The Impact of Telework Attitude and Frequency to the Work/Life Balance, Productivity and Teamwork of Employees Measured by a Daily Mobile Smartphone Application

Erasmus@Work:
Author: Brima Aribowo: 364457
Thesis Coach: Prof.dr.ir. Eric van Heck
Thesis Co-Reader: Prof.dr. Frank Go

Master Thesis MSc. Business Administration,
Rotterdam School of Management Erasmus University
Acknowledgement

This Master thesis paper is established at the end of my one year education at RSM Erasmus University. It is also my main contribution on the New World of Work (Erasmus@work) research project which I joined when starting the Master thesis proposal. Below, I mentioned several peoples and parties who I would like to thanks.

First, I would like to thank Allah which gave me the opportunity, chance and help for me to finish this Master thesis according to plan. I would like to say thank you for all my family and my friends here in Netherlands and Indonesia for supporting and help to keep me always in a good spirit. My enormous appreciation was given for all the New World of Work research team and especially for my thesis coach Eric van Heck and my co-reader Frank Go for their guidance, insight, trust and feedback during every stage of my thesis.

I also wanted to thank to Gadjah Mada University for having a good relationship with Erasmus University. Therefore, I can successfully complete my Double Degree program as planned. There are many other persons who I cannot be mentioned one by one for being so helpful for testing and distribute the application for this research. Finally, I hope reading my thesis will give benefit and pleasure for all readers.

Brima Aribowo

Rotterdam, August 2012
# Table of Contents

Acknowledgement .................................................................................................................. 1
Table of Contents ..................................................................................................................... 2

## 1. Introduction .................................................................................................................... 5

  1.1 Problem Statement & Research Question ................................................................. 6
  1.2 Contribution to Theory and management practice .................................................. 7

## 2. Literature Review .......................................................................................................... 9

  2.1 Telework ....................................................................................................................... 9
      2.1.1 Attitude towards Teleworking ............................................................................ 10
      2.1.2 Frequency of telework ..................................................................................... 13
      2.1.2 Types of telework ............................................................................................. 14
  2.2 Work/Life Balance ....................................................................................................... 15
  2.3 Teamwork ..................................................................................................................... 17
  2.4 Productivity .................................................................................................................. 18
  2.5 Conceptual Model ........................................................................................................ 19

## 3. Methodology .................................................................................................................. 21

  3.1 Research Design .......................................................................................................... 21
      3.1 Unit of analysis and selection criteria ..................................................................... 22
  3.2 Data collection .............................................................................................................. 22
  3.3 Sample .......................................................................................................................... 22
  3.4 Measurement ............................................................................................................... 23
      3.4.1 Pre-test .............................................................................................................. 24
  3.5 Questionnaire Structure ............................................................................................. 24
      3.5.1 Introduction part of questionnaire .................................................................... 24
      3.5.2 Part 1 Demographic Characteristic ................................................................. 24
      3.5.3 Part 2 Work Related Attitudes ....................................................................... 25
      3.5.4 Part 3 Support Factors ..................................................................................... 25
      3.5.5 Part 4 Attitudes towards Teleworking .............................................................. 26
      3.5.6 Part 5 Type of Teleworker ............................................................................. 26
      3.5.7 Part 6 Teleworking Frequency ...................................................................... 27
      3.5.8 Part 7 Work/Life Balance .............................................................................. 27
      3.5.9 Part 8 Teamwork .............................................................................................. 28
      3.5.10 Part 9 Productivity ....................................................................................... 28
3.6 Application Development ........................................................................................................... 29
3.6.1 Smartphone .......................................................................................................................... 29
3.6.2 Development Method ........................................................................................................... 30
3.6.3 Google Drive ......................................................................................................................... 31
3.6.2 PhoneGap ............................................................................................................................. 32
3.6.3 Eclipse ................................................................................................................................... 33
3.6.4 Xcode ................................................................................................................................... 34
3.6.5 Microsoft Visual Studio......................................................................................................... 35
3.6.6 Layout and Application design.............................................................................................. 36
3.7 Construct validity and reliability ............................................................................................. 37
3.8 Reliability of Construct ............................................................................................................ 38

4. Data Analysis ........................................................................................................................... 39
4.1 Univariate data analysis .......................................................................................................... 39
4.2 Descriptive Statistic ................................................................................................................ 40
4.3 Hypothesis testing: Multi-level analysis .................................................................................. 42
4.3.1 Attitude towards teleworking ............................................................................................... 43
4.3.2 Frequency of telework ......................................................................................................... 45
4.3.3 Work/Life balance .............................................................................................................. 48
4.3.4 Teamwork ............................................................................................................................ 49
4.3.5 Productivity ........................................................................................................................ 50
4.3.6 Teleworking type ................................................................................................................ 53
4.4 Relationship Overview and Empirical Model ........................................................................... 54

5. Discussion ..................................................................................................................................... 57
5.1 Factors influencing the attitudes toward teleworking ............................................................... 57
5.1.1 Teleworker demographics .................................................................................................. 57
5.1.2 Work Related attitudes ....................................................................................................... 58
5.1.3 Support factors .................................................................................................................... 58
5.2 Relationship between attitudes and frequency of teleworking ............................................ 59
5.3 The effect of teleworking frequency ....................................................................................... 59
5.3.1 Productivity ........................................................................................................................ 60
5.3.2 Work/life Balance .............................................................................................................. 60
5.3.3 Teamwork ............................................................................................................................ 60
5.4 Type of telework ...................................................................................................................... 61

6. Conclusion .................................................................................................................................... 62
6.1 Contribution to theory and management practice ................................................................. 63
6.2 Limitation .................................................................................................................................. 64
6.3 Recommendation for future research .......................................................................................... 64

Bibliography .................................................................................................................................... 66

Appendix ........................................................................................................................................ 73
  Appendix A: Demographic overview of survey sample ................................................................. 73
  Appendix B: Survey Invitation ......................................................................................................... 73
  Appendix C: Survey Introduction and Constructs ........................................................................... 76
  Appendix D: Actual Survey Questionnaire ....................................................................................... 77
  Appendix D: Reliability Analysis ..................................................................................................... 82
  Appendix E: Univariate data overview ............................................................................................. 84
1. Introduction

The technology growth on mobile communication and data transfer has led to a tremendous amount of changes in people behavior throughout Internet. These evolving technologies also have an impact on the way of working. The telecommunication tools made it possible to do the job that was formerly done in the office, outside the office. This resulted in a new term called Telework, which is a form of work that enables employees to work outside their office environment using the help of ICT. As Statistics Netherlands (Centraal Bureau voor de Statistiek) reported in January 2009, it appears that the proportion of companies employing teleworkers had doubled within four years, from 25% in 2003 to 50% in 2007 (CBS, 2009). With this high prevalence of telework, the Netherlands is one of Europe’s leading countries regarding telework (EFILWC, 2010; Crucq, 2008).

Since its US inception in the 1970s, some literature has emerged regarding the various telework benefits for the individual, the organization and society as a whole, which has continuously added to its popularity (Madsen, 2003; Harpaz, 2002). Yet despite its uptake in practice, the majority of research on telework is limited to anecdotal program reports that lack methodological rigor and verifiability (Westfall, 1998). It seems that there has been a systematic lack of solid experimental research on the influence of telework on business and personal outcomes (Siha and Monroe, 2006; Neufeld and Fang, 2005; Shin et al., 2000; Hill et al., 1998), and there are reports that research interest has declined over the past years (EFILWC, 2010).

Up to 2010 data from research conducted by Telework Research Network in United States (2011), it still shows growth on the number of teleworking during that year. The data pictures even more dramatic results during the years 2005 and 2008, when there are high levels of percentage in the work at home population by 74 percent. Therefore, numerous researches have been conducted on this marvel on teleworking related to the productivity, work/life balance and teamwork. However, those previous researches were mostly done using the general method of obtaining data from a sample. They only measured employee condition during the period in which the surveys were taken or before and after they were experiencing telework. The findings of this result could be a general feeling from the respondents about their overall condition.
If we look into teleworking activity more closely, its activity and flexibility can be influenced by variation and different challenges every day. Because of its flexibility as well, teleworker can choose how many hours they can spend on teleworking each day. However, tracking those activities each day by doing paper or computer surveys might require more effort. Thus, a more flexible and convenient way to analyze daily variables that may have associations with teleworking is still available to be explored.

1.1 Problem Statement & Research Question

The first underlying question of this research is the factors may affect the attitudes toward teleworking. When doing their job in a mobile fashion, teleworkers deals with many other situations and condition which drive their attitude towards teleworking. However, as described in the introduction section, many previous researches about the teleworking were mostly done by research in one or some period of time. This measurement is often very general and does not address more specific variables that may represent the daily situations which could result in factors that would drive positive attitude towards telework. Therefore, before we dive deeper, an understanding about the variables that may affect attitudes towards teleworking is significant. Accordingly, the following research question will be investigated:

“How can we use more frequent data collection to analyze the variables which can affect the attitude towards teleworking?”

After knowing the available variables that may affect attitude towards teleworking, the further step is to analyze whether the attitude is implemented on action. By understanding the attitude towards telework, we can see that the action that would be shown as an indicator in this case is the frequency of teleworking. Will a person with good attitudes toward teleworking also have a higher teleworking frequency?

“Do positive attitudes toward teleworking have a positive relationship on teleworking frequency?”

Research has shown that for both organizations and employees, personal productivity ranks among the top advantages of telework, while work/life balance-related benefits play an even greater role for employees (Madsen, 2003; Harpaz, 2002; Khaifa and Davidson, 2000;
Baruch, 2000; Kurland and Bailey, 1999). To address the influences of positive attitudes towards telework on the work/life balance, teamwork and productivity it is important to look into evidence and result of the current situation and feeling of the employee. Therefore, the next research question will be:

“What are the effects of telework frequency on productivity, teamwork and work/life balance?”

1.2 Contribution to Theory and management practice

This research, which examines the impact of telework on work/life balance, productivity and teamwork and other factors that influence the attitude towards telework, will give contributions for the following points:

First, up until now, relatively little research has empirically investigated 1) telework in its present state, where teleworking frequency as a continuous variable plays an important role (Golden and Veiga, 2005; Raghuram et al., 2003; Hartman et al., 1991), 2) the factors that influence the attitude towards teleworking (Vivien, 2000), 3) the productivity of teleworkers (Neufeld and Fang, 2005; Kemerling, 2002). All these gaps in the scientific literature will be addressed in this thesis. This adds theoretical relevance to the thesis.

Second, work/life balance, productivity and teamwork are among the main reasons for both companies and individuals alike to establish, and participate in, telework initiatives (Hill, Miller and Weiner 1998; Meulen 2010; Madsen, 2003; Harpaz, 2002; Khaifa and Davidson, 2000; Baruch, 2000; Kurland and Bailey, 1999; Gallie and Zhou, 2010). Knowledge about the effects of teleworking frequency on these three variables will help companies not only assess the usefulness of (possible) telework programs, but also facilitate in the creation of efficient telework programs. It will also provide companies with valuable factors that can be within or even beyond their range of control. It will also help companies to manage and regulate their employee in doing their telework activity and the optimal frequency as well.
On top of that, this research will give researches a more in-depth result of the analysis because this research will use a more intense questioner. The mobile application that is made for this research can also give a contribution for the Erasmus New Worlds of Work research team, and can be used as one of their tools in the future.
2. Literature Review

This chapter will describe the study of literature and concept on variables used in this research. Therefore, it will include the Attitudes towards Telework, Telework Frequency, Work/Life Balance, Teamwork and Productivity. It will also describe the hypothesis and conceptual model used in this research.

2.1 Telework

Telework literature has one major problem that has existed for years and will make future research more difficult: there is no single or clear accepted definition of telework (McCloskey and Igbaria, 1998). The term has been used with a high degree of arbitrariness and has changed extensively over the course of the last four decades. This may be due to its evolutionary nature, extending its original meaning of working at home with the help of ICT to include more complex forms (Di Martino and Wirth, 1990). The wide variety of tasks that can now be done remotely has led to the creation of new concepts that are used to describe certain aspects of telework. Telework has thus become more or less an umbrella term for working at home, telecommuting, flexible working, and other (officing) arrangements, such as are called ‘networking’, ‘virtual working’, ‘mobile working’, ‘distance working’, ‘remote working’, ‘electronic working’, ‘nomadic working’, ‘satellite office working’ or ‘telecottage working’ (Bergum, 2007; Yttri, 1999; Qvortrup, 1998). In some cases, the term is even deliberately kept broad – such as in the case of the European Framework Agreement on Telework of 2002, to allow resolutions to cover different forms of telework. Companies that introduce teleworking contribute to definitional difficulties as they all have their own terms, policies and practices aimed at differentiating themselves from similar companies. With terminologies differing in theory and practice, it becomes difficult to exactly specify what telework entails, let alone to distinguish the varieties of telework.

Because of those different forms of telework and we need to focus on one definition which can be used and is relevant to the current situation in this research, we will use the definition of telework according to article 2 of the European Framework Agreement on Telework of 2002 (EFILWC, 2010):
“Telework is a form of organizing and/or performing work, using information technology, in the context of an employment contract/relationship, where work, which could also be performed at the employer’s premises, is carried out away from those premises on a regular basis.”

Most authors who claim that telework is performed away from the main office environment consider the home workplace as just one of the alternatives. Yet while working from locations other than the office or home workplace is increasing (James, 2004), evidence shows that most teleworkers work at home (EFILWC, 2010; Madsen, 2003).

### 2.1.1 Attitude towards Teleworking

There are reasons why most teleworkers do their work at home or outside of their office, either because of the system of their working organization or a positive attitude towards teleworking. This can be followed up from Lim & Teo’s (2000) research on factors that give positive impact on attitudes towards teleworking. This research came up with four different factors, which are: Demographic Characteristics, work-related Attitudes, Support Factors and Perceived Advantages and Disadvantages to individuals and Organization.

Those four factors are really important because they present the actual conditions, which can either motivate or inhibit the worker to do teleworking. However, from those four factors above, the perceived advantages and disadvantages to individual and organization factor will not be used in this research. This is due to the simplicity needed in the daily report using the mobile application. Hence, the three factors are: demographic characteristic which will be measured once while the support factors. Then, the supporting factors and work related attitudes will be measured deeper on employee daily activities.

Regarding demographic variables, we will use gender, marital status and number of child. Therefore, the hypotheses are:

H1a: Gender has a relationship with attitudes towards teleworking

H1b: Marital status has a relationship with attitudes towards teleworking

H1c: Number of child’s has a relationship with attitudes towards teleworking
In terms of work-related attitudes, we will measure it from the job insecurity and organizational commitment. Job insecurity refers to the amount of uncertainty a person has about his or her job continuity or continuity of certain aspects of the job (Greenhalgh and Rosenblatt, 1984). Increasing competition among organizations has threatened the job security of employees. The changing organizational, economic and technological factors have rendered many working skills inadequate and obsolete. Consequently, employees' feelings of job security with their present organization are negatively affected (Lim, 1996; De Witte, 1999).

Teleworking will be perceived as a source of threat to job security since it can adversely affect an individual's career advancement opportunities due to the “out-of-sight, out-of-mind” syndrome (Ramsower, 1985; Duxbury et al., 1987; Huws et al., 1990). Previous studies showed that individuals perceived that teleworking would impede their professional development and threaten their career opportunities (e.g. Shamir and Salomon, 1985). This is because teleworkers are not always physically present in the workplace and may lose out in terms of visibility and direct daily interaction with their supervisors. Since their supervisors do not see the teleworkers often enough, the latter may most likely be passed over during promotion periods. On the other hand, their non-teleworking counterparts in the office, who are physically present at the workplace, may have a better chance of climbing up the corporate ladder.

Organizational commitment is defined as [The] strength of an individual's identification with and involvement in a particular organization, and a person with very strong organizational commitment will have a strong belief in, and acceptance of, the organization's goals and values; a readiness to exert considerable effort on behalf of the organization (Cook and Wall, 1980).

In accordance with the reasoning above, individual with higher level of job insecurity will have less favorable attitude towards teleworking and vice versa. Salancik (1977) argued that individuals with higher organizational commitment would conform to the implied or explicit values and expectations of their organizations. Individuals with high commitment are more willing to put in a great deal of effort in order to help the organization to be successful than their less committed counterparts. Therefore, the hypotheses are:
H1d: Job Insecurity has a negative impact on attitudes towards teleworking

H1e: Organizational Commitment has a positive impact on attitudes towards teleworking

In term of support factors, we will use supervisory support and work colleague support to measure its impact on attitude towards teleworking. Therefore, the hypotheses are as follows:

H1f: Supervisory support has a positive impact on attitudes towards teleworking

H1g: Work Colleague support has a positive impact on attitudes towards teleworking

**Figure 2.1:** Conceptual framework of attitudes towards teleworking hypothesis
2.1.2 Frequency of telework

The definition of telework leaves a lot of room with regard to who can be regarded as a teleworker: essentially, all employees who telework may be considered as ‘teleworkers’, even though one might work at home for just a few hours a month, whereas the other does so five days a week. That is why this thesis, contrary to most of the literature on telework, will not regard telework as a single, undifferentiated variable, but rather as a continuous variable that incorporates this notion of frequency. Sometimes referred to as ‘telework intensity’ or ‘the extent of telework’, it deals with the number of hours that employees spend working at home.

The idea is that low-frequency (or primarily office-based) teleworkers differ from high-frequency (or primarily home-based) teleworkers with regard to their motivations and how they experience their work context (Raghuram et al., 2003). That is because the factors that are related to telework, such as the increased dependence on ICT, the physical absence of colleagues and supervisors, the ability to work when it makes sense, the time spent commuting and the possible influence of the family or household, are likely to be more pronounced when one spends more time at home and less time at the office. In turn, this might also influence work outcomes. However, empirical research on this fine-grained relationship between telework frequency and work outcomes has been scant (Golden and Veiga, 2005; Raghuram et al., 2003; Hartman et al., 1991).

Golden and Veiga (2005) have recently attempted to solve this lack of empirical research. They examined the impact of the frequency of telework on job satisfaction and discovered that a curvilinear, inverted u-shaped relationship existed between the two variables. More specifically, job satisfaction appeared to plateau out at higher frequencies of telework (Golden and Veiga, 2005). These findings are consistent with those of Virick et al. (2010), who have established that the frequency of telework not only shows a curvilinear, inverted u-shape relationship with job satisfaction, but also with life satisfaction.

H2: Positive attitudes towards teleworking will give a positive impact on teleworking frequency
The frequency of telework does not always relate to variables in a curvilinear fashion. For instance, Golden et al. (2006) have shown that the frequency of telework has a linear relationship with both work-to-family conflict and family-to-work conflict. What these few recent findings have shown is that the frequency of telework can have a significant impact on work outcomes. Therefore, this research will examine its relationship with three variables: work/life balance, productivity and teamwork:

H3: Increase in teleworking frequency will give a positive impact on work/life balance

H4: Increase in teleworking frequency will give a positive impact on teamwork

H5: Increase in teleworking frequency will give a positive impact on productivity

Figure 2.2 Conceptual framework of Teleworking Frequency hypothesis

2.1.2 Types of telework

After investigating the factors that can influence the attitude towards teleworking, the other element that is important to be included is the type of teleworker. This approach is used to identify different variety of teleworkers, and according to the SUSTEL project initiated by the European Commission, there are four types of teleworkers based on their research, case studies and surveys (James, 2004):

1. Home-based employed teleworkers, who work either full time from home, or who alternate between working at home and at the office (either on set days or more flexibly);
2. Self-employed teleworkers, who normally work from their home office;
3. Mobile workers, who spend at least ten hours per week away from their main workplace (this can be either their home or the office);
4. Casual workers (also called ‘day extenders’), who fall under the first group of home-based employed teleworkers, but do so less than ten hours per week. These people usually work full-time from the main office, but occasionally take work home, typically after work or on weekends.

From those 4 different types of teleworkers, this research will only measure the casual workers and mobile workers teleworkers. This is because we want to measure the samples that still feel the environment on the office while also, indeed, do teleworking. By differentiating the type of teleworker depending on how many hours they spend on teleworking, we can measure and analyze its impact on attitudes towards teleworking. Therefore, the hypotheses are:

H6: Attitudes towards teleworking will determine the type of teleworking

H7: Type of teleworking is reflected on teleworking frequency

![Figure 2.3 Conceptual framework of Teleworking Type hypothesis](image)

**2.2 Work/Life Balance**

As Guest (2002) pointed out, work/life balance is a kind of metaphor, and its meaning depends partly on our choice of language. Balance alone has various meanings, and it can be used as either a noun or a verb. In the first case, according to the Oxford dictionary, it stands for “a condition in which different elements are equal or in the correct proportions”. This would mean that one can only speak of work/life balance when both are equal (e.g. “work hard/play hard”), or when this is not the case, when it is distributed according to some
(objectively defined) correct proportion. If this would be the case, objective measures such as work hours should have been used extensively in the literature. This is not the case, however, meaning that this definition does not do justice to the idea that each individual can have his or her own sense of balance: the ‘best’ work/life balance is different for each individual (Baltes and Heydens-Gahir, 2003).

As a verb, the Oxford definition of balance is more useful, meaning to “offset or compare the value of (one thing) with another”. This implies that one can do something to manage balance: something which lays at the heart of the assumption that telework will help employees to obtain a better work/life balance and is therefore very important. This thesis will use the following definition of work/life balance:

“A personal sense of balance when both work and home environment offset each other in such a way that the individual may be successful in both environments”

Some scholars say that the flexibility of telework is what employees need to balance work and home responsibilities (Jenson, 1994). Others see the virtual office as having the potential to blur the boundaries between work and home life (Jones, 1997). In any case, the virtual office adds a new level of complexity as employees attempt to deal with flexibility and “sculpt” the permeability of their own work and personal/family life boundaries (Nippert-Eng, 1995). Olson and Primps (1984) found that some telecommuters exhibited characteristics of workaholism because of lack of work/life separation. Hartman, Stoner, and Arora (1991) found a negative relationship between family relationships and satisfaction with telework. Hill (1995) speculated, “Giving a workaholic an electronic briefcase may in some ways is like giving an alcoholic a bottle of gin” (p. 2). Contrary to the media image of telecommuting, telework experts claim combining dependent care with telecommuting is ineffective (e.g., Christensen, 1992; Riley, 1994). However, scholarly research on the influence of the virtual office on work/life balance is scarce. In this research we will measure its impact on productivity:
H8: Positive work/life balance status has a positive impact on productivity

![Figure 2.4 Conceptual framework of work/life balance hypothesis](image)

### 2.3 Teamwork

A number of studies provide some empirical support for the generally positive effects of teamwork. For instance, Cohen and Ledford (1994) examined more than 80 self-managing teams at an American telecommunications company and found that self-managing teams had significantly better job performance and higher employee job satisfaction than traditional working groups or departments. Hamilton et al. (2003) found that the adoption of teams at the plant level improved worker productivity even after taking into account the selection of high-ability workers into teams. Batt (2004) showed that self-managed teams were associated with significantly higher levels of perceived discretion, employment security, and satisfaction for workers, and were effective in improving objective performance measures. In a wider European study, Benders et al. (2001) also found a positive effect of group delegation for reducing employee absenteeism rates and improving organizational performance. A review of survey-based research over the last decade concluded that a great majority of studies had found positive effects on operational measures of organizational performance (Delarue et al. 2007).

A central argument for linking teamwork to higher productivity is that it gives employees a sense of empowerment, by increasing the control they can exercise over their immediate work environment (Goodman et al. 1988; Harley 1999). Workers with higher control over their jobs are likely to feel more committed to their organizations and more satisfied with their jobs. As a result, they will be more willing to deploy discretionary effort, thereby enhancing organizational performance (Dunphy and Bryant 1996; Pil and MacDuffie 1996). This assumption also underpins theories of ‘high commitment’ and ‘high performance’ management systems where teamwork is viewed as one of a set of structural features that enhances organizational effectiveness by raising employee motivation (Ramsay et al. 2000).
In term of teamwork outside of the office, to see its relationship to the teleworking we can look at Callentine’s (1995) report that about 90% of her virtual office sample responded that communications with co-teleworkers were less effective than they had been in the traditional office environment. In a qualitative study, Weiner and Hill (1995) found the virtual office negatively influenced communication and peer interaction with co-teleworkers and telemanagers. Ramsower (1985) found that full-time telecommuters engaged in less upward, downward, and horizontal work communications with co-workers and supervisors. Therefore relating the teamwork with productivity and teleworking is still feasible and will give a contribution for the previous research. In this research we will measure its impact on productivity:

H9: Great teamwork has a positive impact on productivity

![Diagram](image)

**Figure 2.5** Conceptual framework of Teamwork hypothesis

### 2.4 Productivity

The traditional definition of productivity stems from the industrial era and bases productivity on a comparison between outputs (typically number of units) and inputs (typically hours of labor). This is a problem in an era where knowledge workers dominate (Drucker, 1999). Definition adopted from Neufeld and Fang (2005):

>“Productivity is an individual’s effectiveness with which he or she applies talents and skills and uses resources to perform work within a specific timeframe”

This definition is in line with the operationalization of productivity by Staples et al. (1999), which will be used in this thesis to measure overall productivity. In a study that examined the influence of the virtual office (Callentine, 1995), respondents reported increased work effectiveness and greater productivity in the “anytime-anyplace’’ office. Pitt-Catsouphes & Marchetta (1991) reported productivity increases of between 10% and 30% in a review of telecommuting studies. Results from the Federal Flexiplace Project (U. S. Department of Transportation, 1993) also indicated improved job performance for most telecommuters.
However, Ramsower (1985) reported that a small group of 16 telecommuters did not differ from a comparison group of office workers on variables related to productivity, absenteeism, and turnover. It is unknown whether results from studies of home-based telecommuters can be generalized to virtual office employees who work from a variety of venues.

### 2.5 Conceptual Model

A conceptual model, which represents the hypotheses and relationships as discussed in this literature review, is depicted in figure 2.2.

![Conceptual Model of the research](image)

Figure 2.6: Conceptual Model of the research

Because the measurement of the research is done daily, we separated the model into two parts. The first part, which has blue color, is only measured once because the data is almost impossible to change daily. This first part will be included in the sign up process so the user can fill in the item only once. The item which has green color (Type of telework) will be measured at the end of the survey by looking into teleworking frequency of each individual, casual teleworker which has less than 10 hours of telework each week and the mobile worker who done teleworking more than 10 hours each week. Finally, the rest of the items, which has red color border, are the factors we will measure daily using a mobile
smartphone application. Explanation of the mobile smartphone application will be presented in the next chapter.
3. Methodology

Before going further on the data analysis, this chapter will link the hypotheses from the previous chapter with the research methodology used in this thesis. It will first describe the unit of analysis and the selection criteria employed by the company under study. Subsequently, the method of data collection is determined and an overview of the final research sample is given. Lastly, the measurement instrument will be discussed, including construct development and tests of construct validity and reliability.

3.1 Research Design

When conducting this research, a quantitative research approach using daily survey is applied. The survey will result in a raw collection of data expressed in numerical term which will be measured based on its dependent and independent variables. A survey is used to collect data for this research. In the survey, a list of prearranged questions is used (questionnaire). The main objective of a survey is to identify and select sample members. According to Wijaya and Tabrani (1991), using surveys has several advantages:

1. Developing people in understanding the structure and processes of an event that is happening in the environment.
2. Motivating people in understanding the problems that exist in the neighborhood and its tendency to move forward.
3. It may provide opportunities for people to find things that are enclosed in the environment.
4. It may provide an opportunity for people to participate actively in the environment.
5. It can develop a sense of freedom of opinion and devote the needs in the surrounding environment.

Fixed response questions are used in the questionnaire to reduce the variability in the results. Pilot testing was also done to prevent misinterpretation of the questionnaire. The questionnaire is distributed via mobile smartphone application. This can be downloaded through the special website for the research. The method is chosen to provide a high speed result, low costs, high quality of data and no interviewer bias (Malhotra & Bricks, 2003).
3.1 *Unit of analysis and selection criteria*

The unit of analysis is very important for the research methodology. It has to be clear before the research actually begins, to define the instrument and limitation of the study (Malhorra and Grover, 1998). This thesis will focus on the Individual level of telework, which in this case is the employee which work outside occasionally with the number of the hour they spend is approximately 10 hour per week. Basically, the important recommendation that needs to be met for doing this research is that the sample is doing teleworking but is also still working at the traditional office. Then it will be separated into two groups based on the result of the research: casual worker who do teleworking less than 10 hour per week and mobile worker who spend more than 10 hour per week doing their teleworking. This method can be measured by accumulating the average number of hour the samples spend on teleworking.

3.2 *Data collection*

This research will conduct the investigation on a certain company that allows their employees to do teleworking besides their actual activity on the office. Instead of using a one at a time survey, this research will go deeper on the actual activity done by the employee. The deeper investigation will be done to give a contribution to the previous research by supporting it or by coming up with new result. Therefore, employees should fill in the survey each day for this research in order to achieve the desired results. They have to do it each day on the night after they are concluding their activity on one day. Because our target in this research is to get a minimum of 500 dataset, it can be achieved if they work five times per week and the research done in two weeks from each sample. Therefore, we can have 5x2=10 dataset on every individual. After sending the invitation of many companies in Netherlands and Indonesia, the total dataset obtained is 530. This is done after removing several samples that has lost of data or irrelevant data entry.

3.3 *Sample*

The survey is sent to many companies around Netherlands and Indonesia. After four week of collecting data (each participant only filling in all data for two weeks on this given time period), the final survey was filled in and completed by 53 respondents that are 83% Indonesian and the other 17% are of Dutch nationality. This number of the respondent is chosen based on the completeness and frequency of filling the survey. This is due to the model of the questionnaire, which uses daily measurement. Therefore, the lack of this
requirement will not be tolerated and the data will be dropped. After looking prudently into the data, four individuals have failed to meet the requirement in the given time period.

Furthermore, there are also some requirements that the participants need to consider before completing the survey. This requirement perhaps made the invitation and communication during the survey crucial for the outcome. For further details about the requirement, please refer to the Appendix C Part II.

A demographic overview of the survey sample can be seen in Appendix A of this research. The gender population is a bit dominated by the male, with an average of 66%, while the female reaches 34% population for the overall survey. The age of sample varies from 19 to 38 years old. 85% of the sample is single while the rest is already married and have kids, varying from 0-3. Most of the participants use the Android version of the app (68%) while the rest was using iPhone (32%). However, none of the sample uses the Windows phone version of the app. Explanation about the mobile smartphone application used in this research will be explained on the other part of this chapter.

3.4 Measurement

This study is a part of New Worlds of Work research project. This research will firstly gather four background items from participant: age, gender, number of children and marital status. It also used three work dimensions, namely work related attitudes, supportive factors, positive attitude toward telework. Finally, work/life balance, productivity and teamwork will be taken from the survey to be used for measuring performance.

Most of question is measured using a 5-point Likert scale from strongly disagree to strongly agree, with the exception on the work/life balance scale. Here, a 5-point semantic differential scale was used. Using 5-point Likert scale not only increases reliability and validity (Dawes, 2008), but also ensures that construct measurement remained as close to the original source as possible. Such devotion to existing constructs and scales also prevents study isolation and fragmentation of the research field (Malhotra and Grover, 1998). The other question will be measured by number of hour (0-24) to record the duration and activity participant spend on the particular day.
3.4.1 Pre-test

On the final stage of the application development, a pre-test is done in order to test the user friendliness of the survey and to check if an acceptable level of measurement reliability could be obtained. During the pre-test period, the respondents give feedback to the researchers by doing a small interview. After conducting 10 pre-tests, there appeared to be no technical difficulties when completing the survey. However there are some comments regarding the wording of the questions. Those comments are taken into account and modification is done to improve the understanding. Furthermore, because of high demand and the majority of the sample is Indonesian, we came out with other language version of the smartphone application to make it easier and faster for those to filling in the survey. For the complete version of the survey (in Indonesian and English) can be seen in appendix D.

3.5 Questionnaire Structure

3.5.1 Introduction part of questionnaire

Before the participant fills in the survey, there is one introduction about the survey in order to make them familiar about teleworking topic. This part also gives them the overview of what they need to do in this study. This introduction is created to reduce the bias, giving insight about the study and make sure that the respondent is eligible to do the survey.

For further detailed information about the introduction part of the questionnaire, please refer to Appendix C. Below, we will discuss each part of the questionnaire and relate it with our literature review to make sure the questions asked in the questionnaire are reliable and have a strong position to be retained.

3.5.2 Part 1 Demographic Characteristic

The Demographic Characteristic measured on the questionnaire is based on three major items, Gender, Marital Status and Number of Child. Because this measurement can be achieved only once, this item will be putted on the sign up form of survey. Therefore the participant can only provide these data once.
Table 3.1: The measurement used in demographic variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demographic Characteristic</td>
<td>1. Gender</td>
<td>1. What is your gender?</td>
</tr>
<tr>
<td></td>
<td>2. Marital Status</td>
<td>2. What is your current marital status?</td>
</tr>
<tr>
<td></td>
<td>3. Number of Child</td>
<td>3. How many children did you have?</td>
</tr>
</tbody>
</table>

3.5.3 Part 2 Work Related Attitudes

In work related Attitudes, we put two core questions to measure, which is based on the previous research about job insecurity (Greenhalgh and Rosenblatt, 1984) and the organizational commitment (Salancik (1977)).

Table 3.2: The measurement used in work related attitudes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Work Related Attitudes</td>
<td>1. Job Insecurity</td>
<td>1. Do you feel your job is secure now and in the future?</td>
</tr>
<tr>
<td></td>
<td>2. Organizational Commitment</td>
<td>2. Do you commit to your organization?</td>
</tr>
</tbody>
</table>

3.5.4 Part 3 Support Factors

In support factors, we will use two main questions to measure it: the supervisory support and work colleague support.

Table 3.3: The measurement used on support factors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Support Factors</td>
<td>1. Supervisory support</td>
<td>1. Do your supervisors or boss support you to do teleworking?</td>
</tr>
<tr>
<td></td>
<td>2. Work colleague support</td>
<td>2. Do your work colleagues are supportive to teleworking?</td>
</tr>
</tbody>
</table>
**3.5.5 Part 4 Attitudes towards Teleworking**

The four item measurement basically came from Lim & Teo’s research (2000) on the factors affecting the attitudes towards teleworking. The two items will be used to measure the attitudes that are in favor of teleworking and teleworking opportunity.

### Table 3.4: The measurement used on attitudes towards teleworking

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Attitudes Towards Teleworking</td>
<td>1. In favor of teleworking</td>
<td>1. Are you in favor of teleworking today?</td>
</tr>
<tr>
<td></td>
<td>2. Teleworking opportunity</td>
<td>2. Do you likely to take teleworking option if offered by your organization?</td>
</tr>
</tbody>
</table>

**3.5.6 Part 5 Type of Teleworker**

Participant will not enter the type of teleworker manually, but rather it will be calculated in the end of the research to separate between two different types of teleworking described in the journal from James (2004).

### Table 3.5: The measurement will be used on type of teleworker

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Type of Teleworker</td>
<td>Between casual or mobile worker (see 2.1.2)</td>
<td>Will be measured automatically, depend on the frequency of teleworking on average. Less than 10 hour per week for casual worker and more than 10 hour per week for mobile worker</td>
</tr>
</tbody>
</table>
3.5.7 Part 6 Teleworking Frequency

The teleworking frequency measurement is pretty simple and straightforward. However, this measurement is important since the data for the survey is recorded daily. It can show the varying number of hours participant spend on their current day.

Table 3.6: The measurement will be used on teleworking frequency

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Teleworking Frequency</td>
<td>Number of hour spent on teleworking</td>
<td>1. How many hours you spend doing teleworking today?</td>
</tr>
</tbody>
</table>

3.5.8 Part 7 Work/Life Balance

In the work/life balance, we measure three items based on the previous research developed by Hill et al (2001). The items measured can be seen in the table below:

Table 3.7: The measurement used on this research

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Work/Life Balance</td>
<td>1. Household or child care responsibility</td>
<td>1. Did mobility enable you to better fulfill household/childcare responsibilities?</td>
</tr>
<tr>
<td></td>
<td>2. Work and life separation</td>
<td>2. Do you have sufficient time away from your job to maintain an adequate balance between your work and personal and family life?</td>
</tr>
<tr>
<td></td>
<td>3. Level of work/life balance</td>
<td>3. How successful do you feel in balancing your work and personal and family life today?</td>
</tr>
</tbody>
</table>
3.5.9 Part 8 Teamwork

In teamwork, we measure two core items: 1.) Informal network and mentoring qualities and 2.) Internal communication. The detailed questions can be seen in the table below:

Table 3.8: The measurement will be used on this research

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Teamwork</td>
<td>1. Informal networks and mentoring qualities</td>
<td>1. Did your informal networks and mentoring struggle in a mobile environment?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Internal communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Do you believe that Mobility is an obstacle to internal communication?</td>
</tr>
</tbody>
</table>

3.5.10 Part 9 Productivity

Productivity is measured using 4 items previously measured by Staples et al. (1999), which are effectiveness, quality of output, efficient and confidence.

Table 3.10: The measurement will be used on this research

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Productivity</td>
<td>1. Effectiveness</td>
<td>1. Are you an effective employee today?</td>
</tr>
<tr>
<td></td>
<td>2. Quality of output</td>
<td>2. Do you happy with the quality of your work output?</td>
</tr>
<tr>
<td></td>
<td>3. Efficient</td>
<td>3. Do you work efficiently today?</td>
</tr>
<tr>
<td></td>
<td>4. Confidence</td>
<td>4. You are a highly productive employee today?</td>
</tr>
</tbody>
</table>
3.6 Application Development

Because the research needs to be done every day and we respect the mobility of teleworkers in doing their regular activity, then a reliable mobile tool for captivating and monitoring data entry given by them would be crucial. The growth of Information Technology on mobile devices perhaps gives the answer for this need. The unification of the platform of devices into few number of it led to result of many applications can be run on more than one type of devices. The application developed for one particular platform will also automatically run on many other devices using the same platform. Therefore for this research, we will develop mobile application that gets the dataset inputted by the employee and putted on the central database to be measured. The application development for the smartphone application is perhaps the most time consuming part of this research. It takes a month to figure out which application will be used to create by trying and learning the language of programming used. After selection of the tools will be used, it takes two month to essentially code and test the application.

There are actually already numerous mobile applications for exploit mobile surveys like Opiniometer (http://opinionmeter.com), iSurvey (www.isurveysoft.com), SnapSurveys (http://www.snapsurveys.com), doForms (http://www.doforms.com) and Voxco (http://www.voxco.com). However, there is almost no evidence found yet on how these mobile applications contribute on this particular research field. There are also no literature designated the grant of using mobile smartphone application to exploit research, even though there are already many mobile applications for doing research. The application developed in this research will focus on more specific purpose and will have additional features that previous mobile surveys did not have, such as the notification to fill in the survey.

3.6.1 Smartphone

There are no vibrant descriptions of smartphone although the rudimentary idea of it is a mobile phone constructed on a mobile computing platform, which has more advanced computing capability and connectivity than a feature phone. Nowadays, smartphones are becoming more similar to a computer. Basically, it has an operating system and hardware. Each smartphone device that has a same operating system can run the same application even though it has different hardware.
If we look into the survey of market share of the smartphone platform in United States according to ComScore (2012), it can be noticeably seen that the growth of smartphone is moderately significant, with iPhone and Android operating system as the two of the biggest players on the market with very big market share. Therefore, in this research we will develop an application for those two biggest market shares of smartphone.

Of course bigger market shares mean that most people are using that operating system/platform. Moreover, it also means that both of them have a very strong relationship with many big application developers, which would make it easier to link the platform, and also that there are many tutorial and online help available. However, Android and iPhone has different tools that can be used for development. Android development, for instance, can be done in Microsoft Windows and Mac environment using free software named Eclipse. However for iPhone development is using tools named Xcode, which can only be run in the Apple environment. Further description and explanation of those tools will be described in the next segment.

### 3.6.2 Development Method

The basic concept of the application and for centralizing the database used in this research is by using a web-app, which is basically an application made for smartphones that communicate with the website providing the content without having to put in the link/url address in the browser. Thus, instead of using a browser to open it, a web-app does not only serve as the website but also gives other option and security for the user and data transfer. We will also include the notification for daily report just in case the participants forget to fill in the survey.
3.6.3 Google Drive

Google Drive is a cloud data storage owned by Google. It made it possible for the data to become available in the cloud, and also for everyone in the world to create their own free website and online forms which will both be used in this research. The website will be used to give information and the general idea of the survey. It also contains the link for downloading the mobile application.
Figure 3.2: A screenshot of the website for this survey, created using Google Drive

The next important thing about Google Drive is that users can create a form, which can be used as a survey tool because the inputted data on the form will be automatically put inside a spreadsheet inside Google Drive. By manipulating this form, getting the source code and modifying it into a compact and mobile friendly page, it can be bought to PhoneGap application (which will be explained on the section below) and create a code which can be used in many different smartphone devices.

3.6.2 PhoneGap

PhoneGap plays the second important role in this app development process, as it plays the fundamental function to constructing the core function of the application. The core can then be distributed into many other platforms consistently. PhoneGap is an open source framework for quickly building cross-platform mobile apps using HTML5, JavaScript and CSS (http://phonegap.com/about). By using this tool, the research questionnaire can be developed into a single and consistent HTML, CSS and JavaScript format. This consistent format then will be taken and distributed into specific smartphone platforms using the related tools for developing the mobile application on the specific platform.
Of course, putting our core source format on every smartphone platform is not as easy as copying and pasting a code. The knowledge and algorithm language on each platform still has to be mastered, and this made the mobile application developing process lasting almost three month just for testing and learning the programming language. In the section below, you can see three different mobile platforms that will be used in this research. Eclipse is used to develop the Android version, Xcode for iOS (iPhone) and Microsoft Visual Studio for the Windows Phone version.

3.6.3 Eclipse

Eclipse is a multi-language software development environment covering an Integrated Development Environment (IDE) and an extensible plug-in system. Not only can it handle many programming languages including Ada, C, C++, COBOL, Haskell, Perl, PHP, Python, R, Ruby (including Ruby on Rails framework), Scala, Clojure, Groovy and Scheme, it can also be used to develop packages for the software Mathematica. Development environments include the Eclipse Java development tools (JDT) for Java, Eclipse CDT for C/C++, and Eclipse PDT for PHP, among others but mostly it was used for programming using Java. (http://www.eclipse.org/org/, 30-07-2012).

Eclipse can handle many languages, and it can also be run on almost every platform of computer. It can run on Windows, Mac and Linux, and it makes it easy to develop an app together in a team with platform diversity. In developing an Android app, Eclipse needs an Android SDK plugin in order to create a project and compile it into an application. The main languages used for developing are XML and Java. After the plugin addition has been installed, Eclipse can compile and distribute the app on the simulator or any Android devices connected to the computer.
3.6.4 Xcode

Similar with Eclipse, Xcode is also an Integrated Development Environment (IDE) containing a suite of software development tools. However, instead of making it open, Apple develops it for developing software specifically for OS X and iOS (Mac, iPhone and iPad) only. Apple Mac environment is the only platform that can use this application, while Windows and Linux computer cannot. The current version of Xcode is 4.3.3 can be obtained for free for the Mac Lion Operating System users. (https://developer.apple.com/xcode/, 30-01-2012)

In term of programing languages, Xcode supports C, C++, Objective-C, Objective-C++, Java, AppleScript, Python and Ruby source code with a variety of programming models, including but not limited to Cocoa, Carbon, and Java. Third parties have added support for GNU Pascal, Free Pascal, Ada, C#, Perl, and D. For iPhone development, Xcode is already packed with the iPhone and iPad simulator so that the code can be tried without installing additional plugin. The experience of using the Xcode is also rather stable and faster than Eclipse. This is perhaps because Xcode is specially designed for creating application on Apple environment, instead of being open like Eclipse.
Microsoft Visual Studio

For developing the Windows Phone application, we use Microsoft Visual Studio as a tool to implement it. It runs really fast, and the phone simulator inside it represents the actual Windows phone performance. Luckily, the phone development can be downloaded and used for free. Programing the Windows Phone application can be done by using C# language Algorithm. C# is a well-known programming language used by many big companies to develop Microsoft Windows Desktop and Laptop application. Therefore, by using C# for its Windows Phone platform, Microsoft has big advantages on it.

Similar with Eclipse and Xcode, the core application developed in PhoneGap is put inside the code and some adjustments are done so that it can run on the simulator, communicating with the server and send the inputted form into a spreadsheet on Google Drive.
Figure 3.4: Screenshot of Windows Phone Development using Microsoft Visual Studio

3.6.6 Layout and Application design

The general design and layout of the smartphone application is quite simple, this simplicity is prioritized in order to give the respondent direct access to the questionnaire content, filling in the survey, hit the submit button and done. When the application runs for the first time and the user is doing activity using the screen, the application will silently put a schedule for a notification each day at 21.00 PM on the system. This function is used to remind the respondent to fill the survey every day, just in case they forget. When the application icon clicked, the splash screen will show for few moments, and then the main form of the survey will show up.
Figure 3.5: From left to right: Application Icon, main form input and the notification alarm

The main form is designed to fit in any size of mobile phone screen. It can extend and shrink according to the size of the device. Furthermore, JavaScript improve the background interaction to the server to reply whether the user has filled in all correct data to shows error if the condition did not meet. You can see the figure 3.5 above, the notification on the notification bar which provides enough information will pop up after the time alarm is activated.

3.7 Construct validity and reliability

The final part of this research methodology consists of testing the validity and reliability of the constructs that are used in this thesis. This is because the data that will be analyzed in the next chapter needs to be confirmed as valid and reliable. The reliability of the constructs below will be investigated by determining the internal consistency of construct items by means of Cronbach’s coefficient alpha. This will determine if items correlate and actually measure the various underlying constructs.
3.8 Reliability of Construct

The internal consistency of the questionnaire was determined by examining Cronbach’s coefficient alpha. Please refer to appendix D for an overview. According to some authors, Cronbach’s coefficient alpha needs to be at least 0.6 for a construct to be considered as reliable (Hair et al., 2006), though most often a minimum value of 0.7 is considered more appropriate – especially for confirmatory research (Nunally and Bernstein, 1994). If this criterion is not met, alpha of item deleted values may indicate if the removal of certain items could improve the alpha value.

For this study, we came out with an average of 0.75 that means the overall data is appropriate. Each of the item has Cronbach’s alpha around 0.715 – 0.780. The initial founding of the Cronbach’s is actually already acceptable with the average coefficient alpha already above 6. But in order to make the research more valid, adjustments can be done by dropping some items which may improve the Cronbach’s alpha score into desirable value. However, this activity of dropping the items is allowed and can manage to still strongly reflect on core essence of this research and achieve even more reliable results. You can refer to the data by looking into appendix D.
4. Data Analysis

This chapter consists of three parts. First, univariate data analysis will be used to report the individual outcomes of the variables in this research. Next, to confirm that the chosen method of regression analysis is suitable, the assumptions of multiple regression analysis are tested for violations. Finally, the actual data analysis takes place: multi-level analysis tested and interpreted to test the hypotheses as established in chapter two.

4.1 Univariate data analysis

All individual variables in research, with the sole exception of the demographic (dummy) variable gender, have been examined to reward a preliminary understanding of how the sample is distributed. This understanding can help assess the suitability of the analysis and may help to clarify later findings. To this end, several descriptive statistics, such as the mathematical mean and standard deviation, as well as minimum and maximum values and correlation are reviewed. An overview of these values is presented in the Appendix. Additionally, individual item frequencies for each variable are reviewed as well, as they provide more fine-grained results (as compared to the mathematical mean): the resulting charts are available in appendix A and E. This section will merely provide a quick point-by-point overview of the most relevant findings:

- The average frequency of telework is 2.49 hours per days.
- 36% of the respondents spent less than 10 hours a week working at home, this percentage of respondent then categorized as a casual worker while others are mobile worker.
- Respondents have fairly positive attitude towards telework (scoring average 3.91 from 5 Likert scale), indicating that they view telework as both useful and compatible with most aspects of their job, considering job function and tasks.
- The work/life balance of the respondents is good or bad? (Scoring 3.51 on average), meaning that most respondents feel that they can adequately find and maintain this balance.
- The productivity of the respondents is high (scoring 3.78 on average), which is an indicator that respondents consider themselves to be producers of quality output, as well as highly productive and efficient.
• The Teamwork of the respondents is good but not so high (scoring 2.81 on average), meaning that more than a half of respondents feel that they can adequately find and maintain the teamwork.

4.2 Descriptive Statistic

Before continuing to further analysis, the finding of descriptive statistics should be discussed first. In table 4.1 below, we can see the means, standard deviation and correlation among the study variables. There are several variables that show significant correlation. For example: attitude towards telework with gender (-.329), attitude towards telework with marital status (.273), teleworking frequency with the type of telework (.750), work/life balance with productivity (.551) and teamwork to productivity (-.331). Further relationship measurement using multilevel analysis will be conducted in the next part.
<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>1.3396</td>
<td>.47811</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Marital Status</td>
<td>1.1509</td>
<td>.36142</td>
<td>-.191</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Children</td>
<td>.2453</td>
<td>.67669</td>
<td>-.144</td>
<td>.868**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Telework Type</td>
<td>1.6415</td>
<td>.48415</td>
<td>.038</td>
<td>-.124</td>
<td>-.079</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Org. Commitment</td>
<td>3.9623</td>
<td>.81032</td>
<td>.034</td>
<td>.158</td>
<td>.200</td>
<td>-.104</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Job insecurity</td>
<td>3.8434</td>
<td>.82707</td>
<td>-.091</td>
<td>.048</td>
<td>.091</td>
<td>.121</td>
<td>.578**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Supervisory support</td>
<td>3.6377</td>
<td>.87733</td>
<td>.001</td>
<td>-.079</td>
<td>.020</td>
<td>-.049</td>
<td>.544**</td>
<td>.593**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Work Colleagues support</td>
<td>3.7623</td>
<td>.72330</td>
<td>-.040</td>
<td>-.118</td>
<td>-.036</td>
<td>-.050</td>
<td>.255</td>
<td>.347*</td>
<td>.571**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Attitude Towards Telework</td>
<td>3.9094</td>
<td>.63814</td>
<td>-.329*</td>
<td>.273*</td>
<td>.195</td>
<td>.089</td>
<td>-.077</td>
<td>.088</td>
<td>.263</td>
<td>.258</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Telework Frequency</td>
<td>2.4906</td>
<td>1.45235</td>
<td>-.012</td>
<td>-.092</td>
<td>-.047</td>
<td>.750**</td>
<td>-.178</td>
<td>.187</td>
<td>.046</td>
<td>-.006</td>
<td>.228</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Work Life Balance</td>
<td>3.5094</td>
<td>.68760</td>
<td>-.123</td>
<td>.229</td>
<td>.251</td>
<td>.141</td>
<td>.419**</td>
<td>.429**</td>
<td>.426**</td>
<td>.629**</td>
<td>.254</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Teamwork</td>
<td>2.8066</td>
<td>.79324</td>
<td>.118</td>
<td>-.134</td>
<td>-.132</td>
<td>.009</td>
<td>-.223</td>
<td>.021</td>
<td>-.066</td>
<td>.025</td>
<td>-.152</td>
<td>.089</td>
<td>-.367**</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>Productivity</td>
<td>3.7802</td>
<td>.65582</td>
<td>-.110</td>
<td>.118</td>
<td>.156</td>
<td>.168</td>
<td>.635**</td>
<td>.586**</td>
<td>.640**</td>
<td>.414**</td>
<td>.367**</td>
<td>.110</td>
<td>.551**</td>
<td>-.331*</td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

N = 53 Participant
4.3 Hypothesis testing: Multi-level analysis

Because this research will use a daily survey measurement, the repeated measured data can be viewed as multi-level data. With repeated measurements nested within individuals, this made our testing into a two-level model with the repeated measures (days) at the first level (n=530 data input) and the individual persons at the second-level (n=53 participants). Multi-level analysis will be conducted using the MLwiN program (Rashbash, Browne, Healy, Cameron, & Charlton, 2000).

Multi-Level Analysis

The basic principal of multi-level analysis is the critical point to the statistical model and it should be recognized as a hierarchical structure where one is present (Rasbah et al., 2009). This model of analysis is very crucial in this research, which perhaps will achieve a better result if the ordinary regression analysis is used. The first thing we noticed in this type of research is that the data is obtained daily during the survey and each participant fills the survey for a total of 10 times. This means that each participant on the survey will have 10 daily data. If we draw this into a hierarchical point of view, then it will be look like this figure below:

![Hierarchical structure of the data](image)

**Figure 4.1: Hierarchical structure of the data**

We can see in figure 4.1 above that there are actually two levels of data in this situation. The first level or level1 is the diary data stored everyday from day 1 to 10, while on the level 2 is the Individual/participant in the survey in this case is 1 to 53 (total participant). By using the ordinary regression analysis method, we will come out with the overall data stored everyday which will be 53X10 = 530 dataset and ignoring every unique individual level of data in the sample. By using the multi-level analysis, we can be aware of the hierarchical structure and perhaps will also result in better insight of the relationship between items measured in this research. Furthermore, by focusing attention at the level of hierarchy in the population, this multilevel modeling will enable us to understand where and how the effects are occurring. It also provides better estimates in answers to the simple questions for which single level analyses were once used and in addition allows more complex questions to be addressed.
Below, we will test our hypothesis by using this multilevel analysis one by one. Actually, in this research we wanted to combine two models of research that were previously done into one. Then we try to enhance it using the benefits of the smartphone application to achieve daily measurement and used the multilevel analysis. Starting with the first model, we measured the variables affecting the attitude towards telework, which mainly represent the previous research by Lim (200). The second model is to analyze the effect of the telework frequency with work/life balance, productivity and teamwork. Many researchers’ uses this second model, one of them is the research done by Meulen (2010). To bridge those two models, we measure the relationship between the attitude towards telework from the first model and the telework frequency from the second model. In addition, we also measure the mediated relationship by the type of telework between them.

4.3.1 Attitude towards teleworking

In the first model of this research, we measure the independent variables that probably have a relationship with the Attitudes towards teleworking using multilevel modeling. In the model summary below, we can see the current formula used to measure the multilevel multiple regression done using MLwiN application. We can see all the variables that are mentioned in hypothesis H1a to H1g. Note that this formula is represents the whole first model about attitude towards teleworking that was explained in the previous part. To read this formula, for example, the \(0.035(0.040)\) Job Insecurity means that the job insecurity variable has a positive relationship with the attitude towards telework with \(\beta = 0.035\) and Significance level of 0.040. The rest of the analysis is based on this style. \(\beta_{0ij}\) is the Intercept while \(u_{0j}\) is the individual level variance component of job insecurity (0.294) and \(e_{0ij}\) is the daily level variance component of job insecurity (0.167).
Table 4.2: Multilevel result of variables relationship on attitude towards telework

<table>
<thead>
<tr>
<th></th>
<th>$\beta$</th>
<th>Std. e.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.528</td>
<td>0.611</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.412</td>
<td>0.165</td>
</tr>
<tr>
<td>Marital Status</td>
<td>0.641</td>
<td>0.437</td>
</tr>
<tr>
<td>Children’s</td>
<td>-0.147</td>
<td>0.231</td>
</tr>
<tr>
<td>Org. Commitment</td>
<td>-0.035</td>
<td>0.043</td>
</tr>
<tr>
<td>Job Insecurity</td>
<td>0.035</td>
<td>0.040</td>
</tr>
<tr>
<td>Supervisory Support</td>
<td>-0.015</td>
<td>0.041</td>
</tr>
<tr>
<td>Work Colleague Support</td>
<td>0.076</td>
<td>0.039</td>
</tr>
<tr>
<td>Variance level 1 (employee)</td>
<td>0.294(0.060)</td>
<td></td>
</tr>
<tr>
<td>Variance level 2 (day)</td>
<td>0.167(0.011)</td>
<td></td>
</tr>
<tr>
<td>-2 Log likelihood</td>
<td>710.092</td>
<td></td>
</tr>
</tbody>
</table>

In this case, we can see that gender, marital status, number of children, organizational commitment and supervisory support do not have a significant relationship with the attitudes, therefore the hypotheses H1a, H1b, H1c, H1e and H1f are rejected. This is because we use the 90% level of confidence and those variables show significant numbers that are more than 0.100. Organizational commitment and supervisory support are also rejected because even though it shows a significant number, the $\beta$ value is minus, which is the opposite of our hypothesis. This elimination of hypotheses leaves only the job insecurity variable (which actually measuring the job security), and work colleague support which both have a good significance level and correct sign of $\beta$. Therefore in the end, only hypothesis H1d and H1g are accepted. You can see the complete formula below.
4.3.2 Frequency of telework

In this section, we will measure the correlation of attitude toward telework on its impact in the frequency of telework. As described on section 4.3 above, this analysis is the “bridge” between the first and second model proposed in this research. In the equation below we can see that the attitude towards telework did not have enough significance level to prove the positive relationship between them. It is presented by the level of significance on the individual level score of 0.188. This is quite smaller than our confidence level (90%).

\[
\text{Telework Frequency}_y = \beta_{0y} \text{Constant} + 0.417(0.118)\text{attitude towards telework}_y + u_{0y} + e_{0y}
\]

\[
\begin{align*}
[u_{0y}] & \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 1.835(0.381) \end{bmatrix} \\
[e_{0y}] & \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 1.314(0.085) \end{bmatrix}
\end{align*}
\]

\[-2*\text{loglikelihood(IGLS Deviance)} = 1792.324\text{(530 of 530 cases in use)}\]

| Table 4.3: Multilevel relationship result of attitude towards telework on telework frequency |
|---------------------------------|-------|-------|
|                                | \(\beta\) | Std. er. |
| Intercept                      | 0.862  | 0.501  |
| Attitude towards telework      | 0.417  | 0.118  |
| Variance level 1 (employee)    | 1.835  | 0.381  |
| Variance level 2 (day)         | 1.314  | 0.085  |
| -2 Log likelihood              | 1792.324 |

\(\beta\) level sign is positive, which can be an indicator that it still shows accordance with the hypothesis “positive attitude towards telework will give higher teleworking frequency”. Therefore we will dig in deeper into further analysis to explore whether there is an explanation as to why the relationship between them is not quite significant. We hope that after this further analysis, we will gain sufficient insight of the beneficial of using the multilevel analysis as well.

The first thing we explore is the plotted data between dependent variable vs. explanatory variable. On the figure 4.1 below, we can see that the data is spread across x and
This first figure is measured using all available dataset (N=530), ignoring that there is uniqueness between day and individual level. In the graph, we can see that most of the samples have a high level of attitude towards telework. There is a chance that the higher the attitude, the higher the teleworking frequency. However, it is difficult to make sure that group of those data have a positive correlation. This is because the number of hours spent on teleworking varies, and perhaps it also depends on company regulations, even though the attitude towards telework is high. Moreover, the shape of the overall data is shaped like a triangle and less like linear line we expected.

**Figure 4.2: Plot response of teleworking frequency vs. attitude towards telework**

The next step is to measure the graph of our actual average data from all individual samples. The outcome of this method is shown in the Figure 4.3 below. In this graph, we already put the unique individual data into account. Each individual data is averaged and then compare to other individual. It can be clearly seen that the higher the attitude towards teleworking, the higher frequency of teleworking is. The graph shows that there is a positive relationship between attitude towards teleworking and the frequency of teleworking. However, even though this graph provides evidence to hypothesis H2, this hypothesis is still rejected because of lack of high significance level.
**Figure 4.3:** The positive relationship on attitude towards telework and the telework frequency using multilevel measurement.

Furthermore, multilevel analysis will give more insight on our result. When compared with regular statistical regression, this model of analysis takes into account the uniqueness between each individual level of our data. All is done by taking a step further of breaking the graph on figure 4.3 into smaller pieces according to the individual level, depending on their unique id. The result can be seen in the figure 4.4 below. We can see many lines representing the uniqueness of every individual. This graph represents the number of the sample we use, so in total there were 53 lines on it. Even though there are many variations on the lines, if we look into the average or most of the graph, it can be seen that most of the data has a high teleworking frequency when the attitude level is increase. However, some individual with lower attitudes when they spend more time doing teleworking made the results less significant. The lower level of individual sample (N=53) might become one influence to this result.
4.3.3 Work/Life balance

Table 4.4: Multilevel relationship result of telework frequency on work/life balance

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>Std. er.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.448</td>
<td>0.098</td>
</tr>
<tr>
<td>Telework frequency</td>
<td>0.025</td>
<td>0.014</td>
</tr>
<tr>
<td>Variance level 1 (employee)</td>
<td>0.441</td>
<td>0.088</td>
</tr>
<tr>
<td>Variance level 2 (day)</td>
<td>0.123</td>
<td>0.008</td>
</tr>
<tr>
<td>-2 Log likelihood</td>
<td>585.537</td>
<td></td>
</tr>
</tbody>
</table>

In this part, we will measure the relationship between telework frequencies and the work life balance. In our hypothesis, we wanted to have positive work life balance when the frequency of telework increases. In the equation below, we found out that the two variables are positively related. It can be seen from the high level of significance (0.014) and positive $\beta$ value of 0.025. Therefore hypothesis H3 is accepted.

Figure 4.4: The positive relationship on attitude towards telework and the telework frequency on individual data using multilevel measurement.
Teamwork

Doing teleworking is like moving away from the physical office, and it means less physical meeting with the colleague or team. Without the benefit of Information Technology for communicating, the teamwork of the employee may find it as a difficulty. Many other researches said that telework might suffer the teamwork quality. However, we are pretty sure that when the employee has found the way of managing the teamwork using the Information Technology, they will find that their teamwork might still be in a good condition.

Table 4.5: Multilevel relationship result of telework frequency on teamwork

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>Std. er.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>2.797</td>
<td>0.115</td>
</tr>
<tr>
<td>Telework frequency</td>
<td>0.004</td>
<td>0.016</td>
</tr>
<tr>
<td></td>
<td>0.559</td>
<td>0.119</td>
</tr>
<tr>
<td>Variance level 2 (day)</td>
<td>0.173</td>
<td>0.011</td>
</tr>
<tr>
<td>-2 Log likelihood</td>
<td>764.795</td>
<td></td>
</tr>
</tbody>
</table>

In our findings, the beta level appears to be +0.004 and the significance level 0.016. However, because the question in the questionnaire is a negative question, the β value then will be negative. This means that our hypothesis, which predicted a positive β in hypothesis H4, is rejected. The data shows that teleworking frequency has a negative relationship with teamwork.
Productivity seems to be one variable that could be used to measure the quality of tasks or jobs. In this part, we will measure the level of productivity that a teleworker has and then analyze whether there is a positive relationship between them. Can teleworking improve the productivity of the employee, or does it have a negative impact to the productivity, because one or more other factors? In this part, the measurement is based on the employee level measurement of productivity instead of the organization in which they are working. By using employee level measurement, the employee can judge whether they are quite productive or not in the corresponding day.

| Table 4.6: Multilevel relationship result of telework frequency on Productivity |
|-----------------|---------|---------|
| Intercept       | 3.674   | 0.094   |
| Telework frequency | 0.043   | 0.013   |
| Variance level 1 (employee) | 0.407   | 0.081 |
| Variance level 2 (day) | 0.105   | 0.007 |
| -2 Log likelihood | 504.757 |

In the hypothesis, we are predicting that the telework frequency has a positive relationship with the productivity. This Hypothesis H5 is accepted because the high level of significance shown on the equation below (scoring 0.013) and has a relevant β value of positive 0.043.
The second element we measured is the effect of great work balance with productivity of the employee. In the hypothesis we propose the prediction that the work/life balance has a positive relationship with productivity. Employees who can manage their work and able to separate the work and house environment because of the high level of work/life balance will most likely have a higher productivity as well.

Table 4.7: Multilevel relationship result of work/life balance on productivity

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>Std. er.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.327</td>
<td>0.164</td>
</tr>
<tr>
<td>Work/life balance</td>
<td>0.129</td>
<td>0.040</td>
</tr>
<tr>
<td>Variance level 1 (employee)</td>
<td>0.356</td>
<td>0.071</td>
</tr>
<tr>
<td>Variance level 2 (day)</td>
<td>0.107</td>
<td>0.007</td>
</tr>
<tr>
<td>-2 Log likelihood</td>
<td>506.394</td>
<td></td>
</tr>
</tbody>
</table>

In the table above, it is clear that the work/life balance has a positive relationship with the productivity. Therefore we accept the hypothesis H8 which has a β value of + 0.129 and the significance of 0.040.
The last part of productivity is to measure its relationship with teamwork, which is to see whether or not teamwork will affect the productivity of the employee. Our first hypothesis states that teamwork has a positive relationship with the productivity. This hypothesis H9 is accepted with the $\beta$ scoring -0.039 and with the significance of 0.034.

<table>
<thead>
<tr>
<th>Table 4.7: Multilevel relationship result of teamwork on productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>Teamwork</td>
</tr>
<tr>
<td>Variance level 1 (employee)</td>
</tr>
<tr>
<td>Variance level 2 (day)</td>
</tr>
<tr>
<td>-2 Log likelihood</td>
</tr>
</tbody>
</table>

- $-2 \log \text{likelihood (IGLS Deviance)} = 506.394$ (530 of 530 cases in use)
4.3.6 Teleworking type

The last part of analysis is to measure the role of teleworking type on attitude towards telework and the teleworking frequency. If we look into our conceptual model presented in the Figure 2.6 on chapter 2, we can see that type of teleworker becomes the mediator for both of it. Therefore, in this part we will measure the mediated effect of teleworking type. We will use the mediation measurement based on Judd and Kenny’s (1981) indirect effect.

The sign of mediation can be determined by computing the difference between two regression coefficients. To do this, two regressions are required. Below is the first regression can be observed that there is actually no significant relationship among them.

\[
\begin{align*}
\text{TeleworkFrequency}_y & \sim N(\mu, \Omega) \\
\text{TeleworkFrequency}_y & = \beta_{0y} \text{Constant} + 0.427(0.111) \text{attitude towards telework}_y + 2.071(0.299) \text{Type of Telework}_y \\
\beta_{0y} & = -0.587(0.498) + u_{0y} + e_{0y}
\end{align*}
\]

\[
\begin{bmatrix}
u_{0y}
\end{bmatrix} \sim N(0, \Omega_u) \quad \Omega_u = \begin{bmatrix}
0.900(0.200)
\end{bmatrix}
\]

\[
\begin{bmatrix}
e_{0y}
\end{bmatrix} \sim N(0, \Omega_e) \quad \Omega_e = \begin{bmatrix}
1.314(0.085)
\end{bmatrix}
\]

\[ -2^*\text{loglikelihoood} (IGLS Deviance) = 1758.142(530 \text{ of 530 cases in use}) \]

The second regression is shown, no significant relationship as well between both variables. The \( \beta_{\text{indirect}} = \beta - \beta_1 \) so the result we got is \(0.417 - 0.427 = -0.010\). Due to this negative \( \beta \) score and no significant relationship among them, further analysis is along the mediation relationship is dropped.

\[
\begin{align*}
\text{TeleworkFrequency}_y & \sim N(\mu, \Omega) \\
\text{TeleworkFrequency}_y & = \beta_{0y} \text{Constant} + 0.417(0.118) \text{attitude towards telework}_y \\
\beta_{0y} & = 0.862(0.501) + u_{0y} + e_{0y}
\end{align*}
\]

\[
\begin{bmatrix}
u_{0y}
\end{bmatrix} \sim N(0, \Omega_u) \quad \Omega_u = \begin{bmatrix}
1.835(0.381)
\end{bmatrix}
\]

\[
\begin{bmatrix}
e_{0y}
\end{bmatrix} \sim N(0, \Omega_e) \quad \Omega_e = \begin{bmatrix}
1.314(0.085)
\end{bmatrix}
\]

\[ -2^*\text{loglikelihoood} (IGLS Deviance) = 1792.324(530 \text{ of 530 cases in use}) \]

However, regardless of the mediation effect, we still found evidence that type of teleworking has a positive relationship with a positive attitude towards telework. We can see
in the equation below that the \( \beta \) score is +0.002 with the significance of 0.027. Therefore we accept hypothesis \( H6 \).

\[
\text{TypeofTelework}_i \sim N(\mathbf{X}\beta, \Omega)
\]
\[
\text{TypeofTelework}_i = \beta_0 + \mathbf{X}_i \text{Constant} + 0.002(0.027) \text{attitudetowardstelework},
\]
\[
\beta_0 = 1.671(0.109) + e_0
\]
\[
\begin{bmatrix}
  e_0 \\
  \end{bmatrix}
\sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix}
  0.218(0.013)
\end{bmatrix}
\]
\[-2*\text{loglikelihood(IQLS Deviance)} = 696.428(530 of 530 cases in use)\]

For testing hypothesis \( H7 \) that predicts that the type of teleworking may affect the frequency of telework, we measured it using the equation below. The significant result is not very high (only 0.142), even though the \( \beta \) value is positive.

\[
\text{TeleworkFrequency}_i \sim N(\mathbf{X}\beta, \Omega)
\]
\[
\text{TeleworkFrequency}_i = \beta_0 + \mathbf{X}_i \text{Constant} + 2.073(0.142) \text{TypeofTelework}_2,
\]
\[
\beta_0 = 1.082(0.117) + e_0
\]
\[
\begin{bmatrix}
  e_0 \\
  \end{bmatrix}
\sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix}
  2.340(0.144)
\end{bmatrix}
\]
\[-2*\text{loglikelihood(IQLS Deviance)} = 1954.627(530 of 530 cases in use)\]

4.4 Relationship Overview and Empirical Model

An empirical model, which represents the supported hypotheses and relationships as established in this data analysis chapter, is depicted in figure 4.1 Solid lines represent accepted hypotheses. The arrows of hypotheses that were not empirically supported are ‘grayed out’. Additionally, table 4.1 gives an overview of the empirical findings for each hypothesis. Chapter five discusses the implications of the findings in this chapter.
Figure 4.5: Empirical Model
<table>
<thead>
<tr>
<th>Hypothesis (relationship)</th>
<th>Conceptual Relationship</th>
<th>$\beta^a$</th>
<th>Significance$^a$</th>
<th>Accepted?</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1a: Gender $\rightarrow$ Attitudes</td>
<td>+/-</td>
<td>-0.412</td>
<td>0.165</td>
<td>Rejected</td>
</tr>
<tr>
<td>H1b: Marital $\rightarrow$ Attitudes</td>
<td>+/-</td>
<td>0.641</td>
<td>0.437</td>
<td>Rejected</td>
</tr>
<tr>
<td>H1c: Child $\rightarrow$ Attitudes</td>
<td>+/-</td>
<td>-0.147</td>
<td>0.231</td>
<td>Rejected</td>
</tr>
<tr>
<td>H1d: Job Insecurity $\rightarrow$ Attitudes</td>
<td>-</td>
<td>-0.035</td>
<td>0.040</td>
<td>Accepted</td>
</tr>
<tr>
<td>H1e: Org. Commitment $\rightarrow$ Attitudes</td>
<td>+</td>
<td>-0.035</td>
<td>0.043</td>
<td>Rejected</td>
</tr>
<tr>
<td>H1f: Supervisory Support $\rightarrow$ Attitudes</td>
<td>+</td>
<td>-0.015</td>
<td>0.041</td>
<td>Rejected</td>
</tr>
<tr>
<td>H1g: Colleague Support $\rightarrow$ Attitudes</td>
<td>+</td>
<td>0.076</td>
<td>0.039</td>
<td>Accepted</td>
</tr>
<tr>
<td>H2: Attitudes $\rightarrow$ Frequency</td>
<td>+</td>
<td>0.417</td>
<td>0.118</td>
<td>Rejected</td>
</tr>
<tr>
<td>H3: Frequency $\rightarrow$ Work/life Balance</td>
<td>+</td>
<td>0.025</td>
<td>0.014</td>
<td>Accepted</td>
</tr>
<tr>
<td>H4: Frequency $\rightarrow$ Teamwork</td>
<td>+</td>
<td>0.004</td>
<td>0.016</td>
<td>Rejected</td>
</tr>
<tr>
<td>H5: Frequency $\rightarrow$ Productivity</td>
<td>+</td>
<td>0.043</td>
<td>0.013</td>
<td>Accepted</td>
</tr>
<tr>
<td>H6: Attitudes $\rightarrow$ Type of Teleworking</td>
<td>+</td>
<td>0.002</td>
<td>0.027</td>
<td>Accepted</td>
</tr>
<tr>
<td>H7: Type of Teleworking $\rightarrow$ Frequency</td>
<td>+</td>
<td>2.073</td>
<td>0.142</td>
<td>Rejected</td>
</tr>
<tr>
<td>H8: Work/life Balance $\rightarrow$ Productivity</td>
<td>+</td>
<td>0.129</td>
<td>0.040</td>
<td>Accepted</td>
</tr>
<tr>
<td>H9: Teamwork $\rightarrow$ Productivity</td>
<td>-</td>
<td>-0.039</td>
<td>0.034</td>
<td>Accepted</td>
</tr>
</tbody>
</table>
5. Discussion

This chapter presents the main findings and implications of the results presented in chapter four. We will also compare our research finding with the existing theories and research as we discussed in chapter three. This chapter will also present the basis idea for the conclusion, which will be elaborated more in chapter six.

5.1 Factors influencing the attitudes toward teleworking

This first part of discussion covers our first model where we measure many variables which affect the attitude towards telework. This first main model is mainly taken from the previous research conducted by Lim & Teo (2000). In each sub section below, we discuss each group of variable used in this thesis.

5.1.1 Teleworker demographics

In the teleworker demographics, we measure gender, marital status and number of child. In our findings, gender found to be not significantly related to the attitude towards telework. This is due to lack of significance which shows only 0.165. If we look into the previous research, most of the researches propose woman will have more favor on doing teleworker. This means that it has a positive relation to the attitude toward telework. This is because women usually stays and do more housework at home than man (Belanger, 1999).

Our finding shows that the tendency of gender is more shifted to man than a woman. This can be seen on the $\beta$ level that is negative. However, if we look at our demographic data, the percentage of male sample is greater than female (66%, compared with 34%). Furthermore, it is likely that gender differences are slowly disappearing due to emancipation in Netherlands and Indonesia.

The second variable we measured is marital status. Previous research shows that married employees tend to favor teleworking more than their single counterpart (Abdul Azeez and Supian, 1996). This is largely because of time flexibility that allows their work to be fitted around their family commitments. However, in our research it is unlikely to say that marital status has a relationship with the attitudes towards telework. Even though we have a positive $\beta$, the level of significance is way out of acceptance level (only shows 0.437). The demographic data of our research perhaps will give insight about this result. Our 53 samples is mostly still single (85%)
The last variable of this part is the number of child. The presence of children in the household does not imply a positive attitude towards telework, it has negative $\beta$ and less significant value of 0.231. In the demographic mean of our sample, an insufficient amount of individual samples that already have children is one of the reasons why this hypothesis is not accepted.

5.1.2 Work Related attitudes

In work related attitudes, we measure job insecurity and organizational commitment. The job insecurity hypothesis is accepted, with the level of significance 0.040. This shows that when employee feel their job position is secure, they are more likely to have positive attitudes towards telework. This finding support the previous research that by did not being present in the office, they will be more concerned about the security of their job (e.g. Shamir and Salomon, 1985). Therefore, when employees feel that their current job position is safe, they will tend to have a positive attitude towards telework.

The second work related attitude we will measure is the organizational commitment. Surprisingly our research finding shows that the organizational commitment didn't have a positive relationship with the attitude towards teleworking. It shows a negative $\beta$ instead with a significant of 0.43. This shows opposite results compared with the hypothesis formed by Lim & Teo (2000) research which measure the individual with higher level of organizational commitment supervise to have a more favorable attitude towards teleworking. However, there is a plausible explanation for this finding: individuals with low organizational commitment would want to physically distance themselves from the workspace so therefore they will prefer to work at home. This finding is supported by previous research done by Frolick et al. (1993) who noted that if employee perceives their work atmosphere as undesirable, teleworking might then be seen as a way to escape such a working atmosphere.

5.1.3 Support factors

On the support factor, we measure the relationship on the supervisory support and work colleague support. On the supervisory support variables, we reject the hypothesis that support from supervisor/boss to do teleworking will have a positive relationship with attitudes towards telework. However, result in this research is the other way around. Less supervisory support will lead to better attitudes towards teleworking. This is also not in accordance with
the previous literature by Lim & Teo (2000), where there is no significant relationship between both of variable. A plausible explanation may be that there just few communication established between employee and their supervisor. As a result, employees would not get the message whether their supervisor is supportive on teleworking.

In the work colleague support, our research shows support on the hypothesis that higher colleague support will lead to the positive attitude towards telework. It has a positive $\beta$ level of 0.076 and significance of 0.039. This implies that when more employees inside one company do telework, other employees will tend to have a positive favor towards teleworking as well. This support previous research done by Yap and Tng (1990) that shows empirical evidence in the social support literature which suggests that support from supervisors and work colleagues (work-based support) is very important in influencing an individual’s attitude towards teleworking.

5.2 Relationship between attitudes and frequency of teleworking

The result shown and explained in the chapter 4.3.1 indicated that there is a positive correlation between attitudes towards telework to teleworking frequency. This should be referred to the theory of reasoned action (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), which notes that behaviors or outcomes are best predicted by using attitude that specifically relates to them. In this case, telework frequency behavior can be predicted using attitude towards telework. Our model fully supports the theory and proves to show a positive relationship. Because the attitudes proved to be related to the frequency of telework, then we can connect the first model of attitudes to the next model described below, forming our conceptual model depicted on the figure 2.6.

5.3 The effect of teleworking frequency

Our research second model goal was to assess the effects of telework on the individual level, by examining the effect of frequency of telework on productivity, work/life balance and teamwork. This part is the core achievement and beneficial of this research. By using the daily survey using mobile smartphone application developed in this research, we can achieve to get the daily data of the frequency of hour the employee spend and can measure its uniqueness by using the multilevel analysis done on chapter 4.
5.3.1 Productivity

If we look at the previous research conducted by Staples et al. (1999), Callentine (1995), Marchetta (1991) and Catsouphes & Marchetta (1991), they all indicate that the teleworking or virtual office will lead to the high productivity. In this research we measure the high level of virtual office working to the teleworking frequency. Thus, the higher the frequency, the higher the productivity will be. Our research finding shows exactly what we expected. Telework frequency has a positive relationship with productivity.

Not only related to the telework frequency, this productivity is also proven to have a positive relationship with other two variables: work/live balance and teamwork. It implies that the higher the work/live balance or teamwork, the higher the productivity will be.

5.3.2 Work/life Balance

The work/life balance is as important as productivity. When employees are doing their job outside the office, it may affect their ordinary/family life. If they cannot manage the balance well then the imbalance with work and life will occur and may affect other aspects as well. In this research, we found that the higher number of teleworking leads to the higher level of work/life balance. This multilevel analysis model shows a significant positive relationship between two variables. This analysis is very good in taking into account the hierarchical structure of data we use in this research. The result we have found contradicts the research done by Hartman, Stoner, and Arora (1991), which found a negative relationship between family relationship and satisfaction with telework. However, a plausible explanation that can answer this is that by working outside of office, the employees can learn to manage their own lives, they can allocate extra time for their family by doing the job early and frequently on the particular time. This flexibility of choosing the number of hour doing teleworking will be useful for the employee.

5.3.3 Teamwork

Our hypothesis predicts that increasing frequency of telework will lead to greater teamwork. However, the result shows exactly the opposite: increasing number of telework frequency has a negative impact on teamwork. Meaning the higher number of telework, the lesser the quality of teamwork among employee do the teleworking. The explanation for this result is perhaps because of the distance and the decreasing amount of face-to-face communication or meeting, which could lower the quality of teamwork.
5.4 Type of telework

The type of telework used in this research is casual teleworkers who work less than 10 hours and mobile worker who work more than 10 hour per week. This type of teleworker measured by the total time they spend doing teleworking every week. In this research we wanted to know the relationship of this type of telework with the attitude and telework frequency. There is a positive relationship between the attitudes towards telework to the type of telework. The higher the attitude will lead to the higher level of type of telework (more hour spend on teleworking). However, the mediated effect is rejected due to insignificant value of the relationship between the teleworking frequencies with type of telework. The explanation about this result is perhaps because of the frequency of telework is not at a stable state but rather varied from one person to another. For example, the casual worker can work 9 hours once at a time where the mobile worker spends only 3 hours but consistently every day.
6. Conclusion

In this chapter will describe our conclusion after finish discussing the research. Firstly, we will recall our problem statement. We have three problem statements and below are the explanation of our finding regarding each question.

“How can we use more frequent data collection to analyze the variables which can affect the attitude towards teleworking?”

After conducting this research, we are able to respond to this question by developing mobile smartphone application. This smartphone application not only give flexibility for the employee to fill in, but also the possibility to absorb in depth understanding about the relationship among variables measured in this research. Furthermore, this smartphone application can be installed on 3 main smartphone platforms: Android, iPhone and Windows mobile. Therefore, variables that can affect the attitude towards teleworking can be measured and our result shows that job security and work colleague support have a positive relationship to the attitude towards teleworking.

“Do positive attitudes towards teleworking will have a positive relationship on teleworking frequency?”

This question is discussed on section 4.3.2 where there is not enough positive relationship among them. Therefore, this question is answered by no positive relationship among attitudes towards teleworking with the teleworking frequency. If we recall to figure 4.4, we can see that the few number of samples may perhaps leads to this less significance result.

“What are the effects of telework frequency on productivity, teamwork and work/life balance?”

After discussing this in chapter 5, we came with the conclusion that the result shows a positive relationship among frequency on telework and productivity and work/life balance. However, it also shows that teamwork is suffered as the impact of teleworking. The higher
the teleworking frequency, the less effective the teamwork will be. This is perhaps because the IT technology to do telework could not quite mediate the communication among the team. Please note that our data is heterogenic, this can be inferred that not all the sample has the same treatment or IT technology used when they are doing teleworking. Perhaps some samples might still prefer discussion or face-to-face meeting when discuss something in the team.

6.1 Contribution to theory and management practice

The contribution to the theory is successfully achieved. First, it contributes to the relatively little research to date has empirically investigated 1) telework in its present state, where teleworking frequency as a continuous variable plays an important role (Golden and Veiga, 2005; Raghuram et al., 2003; Hartman et al., 1991), 2) the factors that influence the attitude towards teleworking (Vivien, 2000), 3) the productivity of teleworkers (Neufeld and Fang, 2005; Kemerling, 2002) All these gaps in the scientific literature will be addressed in this thesis. This adds theoretical relevance to the thesis.

Second, work/life balance, productivity and teamwork are among the main reasons for both companies and individuals alike to establish, and participate in, telework initiatives (Hill, Miller and Weiner 1998; Meulen 2010; Madsen, 2003; Harpaz, 2002; Khaifa and Davidson, 2000; Baruch, 2000; Kurland and Bailey, 1999; Gallie and Zhou, 2010). Knowledge about the effects of teleworking frequency on these three variables will help companies to not only assess the usefulness of (possible) telework programs, but also facilitate in the creation of efficient telework programs. It will also provide companies with the valuable factors that can be within or even beyond their range of control. It will also help companies to manage and regulate how their employees do their telework activity and the optimal frequency as well.

On top of that, this research gives the previous researches more in-depth result of the analysis because this research use the multilevel analysis which can give the benefit of using dairy or even more frequent data measurement. Instead using a general idea of the variables using a single questionnaire, this research successfully takes into account the uniqueness of an employee’s daily aspects that can vary every day. The mobile application made for this research help to achieve that uniqueness of data and therefore also give a contribution to the Erasmus New Worlds of Work research team as one of the tools they could use in the future.
6.2 Limitation

Naturally, this thesis also has its limitation. In this part, we will describe the few limitation attached to this research. Firstly, because the sample of this research is rather heterogenic, each employee has different regulation on his or her office. This perhaps leads to variation of the results. On one hand, it is good to have a heterogenic sample in the research. However, without massive samples contributing to research, it is difficult to get the desired results. In this case, the number of the sample that is 53 is already enough to get the result but it can be more enhanced using more data sample.

The application development is the phase that took the most time to finish. Therefore, smartphone application developed on this research only serve the main core function of this research, leaving only a simple and straightforward application. The next limitation, which is also correlated to the application development, is the process of distributing the application. Android, iPhone and Windows Phone needs subscription and developer account that need to be created and financed annually to put the application on their application market. Fortunately, installing third party application on Android is still possible. With the help of friends who are one of iPhone developer, the iPhone application can be distributed. The Windows Phone can be installed on developer lock devise. Therefore in distributing the application, there no financial funds were needed.

Lastly, the journals used on this research for measuring the factors that can influence the attitude towards telework are mostly already 12 years old. We are unable to find the newest literature on that specific subject. However, the material in the articles are all still valid and reliable to measure and analysis the result.

6.3 Recommendation for future research

After conducting this result, we have some recommendation which can be taken into account when conducting future research on teleworking or an analysis using multilevel modeling method. Firstly, it would be better for the future research to conduct a mass survey in which can get a great amount of the sample which results in more reliable results. The next recommendation would be to use the mobile application for enhance the data input and get the data of sample without they know it. For example, track the mobile devices based on their location using GPS services and time spent so that we can get the average time the sample went to a particular places Therefore, the support for analyzing the data is also crucial. Even though multilevel modeling is already invented and used by many researchers, the application
for measuring it is still limited. In this research we use the MLWin application to do multilevel modeling, which is already quite old. We hope that in the future there are some other applications or integration of this model into data analysis application like SPSS or EXCEL, which would simplify the research process and provide more detailed results.
Bibliography


68


Jeffrey, H, P…… (1998) Influences Of The Virtual Office On Aspects Of Work And Work/Life Balance. IBM Global Employee Research,


Salancik, G.R. (1977), ‘Commitment and the control of organizational behavior and belief", in Staw, B.M. and Salancik, G.R. (Eds), New Directions in Organizational Behavior, St Claire Press, Chicago, IL, pp. 1-54.


Appendix

Appendix A: Demographic overview of survey sample

Table A.1: Demographic overview of survey sample (n=53)

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>Sample Composition</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Minimum/Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>35</td>
<td>66%</td>
<td>1-2</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>18</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>18-30</td>
<td>40</td>
<td>76%</td>
<td>19-38</td>
</tr>
<tr>
<td></td>
<td>30-40</td>
<td>13</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td>Single</td>
<td>45</td>
<td>85%</td>
<td>1-2</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>8</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Number of Childs</td>
<td></td>
<td></td>
<td></td>
<td>0-3</td>
</tr>
<tr>
<td>Nationality</td>
<td>Indonesia</td>
<td>44</td>
<td>83%</td>
<td>1-2</td>
</tr>
<tr>
<td></td>
<td>Netherlands</td>
<td>9</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Mobile Platform Used</td>
<td>Android</td>
<td>36</td>
<td>68%</td>
<td>1-3</td>
</tr>
<tr>
<td></td>
<td>iPhone</td>
<td>17</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows Phone</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Appendix B: Survey Invitation

Form B.1: Survey Invitation in English

Demi menyelesaikan program Dual degree MBA di Magister Management Universitas Gadjah Mada Indonesia. Saya harus menyelesaikan master thesis saya di Rotterdam School of Management, Erasmus University Belanda dengan melakukan riset survey mengenai teleworking. Oleh karena itu saya memohon partisipasi anda untuk mengikuti survey ini. Karena saya bergabung dengan tim research di Erasmus yaitu Erasmus@work, saya juga telah membuat aplikasi untuk smartphone dan website untuk mempermudah dalam pengisian kuisioner master thesis saya.

Mengikuti survey ini adalah voluntery namun saya sangat menghargai bantuan dan kemauan anda untuk mengisi survey ini demi kelulusan studi saya di Belanda. berikut ini adalah detail cara melakukan survey master thesis saya mengenai teleworking:
1. Silahkan kunjungi website untuk survey saya ini https://sites.google.com/site/erimtelework/

2. Masuklah ke halaman sign up dengan mengklik tab "Sign up" di web. isi dan submitt form sign up cukup satu kali.

3. Anda dapat mengisi kuisioner melalui smartphone anda dengan masuk ke halaman download pada website.

4. Waktu pengisian survey adalah kurang lebih 3-5 menit saja dan data yang di perlukan adalah 10x pengisian dalam kurun waktu dua minggu. Jadi data yang di perlukan untuk melengkapi survey ini adalah 5 kali dalam seminggunya.

5. Deadline pengisian adalah pada tanggal 11 Agustus 2012

Demikian surat invitation ini saya buat, partisipasi anda akan memberikan sumbangsih besar kepada bangsa Indonesia dan Belanda.

Rotterdam, 22 July 2012

Brima Aribowo
New Worlds of Work Research Team
RSM Erasmus University

Form B.2: Survey Invitation in Indonesian

Demi menyelesaikan program Dual degree MBA di Magister Management Universitas Gadjah Mada Indonesia. Saya harus menyelesaikan master thesis saya di Rotterdam School of Management, Erasmus University Belanda dengan melakukan riset survey mengenai teleworking. Oleh karena itu saya memohon partisipasi anda untuk mengikuti survey ini. Karena saya bergabung dengan tim research di Erasmus yaitu Erasmus@work, saya juga telah membuat aplikasi untuk smartphone dan website untuk mempermudah dalam pengisian kuisioner master thesis saya.
Mengikuti survey ini adalah voluentary namun saya sangat menghargai bantuan dan kemauan anda untuk mengisi survey ini demi kelulusan studi saya di Belanda. berikut ini adalah detail cara melakukan survey master thesis saya mengenai teleworking:

6. Silahkan kunjungi website untuk survey saya ini https://sites.google.com/site/erimtelework/

7. Masuklah ke halaman sign up dengan mengklik tab "Sign up" di web. isi dan submit form sign up cukup satu kali.

8. Anda dapat mengisi kuisioner melalui smartphone anda dengan masuk ke halaman download pada website.

9. Waktu pengisian survey adalah kurang lebih 3-5 menit saja dan data yang di perlukan adalah 10x pengisian dalam kurun waktu dua minggu. Jadi data yang di perlukan untuk melengkapi survey ini adalah 5 kali dalam seminggunya.

10. Deadline pengisian adalah pada tanggal 11 Agustus 2012

Demikian surat invitation ini saya buat, partisipasi anda akan memberikan sumbangsih besar kepada bangsa Indonesia dan Belanda.

Rotterdam, 22 July 2012

Brima Aribowo
New Worlds of Work Research Team
RSM Erasmus University
Appendix C: Survey Introduction and Constructs

Teleworking...
Positive attitudes towards it and its impact for the
Work/life balance

Appendix C Part I: Introduction to teleworking research

Teleworking is not a new thing; it has been invented and already been done by many employees long time ago. Instead of working all day on office, employee sometimes has opportunity to do part of the job outside office. Moreover, some of them also can completely work at home full time. This raised question whether or not it will effect on their work or life balance. You can see the example by watch the funny teleworking commercial bellow and see that teleworking sometimes may impact your personal life.

Of course there are many previous research already been done in this field of teleworking. But most of the survey conducted by previous research is only once at a time. The authors see this as an opportunity to see teleworking phenomenon more in depth by conducting more intense data collection to measures what may impact the positive attitudes towards teleworking and its impact on the employee work/life balance.

This research is implemented in order to get my master degree in Erasmus University. This research is fully support by Erasmus @ work team since I also one of the team members. Erasmus@Work is an interdisciplinary research programme focusing on high performance work. Collaborative research among innovative firms and Rotterdam School of Management, Erasmus University provides state-of-the-art knowledge and insights about the key issues for the design and implementation of new ways of working. More information about Erasmus@Work can be obtained from their websites http://www.erim.eur.nl/ERIM/Research/Centres/SBNi/Projects/NWoW

Appendix C Part II: Who can participate and how you do the survey:

1. The participant is currently working at a company and has opportunity to sometimes do the job outside office or fully work outside office (with the help of IT technology for example: Email, messaging, VPN, remote desktop and others).
2. The number of hour spend doing teleworking is flexible, so it's fine if you didn't do teleworking often because in the end there will be a **Casual teleworker** whom are work less than 10 hour per week and **Mobile worker** whom work more than 10 hour per week.

3. The participant needs to fill in the survey 10 times during their working day. So if you feel you are doing the job on Friday or Sunday you can fill in the survey as well.

4. The participant fill in the survey using mobile application provided on other page on the website

5. Because this survey is a representative of the current daily activity, it is suggested that participant fill in the survey after they have general image of their current day activities.

6. Participants have a chance to win **20 Euro or equal to 250 thousand Indonesian Rupiah**, this will be given at the end of the research. One lucky participant will be contacted for further coordination.

7. So therefore **First**, head to the “sign up” pages to sign up for this research **Then** start doing the survey using mobile app or via online survey page in this site for 10 working day.

Thank you for your participation.

---

**Appendix D: Actual Survey Questionnaire**

**Survey in English**

* Required

Do you feel your job is secure now and in the future? *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you feel commit to your organization? *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do your supervisors or bos support you to do teleworking? *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Do your work colleagues are supportive to teleworking? *

Are you in favor of teleworking today? *

Do you likely to take teleworking option if offered by your organization today? *

How many hours you spend working on your office today? *
How many hours you spend doing teleworking today? *
How many hours you spend your day with your friends and family today? *
How many hours you spend time for own enjoyment? *

Did mobility enable you to better fulfill household/childcare responsibilities? *

Mobility blurs your boundary between work and family Life? *

Do you have sufficient time away from your job to maintain an adequate balance between your work and personal and family life? *

How successful do you feel in balancing your work and personal and family life today? *
<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

**Did your teamwork and friendship have suffered as a result of mobility?** *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

**Did your informal networks and mentoring struggle in a mobile environment?** *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

**Do you believe that mobility is an obstacle to internal communications?** *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

**Are you an effective employee today?** *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

**Do you happy with the quality of your work output?** *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

**Do you work efficiently today?** *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

**You are a highly productive employee today?** *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

Please fill in your name and year of birth together *for example: Paul82

Submit
**Survey in Bahasa (Indonesia)**

* Required

Apakah anda merasa pekerjaan anda dalam posisi cukup stabil dalam kurun waktu kedepan *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>Sangat setuju</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Apakah anda merasa merasa berkomitmen dengan perusahaan/organisasi dimana anda bekerja? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>Sangat setuju</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Apakah atasan anda mensupport anda untuk melakukan teleworking? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>Sangat setuju</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Apakah kolega anda supportive(mendukung) adanya teleworking? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>Sangat setuju</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Apakah anda mendukung teleworking hari ini? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>Sangat setuju</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Apakah anda senang untuk melakukan teleworking jika ditawari oleh perusahaan hari ini? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>Sangat setuju</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Berapa jam anda bekerja di kantor hari ini? *

Berapa jam anda lakukan teleworking hari ini? *

Berapa jam anda nikmati dengan keluarga atau teman hari ini? *

Berapa jam anda nikmati untuk menikmati hari anda sendirian hari ini? *

Apakah fleksibilitas dalam memilih bekerja di kantor/dirumah membantu anda untuk mengurus tanggung jawab mengurus keseharian dan anak? *
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sangat setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Apakah mobilitas bekerja mengaburkan batas antara bekerja dengan kehidupan pribadi anda?** *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sangat setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Apakah anda memiliki cukup waktu untuk sementara meninggalkan pekerjaan untuk menjaga keseimbangan yang cukup antara pekerjaan dan kehidupan pribadi anda?** *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sangat setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Apakah anda merasa cukup sukses dalam menjaga keseimbangan antara kerja dengan kehidupan pribadi anda?** *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sangat setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Apakah anda merasa teamwork dan persahabatan berkurang karena melakukan kerja diluar kantor?** *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sangat setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Apakah anda merasa jaringan informal anda berkurang karena melakukan kerja diluar kantor?** *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sangat setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Apakah anda merasa sebagai pegawai yang bekerja efisien hari ini?** *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangat tidak setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sangat setuju</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Apakah anda merasa puas dengan kualitas kerja anda hari ini?** *
Appendix D: Reliability Analysis

Table D.1: Cronbach’s α and item-rest correlation values of constructs

<table>
<thead>
<tr>
<th>Case Processing Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>Cases</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

a. Listwise deletion based on all variables in the procedure.

<table>
<thead>
<tr>
<th>Reliability Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach's Alpha</td>
</tr>
<tr>
<td>.750</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item-Total Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale Mean if Item Deleted</td>
</tr>
<tr>
<td>Do you feel commit to your organization?</td>
</tr>
<tr>
<td><strong>Question</strong></td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Do your supervisors or bos support you to do teleworking?</td>
</tr>
<tr>
<td>Do your work colleagues are supportive to teleworking?</td>
</tr>
<tr>
<td>Are you in favor of teleworking today?</td>
</tr>
<tr>
<td>Do you likely to take teleworking option if offered by your organization today?</td>
</tr>
<tr>
<td>How many hours you spend doing teleworking today?</td>
</tr>
<tr>
<td>Do you likely to take teleworking option if offered by your organization today?</td>
</tr>
<tr>
<td>How many hours you spend doing teleworking today?</td>
</tr>
<tr>
<td>How many hours you spend doing teleworking today?</td>
</tr>
<tr>
<td>How many hours you spend doing teleworking today?</td>
</tr>
<tr>
<td>How many hours you spend doing teleworking today?</td>
</tr>
<tr>
<td>How many hours you spend doing teleworking today?</td>
</tr>
<tr>
<td>How many hours you spend doing teleworking today?</td>
</tr>
<tr>
<td>How many hours you spend doing teleworking today?</td>
</tr>
<tr>
<td>How many hours you spend doing teleworking today?</td>
</tr>
<tr>
<td>How many hours you spend doing teleworking today?</td>
</tr>
<tr>
<td>How many hours you spend doing teleworking today?</td>
</tr>
</tbody>
</table>

* Based on van Dalen and de Leede (2000), where r (minimum) determines the classification:
  Excellent = > 0.7; Good = 0.6 -0.7; Fair = 0.4 –0.6; Bad = < 0.4
### Appendix E: Univariate data overview

**Table E.1: Univariate data overview of variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gender</td>
<td>1.34</td>
<td>.48</td>
</tr>
<tr>
<td>2. Marital Status</td>
<td>1.15</td>
<td>.36</td>
</tr>
<tr>
<td>3. Number of children</td>
<td>.25</td>
<td>.68</td>
</tr>
<tr>
<td>4. Type of Telework</td>
<td>1.68</td>
<td>0.47</td>
</tr>
<tr>
<td>5. commitment</td>
<td>3.96</td>
<td>.81</td>
</tr>
<tr>
<td>6. Job insecurity</td>
<td>3.84</td>
<td>.83</td>
</tr>
<tr>
<td>7. Supervisory support</td>
<td>3.64</td>
<td>.88</td>
</tr>
<tr>
<td>8. Work Colleague support</td>
<td>3.76</td>
<td>.72</td>
</tr>
<tr>
<td>9. attitudes towards telework</td>
<td>3.91</td>
<td>.64</td>
</tr>
<tr>
<td>10. Telework Frequency</td>
<td>2.49</td>
<td>1.45</td>
</tr>
<tr>
<td>11. Work Life Balance</td>
<td>3.51</td>
<td>.69</td>
</tr>
<tr>
<td>12. Teamwork</td>
<td>2.81</td>
<td>.79</td>
</tr>
<tr>
<td>13. Productivity</td>
<td>3.78</td>
<td>.66</td>
</tr>
</tbody>
</table>