

The COVID-19 pandemic changed every aspect of human life, including how and where people work. Worldwide, many protective regulations were adopted, generating a transformation in how businesses operate. One of the most common prevention methods, social distancing, restricts the amount of time a worker can spend in a physical workplace (Prin & Bartels, 2020). Hence, with the COVID-19 outbreak, many companies adopted flexible working methods including flexible locations. A common practice, teleworking, enables workers to perform some part of their tasks away from the traditional workplace (Golden, 2006). The popularity of telework was already increasing in the business world due to developing technology. However, only 10% of EU workers teleworked prior to the outbreak. COVID-19 has unexpectedly forced millions of people into teleworking. In fact, Eurofound (2020) shows that about 40% of the workers in the EU teleworked full-time during April 2020. In a nutshell, teleworking was impending, but COVID-19 made it an inevitable reality.

Bailey and Kurland (2002) explain that teleworking can be a win-win strategy for all parties involved in the organisation such as workers, executives, and employers. The existing literature indicates that teleworking can increase worker satisfaction, reduce overall costs, and increase worker productivity (De Menezes & Kelliher, 2011; Gajendran & Harrison, 2007; Gregory & Milner, 2009). Considering all the benefits listed in the literature, it is not surprising that telework techniques remained popular after COVID-19 restrictions were eased. As telework became the new normal, Hybrid Work Environment (HWE, henceforth) allows employees to work partly in the traditional office and partly remote (Fayard et al., 2021). Therefore, it can be defined as part-time teleworking. HWE is a relatively new terminology in literature since it is a practice that has recently become widespread. However, it is a highly growing research area since the practice of HWE is predicted to remain a standard in the future. For instance, PricewaterhouseCoopers (2021) indicates that, after a year of the COVID-19 pandemic, the majority of the employees indicated that they want to practice HWE once the pandemic ends.

Given the inevitable popularity of HWE as a business practice, defining a manager's main driver for a preference for HWE is a relevant research topic. This paper examines the determinates of preference for HWE with three properties that make this research novel. Existing literature analyses the benefits of HWE either separately or broadly. Instead, the current paper focuses on three main benefits emphasised by the previous research: increased worker satisfaction, reduced costs, and increased worker productivity. It's relevant to focus on these research topics at once and compare their effectiveness. Second, it is important to state that the vast majority of the literature is based on developed economies (Nguyen, 2021). Therefore, it's important to perform research in developing economies, where managers could face different challenges implementing an HWE compared to managers in developed economies. For instance, Brussevich et al. (2020) indicate that Turkey, Chile, Mexico, Ecuador, and Peru stand out with significantly lower average telework ability scores, suggesting fewer jobs can be performed at home. Among these developing countries, a sample from Turkey is used in the current paper. Third, the research is based on managers since they are less likely to be biased in

evaluating their subordinates, and more information related to cost and productivity is available for them. The information presented above is examined based on a survey conducted on 93 managers working in Turkey under the main research question:

*Which factor incentivises a manager the most to implement a hybrid work environment in developing economies?*

The paper concludes that when examined separately, reduced costs, increased worker satisfaction and productivity are all significantly associated with a manager's preference for HWE. When examined collectively, the research shows that increased worker satisfaction and cost reduction have a more relevant role in implementing HWE compared to increased worker productivity. Even though worker satisfaction has a slightly bigger impact than cost reduction, the difference is statistically indistinguishable.

It is important to state that this paper could become a guideline for managers and executives in adopting HWE. Precisely, it brings forward a focus area on implementing HWE. This focus area could be an important contribution for managers who do not have any previous HWE experience. For instance, given the results, a manager is expected to target the overhead costs or human resource management methods when implementing the hybrid work environment.

The paper consists of five sections. Following Section 1, Section 2 presents the theoretical framework, where existing literature is discussed extensively, and the hypotheses are formulated. Subsequently, in Section 3, the methodology section introduces data collection and the regression method. Furthermore, in Section 3, the regression results are presented. Finally, in Section 5, a brief summary of the regression results and the discussion related to regression outcomes are given.

## **Section 2: Literature Review**

In this section, the literature review is presented in four parts. The first explains how hybrid work environment is defined in the existing literature. Second, the determinants of HWE are presented in line with the existing literature. Third, the relevance between the HWE and COVID-19 is discussed. In the fourth part, the hypotheses are formulated.

### **2.1 Defining Hybrid Work Environment**

Telecommuting is a concept that has various definitions and conceptualisations in the existing literature. Distributed work, flexible work arrangements, remote work, telework, and virtual teams are some of the terms used to define telecommuting in the literature (Bosch-Sijtsema & Sivunen, 2013; Shockley & Allen, 2007; U.S. Office of Personnel Management, 2013; Fonner & Roloff, 2010; Tworoger et al., 2013). Overall, with their extensive review of the literature, Allen et al. (2015) define telecommuting as *"a work practice that involves members of an organisation substituting a portion of their typical work hours (ranging from a few hours per week to nearly full-time) to work away from a central workplace—typically principally from home—using technology to interact with others as needed to conduct work tasks."* This definition generates a spectrum of possible practices, from traditional office work to full-time remote work. HWE is an approach that accounts for all the possible telecommuting practices that do not implement these two extremes of the spectrum. In other words, the HWE is the practice of implementing part-time telecommuting. Through HWE, employees work both at home and in traditional office spaces; they engage in virtual and nearby relationships (Halford, 2005). Even though HWE is a widespread practice, full-time remote work and HWE are not distinguished from each other in the existing literature. Therefore, both practices fall under the terminology of telework. This paper acknowledges the conceptual differences between these practices and examines HWE as an entity on its own.

### **2.2 The effects of Hybrid Work Environment**

The concept of "telecommuting" was first formulated in the literature by Jack Niells in 1975 after being stuck in traffic in Los Angeles (Niells, 1975). The initial appeal of telecommuting was derived from the anxieties caused by traffic congestion and pollution in densely populated locations (Bailey & Kurland, 1999). In fact, the practice of teleworking could be traced back to the late 18th century, when men served the family in public by working while women served the family in private (Vickery, 1993). The opposite was inappropriate to society, and a working wife was seen as a sign of failure (Westover, 1986; Goldin, 1990). This ideological constraint especially victimised the working-class wives whose families required a second income (Reskin & Padavic, 1994). Remote working became then the only option for women who wanted to support their families financially (Westover, 1986). This situation created a difference in tasks and earnings for men and women, in which the tasks were usually practised in different locations.

There was a turning point in telecommuting practices in the early 19th century due to the industrial revolution. The need for employment significantly increased the number of women in work, raising the number of dual-worker couples (Russell et al., 2009). This changed the composition of the workforce and introduced new problems such as work-family conflict, which became one of the leading research areas related to telecommuting (Allen et al., 2015; Frone et al., 1992; Jacobs & Gerson, 2004).

### **2.2.1 A solution for work-family conflict**

The work-family conflict is an inter-role conflict that emerges whenever work responsibilities interfere with family responsibilities or vice versa (Thompson et al., 1999). Its impact has been the centre of an increasing number of empirical and conceptual papers. Overall, Gornick & Mayer (2003) indicate that work-family conflict has a potential impact on productivity, personal effectiveness, marital relations, child-parent relationship and child development. As a solution to the increasing work-family conflict, fueled by the rising number of females in the workforce, telecommuting appeared to be a relatively inexpensive and effective solution (Gajendran & Harrison, 2007; Singley & Hynes, 2005; Gregory & Milner, 2009; Golden & Veiga, 2005; Madsen, 2003; Allen, Golden, & Shockley, 2015; Russell et al., 2009). Thus, existing literature reveals that teleworking decreases work-family conflict. The first possible reason for this negative relationship arises from the reduced time and stress related to commuting time (Barusch, 2000; Hill et al., 2009). Second, according to a survey conducted by Yap and Tng (1990), an important majority of women in their sample prefer teleworking due to the extra time it creates for family. Third, Urbanska & Levering (1996) indicate that working from the office can restrict lifestyle and housing options. For instance, telework employees are more likely to live in a small town with lower housing and living costs, a more relaxed lifestyle, and a lower crime rate. All these factors are in favour of teleworking. However, the existing literature also indicates possible negative impacts of teleworking on work-family conflict. Teleworking can create a work-family conflict due to increasing family responsibility, challenges maintaining the boundaries between work and family, and distractions from family members (Hammer et al., 2005; Ramarajan & Reid, 2013; Kraut, 1989).

When assessing the existing literature on work-family conflict, it is also noteworthy to state a few methodological limitations that intervene with the accuracy of the results (Allen et al., 2015). For instance, the design of the majority of studies is single-source and cross-sectional, creating issues determining the direction of the effect. Furthermore, the existing studies' widespread use of the dichotomous telecommuting measures creates another limitation. Allen et al. (2015) emphasise that yes/no answers do not account for telecommuting frequency differences among individuals and mask meaningful disparities in work-family outcomes.

In the mid-1990s, telecommuting acquired, once again, prominence. The global economic crisis resulted in budget shortcuts in the private and public sectors, creating urgency to reduce expenses. As a solution, telecommuting programs were incentivised, and the real estate costs were targeted (Bailey & Kurland, 1999).

### **2.2.2 A solution to the budget shortcuts**

Existing literature addresses the cost reduction benefits of teleworking through quasi-experiments. For instance, Avery & Zabel (2001) examine IBM, which implemented a teleworking strategy in 1995 to attract computer programmers. After enforcing the teleworking strategy, IBM generated an income of \$1.9 billion by selling the reduced 78 million square feet of office space (Caldow, 2009). Likewise, other companies pursued adapting telecommuting programs despite the high costs of additional equipment since they were compensated by the substantial savings in overhead expenses (Di Martino & Wirth, 1990). An example worth mentioning is AT&T, which saved \$80 million in real estate and overhead office costs by implementing a telecommuting strategy in 1994 (Bailey & Kurland, 1999). Overall, Baruch (2000) defines reduced overhead costs as the main incentive for managers to implement teleworking. Furthermore, another important benefit of telecommuting is reduced commuting expenses. Pratt (1984) explains energy shortage and rising fuel costs as major drivers for telecommuting. Therefore, telecommuting can be an attractive strategy to reduce commuting-related costs (Morgan, 2004). Overall, the existing literature indicates that teleworking is associated with reduced costs (De Menezes & Kelliher, 2011; Raney, 1985; Westfall, 1998).

So far mentioned costs are financial and business related. It is also crucial to indicate that telecommuting can reduce social and environmental costs. For instance, the length of commute avoided via teleworking is in accordance with The Clean Air Act, which was established in 1970 to attain and maintain air-quality standards (Allen et al., 2015). According to research based on aggregate data from 1966 to 1999, telecommuting reduces vehicle miles travelled. However, the predicted reduction is only 0.8 percent. The reason behind this small impact is defined as the "rebound effect" by Cairns et al. (2004). The telecommuting strategy increases the number of short distance trips due to personal reasons, which would normally be handled on the way to work or back home (Small, Verhoef & Lindsey, 2007). In addition, when an individual telecommutes, the individual's car could be more frequently used by other family members since it is available during the day, which could increase the vehicle miles travelled (Cairns et al., 2004). To conclude, the level of environmental benefits of telework depends on a diverse set of elements such as travel habits, amount of energy use, and office and home space features (Kitou & Horvath, 2003).

Since the early implementation of teleworking, improved worker productivity has been one of the most claimed advantages of teleworking (McCloskey & Igarria, 2003; Pinsonneault & Boisvert, 2001; Gajendran & Harrison, 2007).

### **2.2.3 A fertiliser for worker productivity**

Empirical articles indicate a positive relationship between teleworking and productivity (Bailyn, 1989; Baruch & Nicholson, 1997; Belanger, 1999, Kinsman, 1987; Frolick, Wilkes & Urwiler, 1993; Hartman, Stoner & Arora, 1992; Olson, 1982; Pratt, 1984; Shirley, 1985). For instance, as a



typically used measure of worker performance, absenteeism decreases with teleworking strategies (Konrad & Mangel, 2000; Stavrou, 2005). The research conducted within a firm shows that teleworking can reduce absenteeism by up to 30 percent (Bailyn et al., 1997). Furthermore, the increase in productivity could also be derived from the increase in voluntary work. The imposed and voluntary work tends to be higher among teleworkers compared to traditional office workers, and teleworkers tend to be more committed to their work (Kelliher & Anderson, 2010; Grover & Crooker, 1995; Roehling, et al. 2001).

Among many reasons fueling the positive relationship between teleworking and productivity, existing literature emphasises two main benefits of teleworking. First, factors associated with transportation are investigated. These factors consist of commute time, commute distance, and stress caused by commute (Bailey & Kurland, 1999; DiMartino & Wirth, 1990). The main findings indicate that telecommuting benefits productivity through the time and stress saved from not travelling to the workplace (Apgar, 1998). Second, an important advantage of telecommuting is the reduced disruption from office factors since it gives the opportunity to self-isolate, creating peace and quietness (Bailey & Kurland, 1999; Halford, 2005). However, the home environment also could create other types of distractions and demands from family, especially for individuals with younger children (Wang et al., 2021). Following this, research by Konrad & Mangel (2000) indicates that the effect of flexible working arrangements, including teleworking, on productivity is dependent on worker characteristics. For instance, Grant et al. (2013) suggest that the ability to avoid home distractions is an important factor in effective teleworking.

Investigating the research methods of the literature, it is clear that the large majority of the empirical evidence on productivity is based on self-reported data with few exceptions, such as Duxbury et al. (1998) and Geisler (1985). When analysing the effects of teleworking, self-rated data could create a bias since teleworkers willing to telework could intentionally or unintentionally overestimate their success (Bailey & Kurland, 2002). The self-reported data often generates inflated and less accurate results compared to other types of reporting methods (Harris & Schaubroeck, 1988; Borman, 1991). For instance, comparing 5524 traditional office and home office IMB workers, the self-rated data shows that teleworking increases the overall worker productivity. However, the results did not indicate any significant difference in recorded worker performance (Hill et al., 2003). Olson (1985) was the first to bring this self-reported data suspicion into the literature. Under the influence of this suspicion, Gajendran and Harrison (2007) conducted meta-analytic research examining 46 studies in natural settings. The study concludes that there is no positive correlation between teleworking and self-reported worker performance. This insignificant correlation implies an overestimation of results in the existing literature. Furthermore, it is important to note that meta-analyses are restrained by the methodological preferences of original studies (Martocchio et al., 2000). Thus, the results obtained by Gajendran and Harrison (2007) could also suffer from inaccuracy of results and bias.

### **2.3 Hybrid Work Environment and COVID-19**

The technology growth experienced the fastest pace in its history during the 1990s, improving the quality and lowering the prices of telecommuting devices (Kizza, 2003). Snizek (1995) defines the most important component of telecommuting strategies as technological devices such as computers. Inevitably, the growth in technology, thus growth in technological devices, increased the applicability and popularity of telecommuting strategies during the late 1990s.

However, what brought teleworking to the spotlight was the COVID-19 pandemic. Prior to worldwide health crises, teleworking was not a widely used practice (Kossek & Lautsch, 2018). Wang et al. (2021) define the teleworking practice as a "luxury for the relatively affluent", emphasising that before the pandemic, workers who had teleworking experience were the high-income earners. The tables have turned very quickly after the first announcement of the pandemic. Telecommuting was no longer a managerial preference but rather a crucial requirement (Wang et al., 2021). For instance, a survey conducted by Garner (2020) reveals that half of the companies had more than 80% of their employees working remote during the early phases of the COVID-19 pandemic. Even though the transition to remote working was sudden, unpredicted, and strict, the business world quickly adapted to the conditions.

In fact, some executives and employees discovered or developed a certain preference for teleworking. Research reveals that after one year of remote working, more than half of the employees want to work remotely at least three days a week once the COVID-19 pandemic ends (PricewaterhouseCoopers, 2021). Since pandemic restrictions are recently lifted, it is not possible to observe the post pandemic preferences. However, existing literature predicts that the hybrid work model may become the most dominant model in business organisations in the future (Sokolic, 2022). PricewaterhouseCoopers (2021) shows that during the pandemic, employees favoured HWE, which fosters positive effects of both fully remote and traditional work practices. Furthermore, research conducted on 10 EU member states shows that workers experience better working conditions and outcomes with HWE compared to full-time teleworking (Vargas-Llave et al., 2020).

To sum up, during COVID-19 restrictions, teleworking, both hybrid and remote, became an inevitable practice in business. The possible positive impacts it creates, such as reduced costs, increased satisfaction and productivity, enabled telework to become a post-COVID-19 reality. Accepting that teleworking is a part of our lives, future research tends to shift from examining whether or not to implement teleworking to determining how to get the most out of this practice (Wang et al., 2021).

### **2.4 Hypotheses**

Based on literature discussed in the previous section, I develop three hypotheses corresponding to three major factors affecting the implementation of a hybrid work environment.

## D. Hurgel (2022)

First, among other benefits, telework is associated with reduced work-family conflict and reduced stress from commuting time (Gajendran & Harrison, 2007; Hill et al., 2009). Therefore, telework increases overall worker satisfaction (Wheatley, 2017). The following hypothesis captures that regularity:

*H1: Increased worker satisfaction is associated with preference for HWE implementation.*

Second, telework is overall associated with reduced costs including real estate and telecommuting related costs (Caldow, 2009; Morgan, 2004; De Menezes & Kelliher, 2011). This leads to the second hypothesis:

*H2: Reduced company costs are associated with preference for HWE implementation.*

Martin & MacDonnell (2012) indicate that telework is positively associated with increased worker productivity. This leads to the third hypothesis:

*H3: Increased worker productivity is associated with preference for HWE implementation.*

### **Section 3: Methodology**

In the following section, the methodology of this study will be described. Section 3.1 gives insights into the data collection. Section 3.2 introduces the regression method including the variables used in the regression.

#### **3.1 Data Collection**

The data was collected by means of a survey. The survey consisted of 14 questions, of which 13 were multiple choice. Furthermore, the survey includes three parts. The first part presents questions related to socio-demographic characteristics, while the second examines firm-level factors. Finally, the third part includes three Likert-scale questions in order to examine factors affecting HWE.

In line with the research question, the target respondent group is managers in Turkey. In order to ensure that respondents fully comprehended the questions, the survey was available both in English and Turkish. Sampling was as follows. First, the survey was distributed to a group of managers who are acquaintances of the researcher. Second, each manager was expected to spread the survey further to their network, creating a snowball effect. Snowball sampling, a widely used qualitative method, is suitable when the study focuses on relatively private matters (Biernacki & Waldorf, 1981). For instance, when the knowledge of insiders is needed to detect people for research. Since managers form a relatively specific group, snowball sampling helped expand the sample size. Naderifar (2017) suggest that the anonymity and the confidentiality of the data are crucial with snowball sampling. Therefore, respondents were ensured that all the data collected by the survey would remain confidential and only be used for research-based purposes. Moreover, the survey was prepared as brief as possible to prevent possible participant fatigue, which can lead to a high drop-out rate (Theofanidis & Fountouki, 2018). Eventually, the survey was available for a month and ninety-three managers responded to the questionnaire. The survey questionnaire is provided in Appendix A.

#### **3.2 The Regression Method**

##### **3.2.1 The Dependent and Independent Variables**

To test the three hypotheses, three independent variables are defined. The independent variables for H1, H2, and H3 are worker satisfaction, cost reduction, and worker productivity, respectively. Moreover, these three variables are scaled from one to five based on the data collected via Likert-scale questions, in a scale where one represents strongly disagree, and five represents strongly agree. One binary dependent variable is used to test the three hypotheses formalised. The dependent variable is the preference for HWE, which examines whether a manager prefers to implement an HWE in their company or not.

### 3.2.2 The Binary Logistic Model

Osborne (2015) considers logistic models as the best method when dealing with binary outcomes. Given that the dependent variable, preference for HWE, is binary, the logit model is a suitable regression method for this research. What distinguishes logit models from linear models is the nature of the dependent variable. In a simple ordinary least squared (OLS) regression, the dependent variables are assumed to be continuous, while the dependent variables are binary in logit models (Hosmer et al., 2013). The main problem of using OLS when the dependent variable is binary stems from the linear nature of the OLS regression. Due to this linearity, binary outcomes can result in predicted probabilities smaller than 0 and greater than 1, which creates an inconsistency within the general rules of probability. Fortunately, the logistic function fits a nonlinear S-shaped line to data, restricting the predicted values between 0 and 1 (Osborne, 2015).

Many methods exist for interpreting the results of logit regression. The odds ratio and marginal effects are the two most common techniques. Marginal effects are the preferred method for this research compared to the odds ratio for two reasons. First, the odds ratio is a conceptually difficult technique to understand since it consists of ratios with respect to a benchmark. Hence, the interpretation of odds is more difficult and less intuitive compared to marginal effects (Norton et al., 2004). Second, the odds ratio is very sensitive to the model specification and should not be compared across models with different sets of variables. Therefore, Norton & Dowd (2018) indicate that marginal effects are a preferred method compared to the odds ratio if the data is not a case-control study. Once marginal effects are determined as a method of interpretation, the next step is to specify the type of marginal effects. Among different types, the average marginal effects are preferred since they take into account all observed values in the sample, representing all individuals. Furthermore, Long and Freese (2014) consider average marginal effects as the best method to summarize the impact of the explanatory variable.

To sum up, the regression method for this research is binary logistic regression, and the regression results are transformed into average marginal effects to simplify the understanding of the results.

### 3.2.3 The Probit Model

It is important to state that, even though Osborne (2015) considers it to be the best method, logit is not the only way to deal with binary outcomes. Another important method is probit, which also uses a link function to address the same issues as logit (Osborne, 2015). In fact, Berkson (1951) states that there is only a small functional difference between the results generated by these two methods. Naturally, there are some aspects that distinguish these methods. Most importantly, probit regression assumes the standard normal cumulative distribution function, while logit regression assumes the cumulative logistic distribution of the errors. Thus, logit distribution has fatter tails, which is more

appropriate for far from the mean outliers (Sarkar et al., 2011). In our sample, the preference for HWE has heavier tails since the distribution has a negative value of skewness. Furthermore, the kurtosis level is higher than three, exceeding the conventional kurtosis level of normal distribution. Given that preference for HWE has outliers in the left tail of the distribution, the logit model is used as the regression method.

### **3.2.4 The Control Variables**

In order to prevent possible biases, the regression contains six control variables including social demographic and firm-level characteristics. First, previous studies show that age and gender are important factors related to the preference for HWE (Galanti et al., 2021; Kossek et al., 2006). Therefore, they are included as demographic characteristics. Continuing with the firm-level characteristics, the model includes the number of performance meetings per month, the firm's industry, and the number of office clerks. These firm-level characteristics can influence the preference or applicability of HWE. For instance, Brussevich et al. (2020) show that different sectors have different levels of telework applicability. Furthermore, Huws et al. (1990) indicate that telework is more attractive for managers in larger firms than managers in smaller firms. Finally, existing literature shows that adapting a working model is affected by the amount of experience an individual has with that working model. Thus, a firm's earlier implementation of HWE is included as a firm-level variable to examine if the firm implemented an HWE previously or not.

## Section 4: Results

### 4.1 Goodness-of-fit & Assumption Testing

To test the goodness-of-fit of the model, the Hosmer-Lemeshow test is conducted, which is a widely used technique when assessing the goodness-of-fit of logistic regressions.

**Table 1**

Hosmer-Lemeshow Goodness-of-fit

|  | Number of groups | Hosmer-Lemeshow Chi-Square | p     |
|--|------------------|----------------------------|-------|
| Satisfaction                               | 10               | 1.54                       | 0.992 |
| Cost reduction                             | 10               | 8.95                       | 0.347 |
| Productivity                               | 10               | 9.88                       | 0.273 |
| Satisfaction, cost reduction, productivity | 10               | 0.66                       | 0.996 |

*Note.* The table presented presents the Hosmer-Lemeshow goodness of fit test results for four models. Every row indicates the same model with different explanatory variables. Each model includes demographic variables, namely age and gender. Furthermore, each model includes firm-level variables, namely, number of office clerks, previous HWE experience, number of monitor meetings and industry. The columns show the number of groups, Hosmer-Lemeshow Chi-Square and p-values, respectively.

The Hosmer-Lemeshow goodness of fit test is conducted for four regressions. It is important to state that with an H-L test, a significant p-value indicates that the model does not fit with the data (Allison, 2012). All regressions feature preference for HWE as the dependent variable. All regressions, moreover, include both demographic and firm-level control variables. In other words, each row in Table 1 examines the same regression when different explanatory variables are introduced, namely, satisfaction, cost reduction, and productivity. Finally, the last row analyses the case where all these explanatory variables are introduced together. With every model presented above, the p-values are larger than the conventional significance level 0.05, indicating insignificance. Therefore, for four models presented above, the data fits the model.

The logistic model is a nonparametric method, indicating that assumptions like normal distribution and homoscedasticity are irrelevant (Osborne, 2015). However, other basic assumptions still have to hold to obtain robust and accurate outcomes. In this part, two related assumptions will be tested.

Assumption 1. *No high collinearity between predictors.*

Multicollinearity occurs when two or more observed variables are correlated with each other. Cohen (2003) explains that as the degree of collinearity between two predictors increases, the coefficient becomes more and more unreliable, which is reflected by large standard errors. In order to test whether the model suffers from multicollinearity, a correlation matrix will be used, which is presented in Table 1.

**Table 2**  
Correlation matrix for independent variables

|              | Satisfaction | Cost    | Product | Age    | Gender | OC    | MM    | PHWE  |
|--------------|--------------|---------|---------|--------|--------|-------|-------|-------|
| Satisfaction | 1.000        |         |         |        |        |       |       |       |
| Cost         | 0.472**      | 1.000   |         |        |        |       |       |       |
| Product      | 0.613**      | 0.622** | 1.000   |        |        |       |       |       |
| Age          | -0.241       | -0.083  | -0.104  | 1.000  |        |       |       |       |
| Gender       | -0.046       | 0.015   | 0.015   | 0.081  | 1.000  |       |       |       |
| OC           | 0.091        | 0.083   | 0.017   | -0.118 | 0.037  | 1.000 |       |       |
| MM           | 0.244        | 0.106   | 0.044   | 0.042  | 0.120  | 0.155 | 1.000 |       |
| PHWE         | 0.208        | 0.350** | 0.370** | 0.073  | 0.131  | 0.026 | 0.245 | 1.000 |

Note: Table above presents the multiple linear regression of the model including the estimates, standard errors and VIF for each variable. The variable industry is eliminated since it is a multi-dimensional categorical variable which could not be presented in correlation matrix. “Product” represents the variable production, “cost” represents the variable cost reduction, “OC” represents the variable office clerks, “MM” represents the variable “monitor meetings”, and “PHWE” represents the variable Previous HWE. All the outcomes are adjusted to three decimal points. \*\*represents  $p \leq 0.05$

Table 2 indicates that among all variables, the correlation ranges from -0.241 to 0.622. The correlation between cost and satisfaction is 0.472 and is statistically significant. Similarly, the correlation between cost and productivity is 0.622 and statistically significant at a 5% level. The same holds for the correlation between productivity and satisfaction is 0.613, which is statistically significant. Finally, the variable previous HWE is significantly correlated with both cost reduction and productivity. It is important to note that the large and significant correlation between the explanatory variables creates a concern for multicollinearity. To test if these significant correlations indicate multicollinearity, variance inflation factors (VIF) are used. VIF is used to measure the induced collinearity for each variable (Craney & Surlles, 2002).

**Table 3**  
OLS regression and variance inflation factor (VIF)

|                  | Coefficient | Standard Error | VIF   |
|------------------|-------------|----------------|-------|
| Satisfaction     | 0.115****   | 0.031          | 2.270 |
| Cost             | 0.062**     | 0.027          | 1.910 |
| Productivity     | 0.020       | 0.036          | 1.730 |
| Age              | -0.084      | 0.066          | 1.300 |
| Gender           | 0.004       | 0.063          | 1.210 |
| Office Clerks    | 0.000       | 0.000          | 1.110 |
| Monitor meetings | -0.006      | 0.023          | 1.050 |
| Previous HWE     | 0.165**     | 0.073          | 1.040 |
| Constant         | 0.021       | 0.122          |       |
| Mean VIF         |             |                | 1.45  |

Note: Table above presents the multiple linear regression of the model including the estimates, standard errors and VIF for each variable, except the multi-dimensional categorical variable firm’s industry. All values are adjusted to third decimal points. \* indicates  $p \leq 0.10$ , \*\* indicates  $p \leq 0.05$ , \*\*\* indicates  $p \leq 0.01$  and \*\*\*\* indicates  $p \leq 0.001$



The VIFs are calculated and presented in Table 3. In order to generate VIF values, first, the variables are regressed by OLS. According to the rule of thumb, a VIF value higher than five indicates serious multicollinearity, requiring correction (Craney & Surles, 2002). Table 3 demonstrates that all the variables have a value VIF lower than the benchmark 5, indicating that no serious multicollinearity exists in the dataset.

*Assumption 2: Fully represented data*

Osborne (2015) indicates that sparse data is one of the most important issues related to logit regression. Sparse data implies an absence of data in one or more categories. This issue could, specially, exist in categorical variables. For instance, for a certain age group, it could be the case that there are no observations. In that case, the odds and logit can go towards the infinity, which is an uninterpretable result. In fact, this was also the case with the initial data collected for this research. In the beginning, the age was designed to have five levels. However, due to the sample size, each age group did not have enough cases, creating sparse data. In order to solve this issue, the variable age is turned into binary data with two levels separated at the age of 45. Overall, all other variables indicated a coefficient different than infinity, showing that the data does not suffer from sparsity.

## 4.2 Descriptive statistics

**Table 4**  
Descriptive Statistics for Categorical Variables

| Variable                     | Category                                      | n  | %     | Mean |
|------------------------------|---|----|-------|------|
| <b>Control Variables</b>     |   |    |       |      |
| <b>Social demographic</b>    |   |    |       |      |
| Age                          | ≤ 45  | 35 | 37.63 |      |
|                              | > 45  | 58 | 62.37 |      |
| Gender                       | Male  | 51 | 54.84 |      |
|                              | Female  | 42 | 45.16 |      |
| <b>Firm-level</b>            |   |    |       |      |
| Previous HWE experience      | Yes   | 60 | 64.52 |      |
|                              | No  | 33 | 35.48 |      |
| Industry                     | (1) Clothing and textile                      | 5  | 5.38  |      |
|                              | (2) Oil, chemicals, and plastics              | 10 | 10.75 |      |
|                              | (3) Electronics, computers and transportation | 9  | 9.68  |      |
|                              | (4) Food production                           | 15 | 16.13 |      |
|                              | (5) Manual manufacturing                      | 6  | 6.45  |      |
|                              | (6) Others                                    | 48 | 51.61 |      |
| <b>Other characteristics</b> |   |    |       |      |

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|                                      |                                |    |        |
|--------------------------------------|--------------------------------|----|--------|
| Education Level                      | Less than a high school degree | 0  | 0      |
|                                      | High school graduate           | 4  | 4.30   |
|                                      | Bachelor's degree              | 45 | 48.39  |
|                                      | Master's degree                | 39 | 41.94  |
|                                      | Professional degree            | 0  | 0      |
|                                      | Doctorate                      | 5  | 5.38   |
| Position in the firm                 | First-line manager             | 23 | 24.73  |
|                                      | Middle manager                 | 20 | 21.51  |
|                                      | Chief executive                | 33 | 35.48  |
|                                      | Others                         | 17 | 18.28  |
| Number of office clerks              |                                | 93 | 284.99 |
| Number of monitor meetings per month |                                | 93 | 2.28   |

*Note.* The table represents all the categorical and continuous variables used in the regression model and other relevant descriptive variables. The table contains the categories, the number of observations for each category, the percentage represented by each category, and the cumulative percentage for each category. Also, the table contains the mean for the continuous variables.

Table 4 presents the descriptive statistics of the sample. Table 4 includes information about the managers in the sample. The majority of the sample consists of males and more than 60% of the sample is over 45 years old. Moreover, almost half of the managers hold a bachelor's degree while about 40% hold a master's degree. Half of the remaining 10% is a high school graduate, while the other half has a PhD degree.

Table 4 also presents information about the firms at which managers work and the manager's role in the firm. First, about 5% of the firms are in the clothing and textile industry, more than 10% are in the oil, chemicals, and plastics industry, and about 10% are in the electronics, computers, and transportation area. Furthermore, roughly 16% of the managers work in the food production sector, while about 7% work in manual manufacturing. The remaining half of the firms operate in other sectors. On average, a firm has about 285 office clerks in the sample. Furthermore, more than two and less than three monitor meetings are held per month on average. Moreover, about 65% of the firms have previously implemented HWE while the other 35% haven't. Lastly, the chief executives represent the largest group in the sample with 35%, while first-line managers are the second largest group with 25%. About 22% of the managers work as middle managers in their company, and the rest work in a different management position.

### 4.3 Regression result

This section presents the regression results of the logistic marginal effects and logit regression. All the results were gathered in four tables. Table 5, Table 6, and Table 7 separately examine the results for the three explanatory variables: satisfaction, cost reduction, and productivity. For these three tables, four models are presented. The first model demonstrates a regression solely consisting of the independent variable of interest. The second and third models contain the demographic control variables

and firm-level control variables, respectively. Finally, the fourth model includes all control variables. Furthermore, Table 8 presents the simultaneous regression of three explanatory variables. Table 8 consists of two models. The first one presents the results of logit marginal effects regression with three explanatory variables without any control variables. In the second model, the control variables age and gender are added. Table 9 presents logit regression results when all explanatory variables are included in the regression. This table gives insights about the relative importance of the variables of interest.

**Table 5**  
Logit marginal effects regression results for Satisfaction

|  | (1)<br>Preference<br>for HWE | (2)<br>Preference for<br>HWE | (3)<br>Preference for<br>HWE | (4)<br>Preference for<br>HWE |
|--|------------------------------|------------------------------|------------------------------|------------------------------|
| <b>Satisfaction</b>                          | 0.115****<br>(0.012)         | 0.110****<br>(0.013)         | 0.105****<br>(0.017)         | 0.098****<br>(0.019)         |
| <b>Age</b>                                   |                              | -0.074<br>(0.076)            |                              | -0.125<br>(0.078)            |
| <b>Gender</b>                                |                              | 0.005<br>(0.064)             |                              | 0.026<br>(0.062)             |
| <b>Office Clerks</b>                         |                              |                              | 0.000<br>(0.000)             | 0.000<br>(0.000)             |
| <b>Previous HWE</b>                          |                              |                              | 0.190***<br>(0.060)          | 0.181***<br>(0.058)          |
| <b>Monitor Meetings</b>                      |                              |                              | -0.024<br>(0.025)            | -0.025<br>(0.364)            |
| <b>Industry</b>                              |                              |                              |                              |                              |
| Oil, chemicals, and<br>plastics              |                              |                              | 0.118<br>(0.132)             | 0.138<br>(0.119)             |
| Electronics, computers<br>and transportation |                              |                              | -0.039<br>(0.151)            | -0.032<br>(0.147)            |
| Food production                              |                              |                              | 0.039<br>(0.131)             | -0.010<br>(0.126)            |
| Manual manufacturing                         |                              |                              | 0.047<br>(0.148)             | 0.079<br>(0.131)             |
| Others                                       |                              |                              | 0.052<br>(0.118)             | 0.068<br>(0.111)             |
| <b>Number of Observations</b>                | 93                           | 93                           | 93                           | 93                           |

*Note.* Table presented above demonstrates the results of marginal effects of logit regression for variable "satisfaction". Four models are presented. Standard deviations are presented in brackets under the coefficients. \* indicates  $p \leq 0.10$ , \*\* indicates  $p \leq 0.05$ , \*\*\* indicates  $p \leq 0.01$  and \*\*\*\* indicates  $p \leq 0.001$

Table 5 shows that the marginal effect of worker satisfaction is highly statistically significant in all models. Specifically, for model 1, when the Likert-scale evaluation of worker satisfaction increases by one level, the average rise in the probability of HWE preference is 0.116. This average change in probability decreases as control variables are included. For instance, when demographic control variables are added separately, the marginal effects of the worker satisfaction are 0.010, and when firm-level characteristics are added separately, the marginal effects are 0.105. Finally, when all

the control variables are included, as shown in model 4, the expected probability of preference for HWE increases, on average, by 0.098 with one point increase in worker satisfaction.

Given these results, increased satisfaction is associated with a higher probability of preference for HWE. To conclude, the null hypothesis that there is no association between the worker satisfaction and preference for HWE implementation is rejected.

**Table 6**  
Logit marginal effects regression results for Cost reduction

|  | (1)                   | (2)                   | (3)                   | (4)                   |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
|  | Preference<br>for HWE | Preference for<br>HWE | Preference for<br>HWE | Preference for<br>HWE |
| <b>Cost reduction</b>                        | 0.103****<br>(0.013)  | 0.101****<br>(0.014)  | 0.082****<br>(0.017)  | 0.080****<br>(0.018)  |
| <b>Age</b>                                   |                       | -0.167**<br>(0.077)   |                       | -0.192**<br>(0.078)   |
| <b>Gender</b>                                |                       | 0.010<br>(0.067)      |                       | 0.012<br>(0.067)      |
| <b>Office Clerks</b>                         |                       |                       | 0.000<br>(0.000)      | 0.000<br>(0.000)      |
| <b>Previous HWE</b>                          |                       |                       | 0.173**<br>(0.077)    | 0.145**<br>(0.071)    |
| <b>Monitor Meetings</b>                      |                       |                       | 0.013<br>(0.028)      | -0.014<br>(0.027)     |
| <b>Industry</b>                              |                       |                       |                       |                       |
| Oil, chemicals, and<br>plastics              |                       |                       | 0.155<br>(0.193)      | 0.183<br>(0.148)      |
| Electronics, computers<br>and transportation |                       |                       | -0.005<br>(0.207)     | 0.008<br>(0.175)      |
| Food production                              |                       |                       | 0.126<br>(0.182)      | 0.040<br>(0.157)      |
| Manual manufacturing                         |                       |                       | 0.095<br>(0.204)      | 0.146<br>(0.158)      |
| Others                                       |                       |                       | 0.106<br>(0.174)      | 0.104<br>(0.139)      |
| <b>Number of Observations</b>                | 93                    | 93                    | 93                    | 93                    |

*Note.* Table presented above demonstrates the results of marginal effects of logit regression for variable "satisfaction". Four models are presented. Standard deviations are presented in brackets under the coefficients. \* indicates  $p \leq 0.10$ , \*\* indicates  $p \leq 0.05$ , \*\*\* indicates  $p \leq 0.01$  and \*\*\*\* indicates  $p \leq 0.001$

Table 6 shows that cost reduction has a positive and highly significant marginal effect in all four models. Without any control variables, one level increase in the evaluation of cost reduction is associated with an average increase in the expected probability of HWE preference by 0.103. As the demographic and firm-level control variables are included in the regression, the magnitude of marginal effects of cost reduction decreases, but remains significant. Model 4 leads to three main inferences. First, one point increase in the evaluation of cost reduction is associated with an increase in the expected probability of preference for HWE by 0.080. Second, being older than forty-five is associated with a decrease in the predicted probability of preference for HWE by 0.192 compared to being forty-five or

younger. Third, having a previous HWE experience is related to an increase in the likelihood of preference for HWE by 0.145 compared to not having any experience.

To conclude, cost reduction is associated with a higher probability of a preference for HWE. In other words, the null hypothesis that there is no association between the cost reduction and preference for HWE implementation is rejected.

**Table 7**

Logit marginal effects regression results for Productivity

|   | (1)                   | (2)                   | (3)                   | (4)                   |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
|   | Preference for<br>HWE | Preference for<br>HWE | Preference for<br>HWE | Preference for<br>HWE |
| <b>Productivity</b>                             | 0.131****<br>(0.016)  | 0.127****<br>(0.018)  | 0.100****<br>(0.021)  | 0.091****<br>(0.023)  |
| <b>Age</b>                                      |                       | -0.133*<br>(0.074)    |                       | -0.164**<br>(0.080)   |
| <b>Gender</b>                                   |                       | -0.027<br>(0.068)     |                       | -0.016<br>(0.066)     |
| <b>Office Clerks</b>                            |                       |                       | 0.000<br>(0.000)      | 0.000<br>(0.000)      |
| <b>Previous HWE</b>                             |                       |                       | 0.153**<br>(0.077)    | 0.142**<br>(0.070)    |
| <b>Monitor Meetings</b>                         |                       |                       | 0.005<br>(0.026)      | 0.005<br>(0.025)      |
| <b>Industry</b>                                 |                       |                       |                       |                       |
| Oil, chemicals, and<br>plastics                 |                       |                       | 0.103<br>(0.169)      | 0.117<br>(0.137)      |
| Electronics,<br>computers and<br>transportation |                       |                       | -0.048<br>(0.185)     | -0.075<br>(0.174)     |
| Food production                                 |                       |                       | 0.112<br>(0.154)      | 0.034<br>(0.137)      |
| Manual<br>manufacturing                         |                       |                       | 0.035<br>(0.201)      | 0.070<br>(0.164)      |
| Others  |                       |                       | 0.081<br>(0.148)      | 0.082<br>(0.122)      |
| <b>Number of<br/>Observations</b>               | 93                    | 93                    | 93                    | 93                    |

*Note.* Table presented above demonstrates the results of marginal effects of logit regression for variable "satisfaction". Four models are presented. Standard deviations are presented in brackets under the coefficients. \* indicates  $p \leq 0.10$ , \*\* indicates  $p \leq 0.05$ , \*\*\* indicates  $p \leq 0.01$  and \*\*\*\* indicates  $p \leq 0.001$

Table 7 shows that worker productivity has a positive and significant marginal effect. The first model examines this explanatory variable alone. The results indicate that when the evaluation of worker productivity increases by one level, the probability of preference for HWE rises by 0.131 on average. This average change in probability decreases as the control variables are added to the model. When the demographic control variables are included, the marginal effects are 0.127, and when the firm-level variables are included, the marginal effects are 0.100. Finally, when all the control variables are added

in model 4, the marginal effects are 0.091. It indicates that one point increase in the evaluation of worker productivity raises the anticipated probability of HWE preference by 0.091, on average.

Overall, results indicate that increased worker productivity is associated with a higher probability of a preference for HWE. This implies that the null hypothesis that there is no association between the worker satisfaction and preference for HWE implementation is rejected.

**Table 8**  
Logit marginal effects regression for all factors

|                               | (1)<br>Preference for HWE | (2)<br>Preference for HWE |
|-------------------------------|---------------------------|---------------------------|
| <b>Satisfaction</b>           | 0.063****<br>(0.017)      | 0.054***<br>(0.019)       |
| <b>Cost reduction</b>         | 0.050***<br>(0.019)       | 0.053***<br>(0.019)       |
| <b>Productivity</b>           | 0.036<br>(0.024)          | 0.040<br>(0.025)          |
| <b>Age</b>                    |                           | -0.088<br>(0.071)         |
| <b>Gender</b>                 |                           | -0.016<br>(0.058)         |
| <b>Number of Observations</b> | 93                        | 93                        |

*Note.* Table presented above demonstrates the results of marginal effects of logit regression for variable "satisfaction". Four models are presented. Standard deviations are presented in brackets under the coefficients. \* indicates  $p \leq 0.10$ , \*\* indicates  $p \leq 0.05$ , \*\*\* indicates  $p \leq 0.01$  and \*\*\*\* indicates  $p \leq 0.001$ .

**Table 9**  
Logit regression for all factors

| Preference for HWE    | Coefficient | Standard-Error | Wald Chi-Square | p      |
|-----------------------|-------------|----------------|-----------------|--------|
| <b>Satisfaction</b>   | 0.747       | 0.310          | 6.550           | 0.011  |
| <b>Cost reduction</b> | 0.728       | 0.294          | 4.660           | 0.031  |
| <b>Productivity</b>   | 0.548       | 0.362          | 1.140           | 0.285  |
| <b>Age</b>            | -1.214      | 1.006          | 3.620           | 0.057  |
| <b>Gender</b>         | -0.220      | 0.804          | 0.001           | 0.9860 |
| <b>Constant</b>       | -3.733      | 1.426          | 6.850           | 0.009  |

*Note.* The table presented above gives the Wald test results of logit regression consisting of dependent variable preference for HWE, explanatory variables, satisfaction, cost reduction, and productivity, and control variables, age and gender. The second column gives the Wald Chi-square values and the third column gives the p-values. All the values are adjusted to three decimal points.

Table 8 presents the marginal effects of all explanatory variables of interest: satisfaction, cost reduction, and productivity. As in previous regressions, the significance of explanatory variables is robust across all models. Thus, the regression model with demographic control variables is chosen. The first model indicates significant results for satisfaction and cost reduction. First, the regression shows that one level increase in the satisfaction level is associated with a 0.063 unit increase in the probability of preference for HWE. Second, one level increase in the reported cost reduction is related to an increase in the probability of preference for HWE by 0.050. Furthermore, both variables remain significant when control variables, age and gender, are included in the regression. However, their magnitude differs. For

instance, the marginal effect of satisfaction reduce to 0.054 while the marginal effect of cost reduction increase to 0.053. Given these results, it is clear that the two variables have almost the same magnitude while worker satisfaction has slightly higher marginal effect.

In order to test the joint significance of these variables of interest, the Wald test is conducted and presented in Table 9. The null hypothesis of this test is that the association between the predictor and outcome variables is zero. Consistent with the results discussed previously, the null hypothesis is rejected for cost reduction and satisfaction, while it cannot be rejected for productivity. This indicates that the cost reduction and satisfaction statistically contribute to the preference for HWE. To conclude, the results given by the Wald test improve the reliability of the results given by the marginal effects.

#### 4.4 Heterogenous effects

Explanatory variables used in the regressions are based on the data gathered by the Likert-scale questionnaires presented in the survey. There are two ways to treat Likert scale-based data differently (Joshi et al., 2015). One treats the variables as an ordinal variable, while the other treats it as an interval scale. Both methods agree that the items have a clear rank order. The main difference between these approaches is that the interval scale assumes even distances between items while the ordinal variable assumes heterogeneous spaces. For instance, if items define a "greater than" or a "smaller than" relationship while the magnitude of difference cannot be determined, then the data should be treated as ordinal. Given this information, the data collected for this research can be described as an ordinal scale. When ordinal data exists, the variable should be treated as a categorical variable. However, in this research, the three explanatory variables based on the Likert scale are treated as a continuous variable. The main reason for this decision is the simplicity and the clarity of the results. When three explanatory variables with five categories are regressed together, the tabulation and the interpretation process become more complicated, creating room for errors.

It is still important to detect if categorical results are in line with the continuous results. Therefore, the information regarding the categorical form of explanatory variables is depicted in Table 10.

**Table 10**  
Regression results for logit marginal effects considering explanatory variables as categorical

|               | (1)                                | (2)                                  | (3)                                |
|---------------|------------------------------------|--------------------------------------|------------------------------------|
|               | Preference for HWE<br>Satisfaction | Preference for HWE<br>Cost reduction | Preference for HWE<br>Productivity |
| <b>Levels</b> |                                    |                                      |                                    |
| <b>2</b>      | 0.079<br>(0.232)                   | 0.124<br>(0.242)                     | 0.501<br>(0.192)                   |
| <b>3</b>      | 0.347*<br>(0.211)                  | 0.466***<br>(0.167)                  | 0.714***<br>(0.119)                |
| <b>4</b>      | 0.611****<br>(0.165)               | 0.409**<br>(0.166)                   | 0.699****<br>(0.123)               |

| <b>5</b>                      | <b>0.633****</b> | <b>0.595****</b> | <b>0.725****</b> |
|-------------------------------|------------------|------------------|------------------|
|                               | (0.161)          | (0.133)          | (0.121)          |
| <b>Age</b>                    | -0.073           | -0.142*          | -0.132*          |
|                               | (0.077)          | (0.077)          | (0.078)          |
| <b>Gender</b>                 | 0.026            | 0.002            | -0.055           |
|                               | (0.068)          | (0.074)          | (0.066)          |
| <b>Number of Observations</b> | 93               | 93               | 93               |

*Note. The table presented above demonstrates the logit marginal effects results for three different models. Each model includes an explanatory variable, respectively, satisfaction, cost reduction, and productivity. Two control variables are added to the regression for all three models, namely, age and gender. The standard errors are presented below in brackets. \* indicates  $p \leq 0.10$ , \*\* indicates  $p \leq 0.05$ , \*\*\* indicates  $p \leq 0.01$  and \*\*\*\* indicates  $p \leq 0.001$ .*

Table 10 demonstrates the regression results when three explanatory variables are treated as categorical variables. The variables satisfaction, cost reduction, and productivity are displayed in three different columns. The results indicate that the fourth level and the fifth level of all variables are positive and statistically highly significant compared to their first level. Furthermore, in the third level, cost reduction and productivity show positive and significant marginal effects compared to level 1. However, level three of satisfaction is not significant at 95%. Given this information, the highly positive result computed with the continuous version of the satisfaction variable is based on the fourth and fifth levels of the variable. Furthermore, highly positive and significant third, fourth, and fifth levels of cost reduction and productivity produce positive results when the variables are used continuously. To conclude, the categorical use of the explanatory variables is in line with continuous use. The higher levels of variables are the main drivers of positive associations.



## Section 5: Discussion and Conclusion

This paper examines the three factors that incentives managers to implement hybrid work environment in their companies.

The three explanatory variables were regressed using logit regression's marginal effects. Four models are presented for each variable. The variable satisfaction indicates a significant positive marginal effect for all considered models. This implies that worker satisfaction is correlated with an increase in the probability of preference for HWE implementation. The variable cost reduction also reveals a significant positive marginal effect for all models, suggesting that the reduced costs are associated with an increased probability of preference for HWE. The last explanatory variable, worker productivity, exhibits a significant and positive marginal effect for all models. This indicates that increased worker productivity is linked to an increased probability of preference for HWE. It is important to state that, for each variable, the magnitude of marginal effects has decreased as the control variables are added to the regression.

Second, the three explanatory variables are regressed together to examine the variable with the highest effect on the manager's preference for HWE. The logistic marginal effects indicate that worker satisfaction and cost reduction have a significant and positive association with a preference for HWE. One point increase in worker satisfaction is associated with an average increase of 0.054 in the probability of implementing HWE if all other covariates are unchanged. Furthermore, one point increase in the reported cost reduction scale is correlated with an average increase in the probability of HWE implementation by 0.053. The difference of change in the probability of HWE implementation between cost reduction and satisfaction is very small, which therefore could be neglected. The logistic marginal effects result indicates that the worker productivity has no significant association with a preference for HWE when all explanatory variables are regressed together. Given these results, worker satisfaction and cost reduction have a more significant role in HWE implementation compared to worker productivity. A possible explanation for the insignificance of worker productivity stems from the fact that the nature of the data is not self-reported, unlike the majority of the existing empirical evidence. When assessing the level of productivity, self-reported data can cause overestimations. When the data is provided by managers, the evaluation of subordinates is more accurate and less inflated compared to the self-evaluation of employees. Therefore, this research indicate that the increased worker productivity is a less influential factor for managers when implementing HWE.

Third, the regression is estimated to establish if these inferences hold when the explanatory variables are regressed as categorical variables instead of continuous variables. The results indicate that the higher levels of explanatory variables are associated with an increased probability of preference for HWE. This implies that the higher levels of the variables drive the positive results conducted with continuous forms.

When addressing the research conclusion, it is important to note that some limitations exist. First, since the representativeness is not ensured with snowball sampling, the results can suffer from selection bias. (Cohen & Arieli, 2011). For instance, the research subjects are dependent on the referrals of other subjects and on their willingness to participate in the research. In this case, the participants are not randomly selected from the population, meaning that findings cannot be generalized beyond the scope of the research sample. The external validity is not ensured, which can harm the reliability of the research outcomes. Second, as the natural experiments do not randomly assign the participants to the treatment groups, causal inferences cannot be drawn from this research. Therefore, it is important to state that the results presented in the research indicate correlation. Third, the binary nature of the dependent variable, preference for HWE, can mask meaningful differences in HWE frequency. In order to tackle these limitations, future research can expand the number of participants, which could be achieved with a less limited time frame and financial incentives. Moreover, future research can use panel data regression techniques to prevent selection bias. For instance, the individual fixed effect could be a plausible technique which accounts for all time-invariant individual characteristics. Furthermore, when examining HWE, future research can take into account the different frequencies of telework. For example, this could be accomplished by adding a categorical variable for days of telework into the regression.

To conclude, this paper shows that increased worker satisfaction and reduced costs are significantly associated with preference for HWE.

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## Appendix A: Survey questionnaire

### Section 1: Manager's demographic

1. What is your age?

- 18 - 30
- 31 - 45
- 46 - 60
- 61 - 75
- 76+
- Prefer not to say.

2. What is your gender?

- Male
- Female
- Non-binary / third gender
- Prefer not to say

3. What is the highest degree or level of school you have completed?

- Less than a high school degree
- High school graduate or equivalent
- Bachelor's degree
- Master's degree
- Professional degree
- Doctorate
- Other
- Prefer not to say

4. Where is your office located?

- Istanbul
- Ankara
- Izmir
- Bursa
- Adana
- Other

### Section 2: Firm-level characteristics

5. What is your position?

- First-line manager (departments' head)
- Middle manager
- Senior manager (chief executives)
- Other

6. How many office clerks work in your company?
7. How many performance monitoring meetings are held in a month?
- 1
  - 2
  - 3
  - 4
  - 5+
8. Which industry do you work in?
- Clothing and textiles
  - Oil, chemicals and plastics
  - Electronics, computer and transportation
  - Food production
  - Metal manufacturing
  - Wood, leather and paper
  - Others
  - Prefer not to say

Section 3: Hybrid Work Environment related questions

Information: Hybrid Work Environment (HWE): Working some portion of time away from the conventional workplace, often from home, and communicating by way of computer-based technology. In other words, HWE refers to working arrangements that combine in-office and remote work.

9. Does your company implement a HWE?
- Yes
  - No
10. Do you agree with this policy of implementing/not implementing this environment?
- Yes
  - No
  - Indifferent
11. If you could implement it on your own, would you implement a HWE in your company?
- Yes
  - No

Instruction: In a scale from 1 to 5 where one is fully disagree and 5 is fully agree answer the following questions

12. Implementing Hybrid Work Environment lowers the costs of my firm and division.

- 1
- 2
- 3
- 4
- 5

13. Implementing HWE increases the satisfaction of my colleagues and subordinates.

- 1
- 2
- 3
- 4
- 5

14. Implementing HWE increases productivity of colleagues and subordinates.

- 1
- 2
- 3
- 4
- 5