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# Developing a teleworking pilot project through the participants' socio-demographic aspects

Tikka, Katja

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**Laurea University of Applied Sciences**
Laurea Lohja

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Katja Tikka
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**Laurea University of Applied Sciences** **Abstract**
Laurea Lohja
Degree Programme in Entrepreneurship and Business, Industrial Service Operations
Master of Business Administration (MBA)

Katja Tikka

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The purpose of the research study was to develop a teleworking pilot project called Part Time Home Working (PTHW) in the European Patent Office by studying the phase II pilot projects participants' socio-demographic characteristics. The results of the study will allow implementation of new measures to prevent possible isolation and imbalance in the participants' social environment before continuing the project.

The research study was designed according to a design action research method and tested against the 12 theoretical hypotheses on the given subject matter. The research material was gathered using an internet based multiple-choice survey and analysed with Microsoft Excel and Statistical Package for the Social Sciences (SPSS) analysis software.

The empirical findings confirmed the theoretical suggestion in relation to the work-life balance. The research implied that the participant's work-life balance, job motivation, satisfaction and performance increased as a result of teleworking. In addition, functional communication with managers and colleagues, as well as feeling part of the team had a positive effect on the participants' motivation and job satisfaction, and consequently job performance. Research further discovered that electronic communication increases as a result of teleworking which emphasises (for the participants) the feeling of being part of the team and enables the maintenance of good verbal communication with colleagues and managers. However the research additionally discovered that less than 30 percent of the participants felt a level of imbalance in their social environment causing isolation, left out of the team, interference at communication and not being kept up-to-date with regards to office information. Research further confirmed that working experience gained in the Office (prior to starting teleworking) makes it easier to adapt to telework and to maintain social relationships.

The following development proposals for the next phase of PTHW were suggested: to pay special attention to the managers' communication with the teleworkers and to improve communications between the project participants and the rest of the team. This could be achieved by installing a voice over internet protocol (VoIP) communication tool or a corporate chat software. The development proposals for the final implementation of the project were as follows: the participants should have at least 5 years work experience in the Office prior to starting teleworking and additionally two days per week was recommended as the maximum time to telework to prevent isolation.

As a further research it was suggested that the participants' social environment and isolation, their length of experience in the Office prior to commencing teleworking and the optimum number of days to be spent teleworking is to be studied with great subtlety. As only one third of the part-timers increased their working hours during the teleworking pilot project, a further investigation is recommended. Additionally it is recommended to study and consider the perceived overall value to the Office gained through teleworking before implementing the project office wide.

Key Words: Telework, international organisation, work-life balance, social relations, communications.

**Laurea-ammattikorkeakoulu** **Tiivistelmä**
Laurea Lohja
Yrittäjyyden ja liiketoimintaosaamisen koulutusohjelma, Teollinen palveluliiketoiminta
Tradenomi (ylempi AMK)

Katja Tikka

**Etätyön kehittäminen etätyöntekijöiden sosiodemografisten muuttujien kautta**

Vuosi 2009 Sivumäärä 91

Kehittämishankkeen tarkoituksena oli tutkia ja kehittää Euroopan Patenttiviraston osa-aikaisen etätyöprojektin (PTHW) toisen vaiheen osallistujien sosiodemografisia muuttujia. Tutkimusongelmana oli löytää tapoja ja metodeja estää etätyöntekijöiden mahdollinen eriytyminen sekä sosiaalisten suhteiden epätasapaino ennen projektin jatkumista.

Kehittämishanke toteutettiin design-toimintatutkimuksena, jossa tutkimuskysymykset testattiin 12 teoreettisen hypoteesin kautta. Tiedonkeruumenetelmänä käytettiin sähköistä monivalintakysymys-lomaketta internetin välityksellä. Aineisto analysoitiin käyttäen Microsoft Exceliä sekä SPSS-statistiikka-analyysiohjelmaa.

Empiiriset tutkimustulokset vahvistivat teoreettisen ehdotelmat koskien työn ja vapaa-ajan tasapainoa. Tutkimus osoitti, että työn ja vapaa-ajan tasapaino ja motivaatio paranevat ja että työn tuottavuus ja työssä viihtyminen kasvavat etätyön myötä. Lisäksi toimiva kommunikaatio esimiesten ja kollegojen kanssa sekä tiimiin kuulumisen tunne kasvattavat etätyöntekijän motivaatiota, työssä viihtymistä sekä työn tuottavuutta. Lisäksi tutkimus osoitti, että elektroninen kommunikaatio lisääntyy väistämättä etätyöhön siirryttäessä. Tämä tarkoittaa (etätyöntekijälle) sitä, että tiimiin kuulumisen tunne ja kommunikaatio tulevat yhä tärkeämmiksi. Tutkimus osoitti myös, että hieman alle 30 prosenttia osallistujista koki epätasapainoa heidän sosiaalisessa työympäristössään, mikä aiheutti mm. eristäytymistä, tiimiin kuulumattomuuden tunnetta, kommunikaation vähenemisen tunnetta sekä tietovajetta patenttiviraston tapahtumista. Tutkimus vahvisti, että aikaisempi työkokemus patenttivirastossa helpottaa sopeutumaan etätyöhön ja auttaa ylläpitämään sosiaalisia suhteita.

Tutkimustulokset osoittivat seuraavia kehitysehdotuksia pilottiprojektiin: Esimiesten kommunikointi on tärkeää etenkin etätyöntekijöiden kanssa sekä etätyöntekijöiden kommunikointi muiden projektin osallistujien ja tiimin jäsenten kanssa. Parannusehdotukseksi esitettiin myös VoIP-perustaisen puhelinjärjestelmän käyttöönottamista tai vaihtoehtoisesti yrityksen sisäisen keskustelujärjestelmän (chat) luomista. Lisäksi projektin loppuvaiheen parannusehdotuksiin sisältyy vaatimus vähintään viidestä työkokemusvuodesta patenttivirastossa, jotta eristäytyminen voitaisiin ehkäistä. Etätyöpäivien maksimimääräksi ehdotettiin myös kahta työpäivää viikossa.

Tärkeimmiksi jatkotutkimuksiksi ehdotettiin syvällisempää tutkimusta etätyöntekijöiden sosiaalisesta työympäristöstä sekä mahdollisesta eriytymisestä että kokemusvuosien ja etätyöpäivien vaikutuksesta edellä mainittuihin asioihin. Tutkimus osoitti myös, että vain yksi kolmesta osa-aikaisesta etätyöntekijästä nosti työtunteja, mikä viittaa tarpeen jatkotutkimukseen. Tämän lisäksi jatkotutkimus Euroopan Patenttiviraston saamasta arvosta ennen etätyön soveltamista koko organisaatioon on suositeltavaa.

Avainsanat: etätyö, kansainvälinen organisaatio, työn ja vapaa-ajan yhteensovittaminen, sosiaaliset suhteet, kommunikaatio.

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# 1 Introduction

The global market is changing from an industrial economy towards a knowledge economy. This is one of the key challenges of the 21st century. It applies to ongoing economic and social development in all sectors and fields of activity. This also means challenging changes for the companies' business and working environments. The critical resource lies in knowledge and competence, and the fact that telecommunication and information technology allow new structures and value mechanisms to be implemented.

## 1.1 Background to the study

In the late 1970s and the 1980s, teleworking was perceived as the work arrangement of the future. Reviewers predicted large-scale implementation of teleworking by the end of the 1980s and early 1990s. (Illegems, Verbeke, S`Jegers 2000, 275.)

Nevertheless teleworking has been adopted only very slowly although support from ICT was received. Illegems, Verbeke and S`Jegers (2000, 290) study which measured teleworking implementation drivers and constraints discovered that a lack of awareness of the teleworking concept, the problem of direct supervision as the main coordination and control mechanism, mainly sequential information flows, mainly local commuting and a substantial number of the employees with temporary contracts appear to be the five most important firm-level barriers that prevent the implementation of teleworking.

To secure a successful adaptation of the new working model, careful analysis of different elements influencing the implementation process is required. The basic conceptual framework model consists of several variables related to the implementation of teleworking. The model is based on two main elements; the overall environment and the individual environment. The overall environment consists of a technological and an institutional environment as well as an organizational environment. The individual environment consists of situational characteristics (job, commuting and socio-demographic characteristics) and perceptions and attitudes of the individuals. (Illegems, Verbeke & S`Jegers 2000, 276.)

From an organization's perspective, teleworking will only be offered as an option to the individual worker if a minimum set of technological, institutional and organizational requirements are fulfilled. If this minimum level is respected, then the individual worker will only consider teleworking if he/she is dissatisfied with one or more aspects of non-telework life, or if a number of drivers to adopt the practice are present. (Illegems etc. 2000, 277.)

## 1.2 Purpose of the study

The new way of working must be valuable for both teleworkers as well as for the organization. The purpose of the study is to clarify the different motivational factors and constraints before implementing a new flexible working model Telework at an international organisation the European Patent Office (EPO). The European Patent Office has created a new pilot project called the Part Time Home Working (PTHW), which addresses the modern way of working and aims to refresh the old working models. The focus is on efficiency and motivation.

Projects motivating factors and constraints are believed to be in terms of autonomy, work/family interaction, space and resource sharing, available capacity, efficiency and productivity, interaction with colleagues and third parties, interaction with manager, sickness and stress, career, isolation and technical areas, motivation and an improved balance between private and professional life.

However, drivers can also turn into constraints. According to Pekkola and Uskelin (2005, 13) teleworking is believed to bring industrial peace in term of concentration of work and different tasks. However, this can turn into a challenge to prevent a lack of communication and isolation. Teleworking is also believed to bring a balance between work and family life but this can also be seen as a challenge to be able to differentiate work from private life.

Teleworking drivers are in the end determined by the users; the teleworkers. If the teleworking does not provide any added value to the participants compared to the previous working method, its legitimacy may be open to question.

### 1.2.1 Outline of the thesis

The study is part of a larger pilot project which measures different characteristics, drivers and constraints before implementing telework as a new working method in an international working environment.

The main Part Time Home Working pilot project is designed to have five phases:

- **Phase I: Preparing the initial test pilot**
  Planning, preparing and technical and physical equipment for the initial test pilot

- **Phase II: Initial test pilot**
  The test comprises 15 testers from Munich and the Hague offices testing the equipment and technologies which are planned for the main pilot

- **Phase III: Evaluation**
  Evaluation of the results of the initial test pilot

- **Phase IV: Main pilot**
  Test with 100 staff members

- **Phase V: Evaluation main pilot**
  Evaluation of the findings of the main pilot, decision of the President, drafting guidelines for the introduction of teleworking and individual agreements.

The study is outlined in Phase II which comprises 15 testers and an evaluation and analysis of the different motivating factors and constraints in the individual employee's socio-demographic characteristics in relation to social communication, isolation and work-life balance. This study does not measure the institutional environment, the technological environment nor the organisation environment mentioned in the basic conceptual framework as these are measured in different phases of the pilot project.

### 1.2.2 Research questions

Set against the background provided above, the aim of this study is to explore the participants' subjective view on the socio-demographic characteristics relating to the implementation of a new working model. Consequently, the main research question that this study aims to answer is formulated in the following manner:

- What can be done to maintain the participants socio-demographic characteristics while teleworking?

The sub questions, which help to construct a picture of the participants' socio-demographic characteristics, are the following:

- Have the participants` work-life balance improved while teleworking?

- Have the participants' motivation, job satisfaction or performance improved while teleworking?

- When teleworking, is there a change in the participants social relations and communication in the international working environment?

The main question and sub questions asked in this research aim to evaluate and study whether intermediate measures should be taken between the end of the pilot project and the next

phase in order to prevent possible isolation and imbalance in the participants' social environment. The research results additionally aim to find recommendations and solutions for the final implementation of the Part Time Home Working pilot project and to discover further research topics for the following surveys that are conducted in the next main pilot phase IV.

## 1.3 Operational thesis part of the Laurea LbD- learning module

The study is an empirical action research thesis using a quantitative internet based survey as well as a documentary analysis to determine the effect of teleworking on socio-demographic characteristics during the pilot project. The survey was carried out using relative and absolute measures. The internet based survey consisted of 33 main- and sub- questions (See Annex 1).

This study is part of the Laurea University of Applied Sciences Master degree in industrial business, which is based on the Learning by Developing (LbD) programme. Learning by Developing (LbD) is a new pedagogical approach to innovation, where learning is formulated in the research and development process (Aho, Korhonen 2008, 23).

The learning process includes three aspects of knowledge: knowledge included (knowledge in practice), knowledge acquired through research (knowledge of practice), and new knowledge produced (knowledge for practice). It aims to produce new practices, competences and demands in collaboration between lecturers, students and different experts acting as researchers, developers and facilitators from the world of work. The focus is on individual and community learning, generation of new knowledge, innovations in the form of new products, productization, operating models and working cultures as seen in Figure 1. (Raij 2007, 26-27).

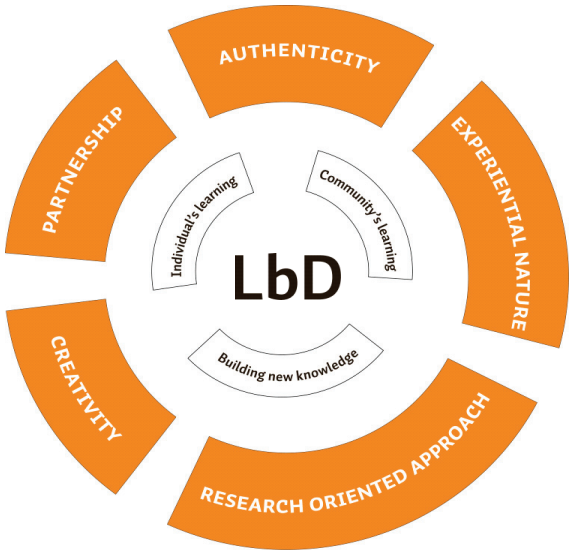


Figure 1: Laurea University`s Learning by Developing model (Aho, Korhonen 2008, 23)

## 1.4 Structure of the study

The study is a combination of three parts; operational part, theoretical part and empirical part of the study. The operational part of the study consists of the introduction to the European Patent Office and the legal framework of the study. The theoretical part of the study consists of a chapter regarding telework which aims to clarify the context for the study in the form of the teleworking challenges as a new working method. The challenges of telework consist of comparison from drivers and constraints and the implementation of telework through a conceptual frame work model which consists of several variables related to the implementation process. The focus is on the socio-demographic characteristics of the basic conceptual framework model apart from social communication, isolation and work-life balance.

The empirical part consists of three chapters: a research and development plan, research analysis and findings as well as a summary and conclusion. In the research and development plan the chosen empirical research approach is explained and in the research findings the empirical research findings are presented and evaluated. In the summary and conclusion chapter the summary on the research and major findings as well as development proposals and a development plan are presented. Additionally the chapter contains suggestions for further research and self evaluation according to Laurea's Learning by Developing evaluation criteria.

## 1.5 Concept definitions

Key concept definitions of the study are clarified as follows:

***Computer supported social network (CSSN)*** enables teleworkers to connect within and between the organisations when they are physically dispersed. CSSN sustains strong, intermediate and weak ties that provide information and social support in both specialised and broadly based relationships.

***Digital Natives*** are people who are born in digital technology age, where virtual networking is obvious. The internet has always been there for them and they move naturally between global networks. (Juva 2009, 16-17.)

***European Patent Convention (EPC)*** is a multilateral treaty instituting the European Patent Organization and providing a legal system according to which European patents are granted. The EPC allows the applicant to file a single application at the European Patent Office and to designate any of the EPC Member States for that purpose. (Khan etc. 2008, 59.)

***European Patent Office (EPO)*** is one of the regional patent offices, created under the European Patent Convention (EPC), responsible for granting European patents for the Member States of the EPC. The EPO also acts as an international searching authority and international preliminary examining authority for PCT international applications and performs searches on behalf of some national patent offices. (Khan etc. 2008, 59.)

***European Patent Organisation (EPC)*** is an intergovernmental organisation which was established in 1977 on the basis of the European Patent Convention (EPC). It has two bodies, the European Patent Office (EPO) and the Administrative Council, which supervises the Office's activities. (European Patent Office. 2009a.)

***Expatriate*** is a person working and living in a country other than their native country.

***E-ties*** is electronic communication between individuals.

***Part Time Home Working (PTHW)*** is a pilot project established in the European Patent Office from 2008 until 2010 to test teleworking as a new working model. The pilot project includes five phases; Phase I preparing the initial test pilot in beginning of the 2008, Phase II initial test pilot from 2008-2009 lasting one year, Phase III evaluation which runs simultaneously with Phase II and IV, Phase IV main pilot compromising over 100 PTHW testers in 2009-2010 and Phase V evaluation of the main pilot at the end of 2010. After the evaluation, a decision from the President whether to implement teleworking office wide will be established.

***Patent*** is an exclusive right granted by law to applicants / assignees who wish to protect an invention. The right us not as often wrongly thought a positive right. Instead the patent holder has the legal right to exclude others from commercially exploiting his invention for a limited period (generally 20 years from filing). In return for exclusive rights, the applicant is obliged to disclose the invention to the public in a manner that enables others, skilled in the art, to replicate the invention. The patent system is designed to balance the interests of applicants / assignees (exclusive rights) and the interests of society (disclosure of invention). (Khan etc. 2008, 60.)

***Patent Cooperation Treaty (PCT)*** is an international treaty administered by the World Intellectual Property Organization (WIPO). The PCT makes it possible to seek patent protection for an invention simultaneously in a large number of countries by filing a single "international application" with a single patent office (i.e. receiving Office). The PCT system simplifies the process of multi-national patent filings by reducing the requirement to file multiple patent applications for multi-national patent rights. PCT international applications do not result in the issuance of “international patents” and the International Bureau (IB) does

not grant patents. The decision on whether to confer patent rights remains in the hands of the national and/or regional patent offices, and patent rights are limited to the jurisdiction of the patent granting authority. (Khan etc. 2008, 60.)

***PCT International Application*** is a patent application filed under the Patent Cooperation Treaty. (Khan etc. 2008, 60.)

***P-ties*** is face-to-face communication between individuals.

***Telework*** Work carried out by a person in his or her home or in other premises of his or her choice, other than the workplace of the employer, for remuneration and which results in a product or service as specified by the employer, irrespective of who provides the equipment, materials or other inputs used (ILO 2009). Telework include various forms and conditions such as home based typing; telebooking-sales and call centre functions; design from home; telecentres; telecottages; consultancy from home; special needs group (e.g. handicapped people) integration; translators from home; maintenance via teleworking; mobile sales and a virtual telework organization. (Blanpain 1995,1.) In this study telework is defined as a work arrangement where the organisational employees work a part of their time remotely at home instead of in their offices.

***Strong ties*** are friends, close friends, co-workers and team-mates.

**Weak ties** are acquaintances, casual contacts and other employees in an organisation.

***World Intellectual Property Organization (WIPO***) is a specialized agency of the United Nations. It is dedicated to developing a balanced and accessible international intellectual property (IP) system, which rewards creativity, stimulates innovation and contributes to economic development while safeguarding the public interest. WIPO was established in 1967 with a mandate from its Member States to promote the protection of IP throughout the world through cooperation among states and in collaboration with other international organizations. (Khan etc. 2008, 61.)

## 2 Operational frame of study

The operational frame aims to present the European Patent Office as an international organisation, and encouraging technological advancement by providing patent protection to applicants which then allows them to invest in new research and technologies.

## 2.1 European Patent Organisation

The European Patent Organisation is an intergovernmental organisation which was established in 1977 on the basis of the European Patent Convention (EPC). It has two bodies, the European Patent Office (EPO) and the Administrative Council, which supervises the Office's activities as seen in Figure 2. (European Patent Office. 2009a.)

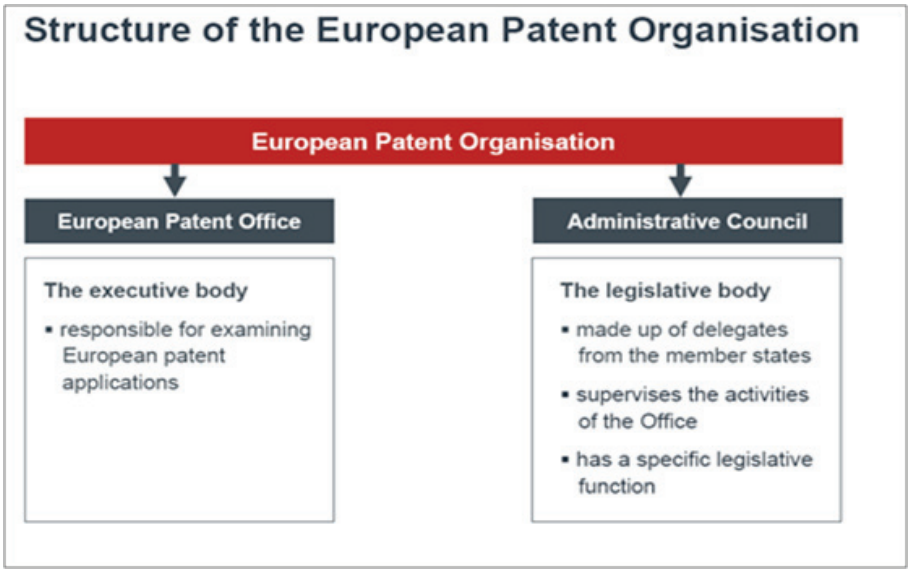


Figure 2: Structure of the European Patent Organisation (Presentation on the EPO 2008, 10)

The European Patent Convention defines the grounds for the organisation: “The Contracting States, desiring to strengthen co-operation between the States of Europe in respect of the protection of inventions, desiring that such protection may be obtained in those States by a single procedure for the grant of patents and by the establishment of certain standard rules governing patents so granted, desiring for this purpose, to conclude a Convention which establishes a European Patent Organisation and which constitutes a special agreement within the meaning of Article 19 of the Convention for the Protection of Industrial Property, signed in Paris on 20 March 1883 and last revised on 14 July 1967, and a regional patent treaty within the meaning of Article 45, paragraph 1, of the Patent Cooperation Treaty of 19 June 1970”. (European Patent Office 2009b.)


The Organisation has 36 member states; Austria, Belgium, Bulgaria, Switzerland, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, Monaco, Former Yugoslav Republic of Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia, San Marino and Turkey. In addition to member states, organisation has 3 observer states: Albania, Bosnia-Herzegovina and Serbia as seen in Figure 3. (European Patent Office 2009c.)

Figure 3: Member states of the European Patent Organisation (European Patent Office 2009b)

European Patent Office

Under the European Patent Convention, the European Patent Office (EPO) carries out searches and substantive examinations on European patent applications and international applications filed under the Patent Cooperation Treaty (European Patent Office 2009d).

The purpose of the patent procedure is to protect individual inventors and companies inventions. Over the last thirty years, 2.7 million patent applications have been filed with the European Patent Office and nearly 900 000 have been granted (Schröder 2008, 4). In 2008, over 146 500 applications were filed under the European Patent Convention, of which 63 000 applications were direct European filings and 83 500 international Euro-PCT applications entering the regional phase under the Patent Cooperation Treaty as seen in Table 1 (Schröder 2009a, 17).

| | | | Wachstum in %<br>Change in %<br>Taux de croissance en % |
|---|---|---|---|
| Europäische Direktanmeldungen<br>Direct European filings<br>Demandes européennes directes | 2008<br>2007 | 63 013<br>62 755 | +0.4 |
| In die regionale Phase eintretende Euro-PCT-Anmeldungen<br>Euro-PCT applications entering the regional phase<br>Demandes euro-PCT entrant dans la phase régionale | 2008<br>2007 | 83 548<br>78 684 | +6.2 |
| **Summe<br>Total<br>Total** | **2008<br>2007** | **146 561<br>141 439** | **+3.6** |

Table 1: Applications filed in 2007 and 2008 (Schröder 2009a, 19)

As seen in Table 2, the EPO`s 6700 employees come from over 30 European states working at five sites in four countries: Germany, The Netherlands, Austria and Belgium. As shown in Table 3 the three main nationalities are Germans with 27 %, second French with 18 % and third Dutch with 9 % from the total workforce. Out of the EPO`s 6700 employees around 60% are patent examiners who perform the search, substantive examination and opposition for the patent application. 40% are working in patent administration and on or for the independent boards of appeal. (Schröder 2009b, 26.)

| Country | | Number of staff |
|---|---|---|
| AT | Austria | 237 |
| BE | Belgium | 357 |
| BG | Bulgaria | 30 |
| CH | Switzerland | 69 |
| CY | Cyprus | 8 |
| CZ | Czech Republic | 20 |
| DE | Germany | 1807 |
| DK | Denmark | 74 |
| EE | Estonia | 6 |
| ES | Spain | 426 |
| FI | Finland | 48 |
| FR | France | 1190 |
| GB | United Kingdom | 514 |
| GR | Greece | 160 |
| HU | Hungary | 25 |
| HR | Croatia | 2 |
| IE | Ireland | 82 |

| Country | | Number of staff |
|---|---|---|
| IS | Iceland | 1 |
| IT | Italy | 497 |
| LI | Liechtenstein | 1 |
| LT | Lithuania | 4 |
| LU | Luxembourg | 73 |
| LV | Latvia | 4 |
| MT | Malta | 2 |
| NL | Netherlands | 618 |
| PL | Poland | 56 |
| PT | Portugal | 85 |
| RO | Romani | 107 |
| SE | Sweden | 124 |
| SI | Slovenia | 14 |
| SK | Slovakia | 15 |
| TR | Turkey | 26 |
| | Others | 3 |
| | Total | 6685 |

Table 2: Breakdown by nationalities in EPO (Schröder 2009b, 27)

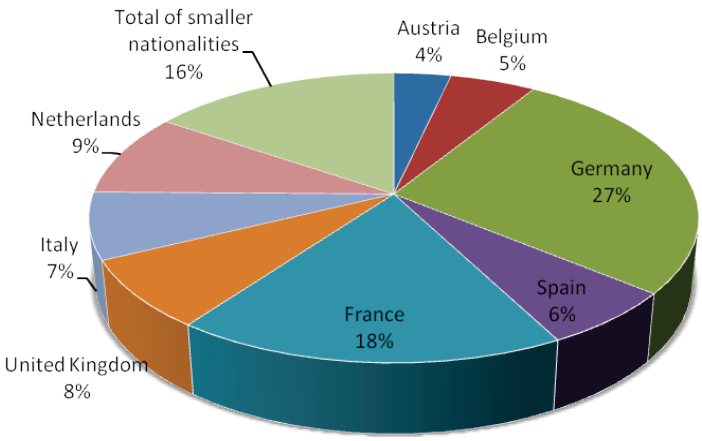


Table 3: Chart of different nationalities working in EPO

## 2.2 Legal framework of the study

The European Patent Office along with the US Patent and Trademark Office and the Japanese Patent Office, is one of the three most important patent offices in the world. Between them, the so-called trilateral authorities handle over 80% of the world's patent applications. (Wild 2008, 8.)

Other patent offices, such as the State Intellectual Property Office of P.R.China along with the Korean Intellectual Property Office are also showing some increase in their filing figures as seen in Figure 3. The total number of applications filed across the world in 2006 was estimated to be 1.76 million, representing a 4.9% increase from the previous year (Khan etc. 2008, 7).

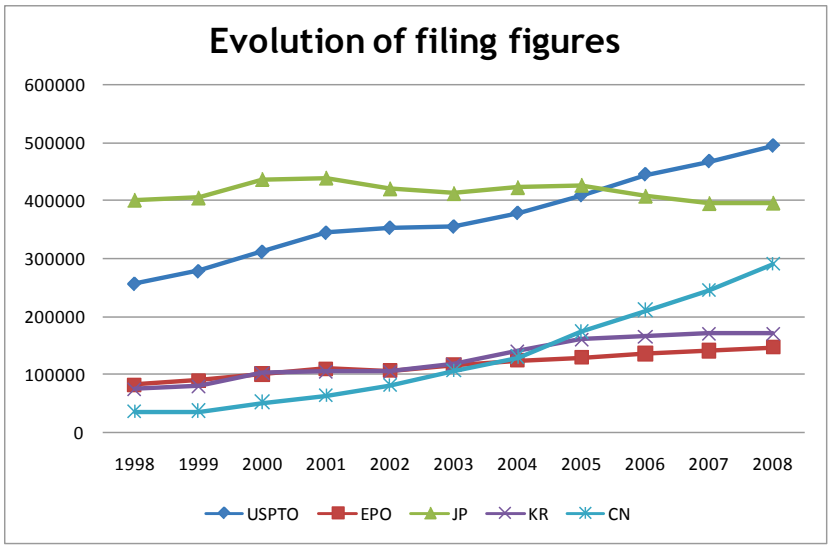


Figure 1: Evolution of filing figures (1998-2008) (European Patent Office 2009e, USPTO 2009,116)

Although the number of patent applications filed across the world has increased at a steady pace, the rate of increase is less than the rate of increase observed for other economic indicators such as GDP and trade (Khan etc. 2008, 7).

According to Alain Pompidou, the former President of the European Patent Office, the forces of globalisation, geopolitical developments, technological change and societal demands are few examples of the multiple pressures bearing down on today's patent system (Förster, Elahi & Terzic 2007, 2).

The current President, Alison Brimelow, continues that capacity for reform is crucial to the future of European Patent system. Issues such as the impact of the global market economy,

developments within Europe or new technologies are parameters which governs the European Patent Office's development. The challenge means changes from past practise in issues such as workload, cooperation with member states and office finances. (Brimelow 2008, 7.)

Due to the global change, the European Patent Office launched a strategic renewal process in order to make the Office fit for the challenges it is facing. One sector of the strategic renewal process concerns new working methods, which aims to introduce a more flexible working environment compared to the existing one.

Flexibility can be seen in two different perspectives, both from the employees as well from the employer's side. Avery and Zabel (2001, 2) refers to Olmsteds and Smiths (1997) definition on flexibility. From the employer's side flexibility means being able to adjust quickly to changing economic conditions by increasing productivity, decreasing costs, expanding, contracting or reallocating labour supply and improving service in order to become more competitive.

Avery and Zabel continues (2001, 2) that from the employee's side flexibility means to be able to adjust work time or workplace when personal needs are in conflict with their current schedule, being able to change starting and finishing times occasionally, reducing paid work time for a while, start a family, recover from burnout or attend nonwork functions without being penalised.

Flexible work arrangements include a range of options, these being flexible work schedules, compressed workweeks, job sharing, job exchanges, voluntary part-time work, phased retirement, telecommuting, and home-based work. (Avery & Zabel 2001, 1.) This study focuses on telecommuting, also known as telework and its social impact on employees working environment.

## 3 Theoretical frame of the study: Teleworking

The theoretical frame of the study aims to clarify the context of telework and its challenges as a new flexible working method. The challenges of telework consist of comparison of the drivers and constraints and their impact on the teleworkers' socio-demographic characteristics true conceptual frame work model. In order to understand the teleworkers' socio-demographic characteristics, the conceptual frame work model is explained and evaluated.

The study's theoretical frame is mainly based on business reviews- and journal articles. The articles are from the last twenty years and consist of various researchers' views and newest research findings. Other literature is used as a supporting material to clarify the wider context of telework.

Telework include various forms and conditions such as home based typing; telebooking-sales and call centre functions; design from home; telecentres; telecottages; consultancy from home; special needs group (e.g. handicapped) integration; translators from home; maintenance via teleworking; mobile sales and a virtual telework organization. (Blanpain 1995,1.) In this study telework is defined as a work arrangement where the organisational employees work a part of their time remotely at home instead of in their offices.

## 3.1 History of Teleworking

Modern information and communication technologies are changing the way business works. The global economy was once dominated by the exchange of goods, but it is now transforming towards an information dominated economy where the change process is at an unparalleled rate of development of information and communication technology. The continual improvement of microchips, fibre optics, telecommunications systems, communications satellites and other elements of these technologies allows new structures and working mechanisms to be implemented. (Nilles 1999, 1-2.)

The first papers regarding telework were written in the 1970`s, when the practise of telecommuting was developed in Southern California as a way to decrease congestion on the state's freeways. The objective was to avoid commuting and traffic jams. Jack Nilles is said to have invented the term "telecommuting" that later was expanded to the concept of “telework” in the 1980s`. (Gani & Toleman 2006, 82.)

In the 1980’s telework programs were developed as a way of employing the disabled as home-based word processing operators (Whiten 1996). The tasks and occupations of teleworkers were in general limited to DP professionals, sales staff, data entry/text processing and management tasks, while all other occupations were seldom executed via telework. The Trade Unions, governments as well as the media generally responded negatively to the concept of telework. Public discussion raised the threat of social isolation and the lack of supervision which were due to technological restrictions. (Chrissafis 2000, 5-6.)

In the 1990`s technical development enabled the self-employed and micro-businesses to gradually adopt teleworking models. The European Commission´s 1993 “White Paper on Growth, Competitiveness and Employment” led to a strong political initiative to make use of telework to foster economic competitiveness. Also larger companies adopted off-shore telework by placing telework centres in low-paid or English speaking locations such as India, Jamaica, Eastern Europe or Ireland. The prospect of an off-shore labour market together with an employee’s growing demand to implement telework, led to a turn-around in trade union attitudes. (Chrissafis 2000, 6.)

By the start of the new millenium, telework had not expanded on the scale it was predicted to. Some studies had forecast that in the USA alone over 50 million employees would be conducting teleworking by the start of the year 2000. The results were below the estimate, barely reaching 20 million by the beginning of the year 2000. Organisational attitudes were seen as the major obstacle due to the apparent lack of supervision. (Wells 2001, 34-54.)

## 3.2 Motivating factors and constraints in relation to teleworking

Teleworking has the potential to bring a wide range of benefits to both employers and employees. By allowing more flexible ways of working, teleworking can increase employment opportunities, particularly for those with families or who have long journeys to work. In addition, it can ease pressure on infrastructure, facilitate regional development and help employees improve the balance between work and home life. For business these new ways of working can offer new business opportunities, improve productivity and maintain competitiveness. (Telework guidance 2003, 3.)

Employer and organisational motivating factors and constraints connected to teleworking can be seen in Table 4 and in Table 5.

| ORGANISATIONAL MOTIVATING FACTORS AND CONSTRAINTS CONNECTED TO TELEWORKING | |
|---|---|
| **POTENTIAL MOTIVATING FACTORS:** | **POTENTIAL CONSTRAINTS:** |
| ❑ Possible productivity gains through staff having fewer interruptions and less commuting time.<br>❑ Improved retention of employees, for example teleworking can help retain working parents with childcare responsibilities.<br>❑ A wider pool of applicants from which to recruit, for example disabled people who may prefer or are only able to work from home.<br>❑ Savings on office space and other facilities. (Business Link 2009.)<br>❑ Reduction on teleworkers carbon footprint, which reflects the image of the office as a modern organisation, that invest on global environmental issues and reduces traffic congestion. (Pekkola & Uskelin 2005, 19) | ❑ Difficulty of managing home workers and monitoring their output.<br>❑ Harder to maintain a team spirit.<br>❑ Working from home is unsuitable for certain types of job.<br>❑ Possible deterioration in employees' skills and their work quality.<br>❑ Initial costs of training and providing suitable equipment, including adaptations to meet health and safety standards and the needs of disabled employees.<br>❑ Risk of information-security problems.<br>❑ Risk of communication problems and a sense of isolation among home workers. (Business Link 2009.) |

Table 4: Organisational motivating factors and constraints connected to teleworking

The main organisational drivers are seen in productivity gains, better retention of staff, cost savings and a positive effect on an organisation´s image (Pekkola & Uskelin 2005, 17-19).

Productivity gains are based mainly on the fact that workers simply work longer hours than in the traditional working place. Well planned teleworking has fewer interruptions and enables better planning of the working time. Teleworkers may also take more responsibility to achieve their goals since they are working more independently. In addition commuting time saved can be diverted to working time and some workers may also feel a sense of privilege to be allowed to telework, which reflects on their motivation and diligence. (Pekkola & Uskelin 2005, 17-18).

Telework reflects an organisation`s image as a modern workplace, which follows a mobile information society's rhythm by utilising advanced information communication technology. In addition, telework offers an opportunity for employees to influence their social responsibilities and take account of the environmental aspects. (Pekkola & Uskelin 2005, 19).

| EMPLOYEE'S MOTIVATING FACTORS AND CONSTRAINTS CONNECTED TO TELEWORKING | |
|---|---|
| **POTENTIAL MOTIVATING FACTORS:** | **POTENTIAL CONSTRAINTS:** |
| ❑ Time and money savings due to decrease in commuting time.<br>❑ Flexibility on choosing residential areas, for example place of work is no longer The main selection criteria.<br>❑ Enables work to continue in adverse driving conditions such as bad weather, transport disruptions and physical obstacles.<br>❑ Enable working for disabled people which increases their overall situation of life and reflects In their motivation and job satisfaction.<br>❑ Improvement in working relationships with fewer industrial disruptions such as strikes.<br>❑ Increase in working efficiency.<br>❑ Better balance between work and life. (Pekkola & Uskelin 2005, 13-14)<br>❑ Increased staff motivation reculting reduced stress and sickness levels. (Business Link 2009.) | ❑ Telework is often seen as paid overtime rather than normal work.<br>❑ Balance line between work and social life can be mixed – no clear boundary between the two.<br>❑ Telework days are constrained due to meetings and official gatherings<br>❑ Transition of working material between main workplace and home. (Pekkola & Uskelin 2005, 13-14) |

Table 5: Employees motivating factors and constraints connected to teleworking

However, drivers can also turn into constraints. Teleworking is believed to bring industrial peace in term of concentration of work and different tasks. This can turn into a challenge to prevent the lack of communication and isolation in teleworkers social presence. Teleworking is also believed to be a balance between work and family life; in addition this can also be seen as a challenge to be able to differentiate work from private life. From the teleworkers´ side, implementing a new flexible working method in a combination of work, home life and commuting as well as leisure is a new way of living and working. (Pekkola & Uskelin 2005, 13.)

## 3.3 Telework implementation in international patent organisations

In the past years, teleworking has been implemented in different companies and organisations, mainly in small and medium size enterprises. The larger revolution has been expected for a while, but the progress has been rather slow in governmental areas, as a result of the

working models that were created during the Industrial Revolution development (Pekkola & Uskelin 2005, 3).

Larger international patent organisations, for example the United States Patent and Trademark Office started a TWAH teleworking program in 1997, followed by the Korean Intellectual Property office in 2005 and the European Patent Office with the PTHW program in 2008, have started to move towards teleworking.

### 3.3.1 United States Patent and Trademark Office

The Department of Commerce`s United States Patent and Trademark Office (USPTO) launched the Trademark Work-at-Home (TWAH) program in 1997 as a two-year pilot program with 18 examining attorneys working three days a week from home. After the pilot proved to be successful, the USPTO expanded its telework initiative to include patent examiners and employees in other business units throughout the agency. The goal of the project was to broaden the current technology and allow employees to enjoy the benefits of working remotely, while still meeting the same qualitative and quantitative goals as their colleagues who were working in the office five days a week. (United States Patent and Trademark Office 2009a.)

At the end of 2007 over 40 % of USPTO`s total workforce were teleworking. According to the Deputy Director of the United States Patent and Trade Office Margaret J.A. Peterling, the program benefits were seen to add to employee productivity, to higher levels of sustained performance, reduced traffic congestion and air pollution, and reduced real estate costs. (United States Patent and Trademark Office 2009b.)

### 3.3.2 Korean Intellectual Property Office

In the beginning of 2005 the Korean Intellectual Property Office (KIPO) launched a telework programme in order to cope with an increased number of examiners as well as a lack of space. The programme had a limited number of places available and was aimed at examiners having more than two years of experience in the office. In order to keep up the competition among participants, applications for teleworking were made every 6 months.

After a successful trial, the program benefits were seen to add value in four main characteristics such as easy to attract high-quality human resources, increase in the participants´ work efficiency, and collaboration with childcare problems as well as solving a lack of working space which enabled the KIPO to hire more examiners. (Chang-kyun Jung, personal notification 14.05.2009.)

### 3.3.3 European Patent Office

Subsequently the European Patent Office launched a telework pilot project known as Part Time Home Working (PTHW) in early 2008, to implement a new flexible working model at an international organisation. The project benefits are believed to be in terms of autonomy, space and resource sharing, increase in available capacity, efficiency, productivity, motivation and an improved balance between private and professional life.

In order to implement a new working model, pilot projects drivers and constraints are to be measured entirely in order to launch a working model that is suitable for both the organisation and its employees. The pilot project is foreseen to end in 2010 and implemented office wide in 2011.

## 3.4 Basic conceptual framework model

Illegems, Verbeke and S`Jegers (2001, 276) refers to Bernandinos, Beb-Akiva and Salomons (1992) basic conceptual framework model for a successful implementation process of teleworking as seen in Figure 4. The basic conceptual framework is a combination of different components that influence the implementation decision including the environment and the individual-employee. The environment includes the technological environment, institutional environment and organisational environment and the individual-employee includes situational characteristics and perceptions and attitudes of the individuals.

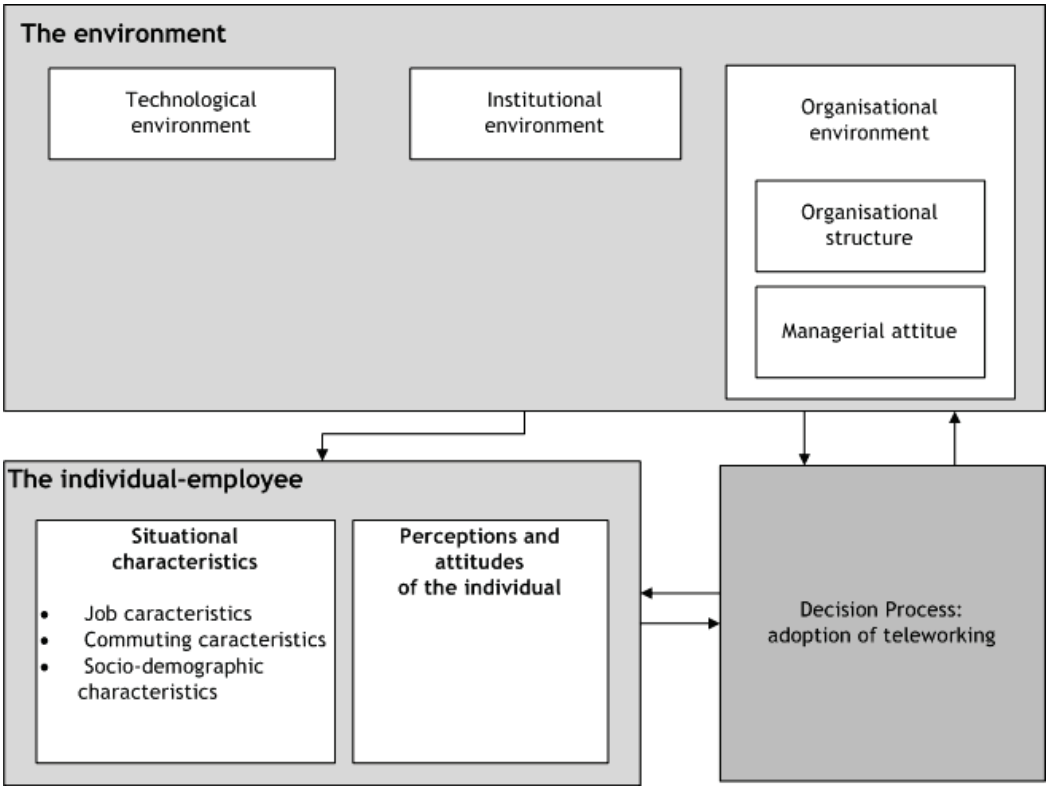


Figure 4: Basic conceptual framework for modelling the implementation process of teleworking (Bernardino et al. 1992, 20-30)

### 3.4.1 The environment

The environment includes three environmental areas; technological, institutional and organisational environment.

**Technological environment**

A growing percentage of the labour force consists of knowledge workers, who perform highly skilled jobs in a technologically enhanced environment. The main input for these workers is centralised information, which is accessible by all workers who need it without any physical or temporal constraints. Due to current ICT developments, pure technological barriers to prevent the implementation of teleworking are no longer present, although some financial barriers often still exist. For instance, in some industrialised countries it is still rather expensive to obtain some basic ICT such as an effective intranet at the firm level. (Illegemens et al, 2001, 277.)

**Institutional environment**

Institutional regulations often result from a specific historical context. In the EU, the involvement of governments in the implementation of teleworking is mostly limited to issuing regulations that reduce existing barriers to teleworking implementation, although in The

Netherlands and Sweden, governments are actively playing a role in the implementation projects. However, private initiatives are seen as the main drivers for most teleworking implementation. (Illegemens et al, 2001, 278.)

**Organisational environment**
The organisational environment includes two aspects; organisational structure and managerial attitude.

*Organisational structure:* Organisational structures are driven to change their strategy into a more flexible and adaptive way in response to the change of the global markets. Size and physical capital no longer represent the key strengths of the organisations and are increasingly replaced by knowledge and information. Traditional vertical integration of the value chain often becomes counter-productive, where frequent outsourcing of the non-strategic and capital-intensive part is occurring. Such an environment also improves the applicability of teleworking implementation. (Illegemens et al, 2001, 278.)

*Managerial attitude:* Managing teleworkers requires special coordination, controlling, motivation, organising availability as well as communication with non-teleworkers, in order to preserve the corporate culture among teleworkers. Face-to-face interactions and direct supervision is replaced by mutual trust. If managers attribute a high importance to full control over the actual working process, it could be a major organisational barrier. This enhanced professional freedom of teleworkers requires an increased adoption of managerial techniques. However managers are often unwilling to change their co-ordination and control habits, which suggest that substantial organisational barriers exist to the implementation of teleworking. (Illegemens et al, 2001, 278.)

### 3.4.2 The individual employee

The individual employee includes perceptions and attitudes of the individuals as well as situational characteristics; job characteristics, commuting characteristics and socio-demographic characteristics.

**Perceptions and attitudes of the individual**
The attitudes and perceptions of the individual provide the grounds as to whether or not to telework. If an employee is ill-informed of the potential of teleworking as a possible work form, he/she is unlikely to consider it as an option. In addition, if an employee is risk aversive, he/she may not want to jeopardize their current career potential by adopting telework. Telework is a rather new work form and employees may view the risk too high to try it out. (Illegemens et al, 2001, 280.)

**Situational characteristics**

*Job characteristics:* Some jobs are location dependent and not suitable for teleworking. However, current jobs usually have one or more tasks that can be performed through teleworking. The workforce is seen to be moving towards a knowledge working where the centralisation of information is necessary, rather than the physical centralisation of workers. (Illegemens et al, 2001, 279.). However centralisation of the individuals helps to consolidate information between workers.

*Commuting characteristics:* The lack of balance between the demand for mobility and the transport infrastructure has resulted in increasing congestion levels. Higher congestions levels are extending commuting trips and increasing commuting expenses. These may be seen as substantial drivers of an increased adoption of teleworking. (Illegemens et al, 2001, 279.)

*Socio-demographic characteristics*: Flexibility becomes more and more important for families to be able to manage their work-life balance. Traditional, gender-based roles push employees to seek far more flexible working methods in order to combine their work and household responsibilities. (Illegemens et al, 2001, 279.) However, teleworking is based mainly on electronic communication, which may have a negative influence on teleworkers' social interactions and may in the worst-case scenario lead to social Isolation and reduce teleworkers' motivation and job satisfaction.

## 3.5 The conceptual framework

The aim of the study is to evaluate and analyse different drivers and constraints in the individual employee's socio-demographic characteristics by applying 12 hypotheses apart from their work-life balance which is believed to add to teleworkers motivation and performance as well as their social relations and communications which may in the worst-case scenario lead to isolation. The 12 hypotheses (H1a-H5b) are based on earlier research and literature.

### 3.5.1 Work-life balance

The balance between work and family has been studied partly in different telework research. Vittersoe, Akselsen, Evjemo, Julsrud, Yttri, Bergvik (2003, 205) state that teleworkers had significantly lower levels of interference from work to family and vice versa, as well as significantly fewer problems managing their family time, than they did before they began teleworking. Teleworking may allow employees to combine work with caring for their children or dependants and allow them to spend more time with their families or on leisure interests and reduce the time spent commuting (Kerrin & Hone 2001, 133) and provide flexibility to

live closer to individuals' relatives (Heinonen, Saarimaa 2009, 18). Saved commuting time and a better combination of family and work may also increase part-time workers working hours.

In addition, the balance between work and family is seen to increase teleworkers´ work motivation and performance (Heinonen 1998, 17). Kerrin and Hone (2001, 133) refers to teleworking results from Khalifa and Etezadi (1997) that employees expect the personal outcomes of teleworking to be predominantly positive with improvements expected in their overall quality of life, job satisfaction and physical well-being.

However, the potential advantages also bring with them potential disadvantages, for example, when employees are teleworking from their own homes, they may have problems separating their work from their home lives. In addition, some see that the time spent commuting is a useful break, which was used previously to separate work and home lives. Also there is a concern regarding the extent to which non-work aspects of life, such as child care and social commitments may distract teleworkers from their tasks. (Kerrin & Hone 2001, 133.) Similarly where teleworking is associated with an increase in routine tasks, there may be a negative effects on job satisfaction (Kerrin & Hone 2001, 134).

Despite these disadvantages, teleworking is generally seen to improve the integration of family life and work life through a more flexible organisation of work-related tasks. However, the implementation of teleworking could also have a negative social influence. Social interactions at the conventional workplace are reduced through the implementation of teleworking, which could lead to social isolation. (Illegemens et al, 2001, 286.)

Consequently, the following hypotheses are formulated on the work-life balance:

*H1a* *Teleworking increases participant`s work-life balance*

*H1b* *Better work-life balance in teleworking will increase part-time employees working hours.*

*H2a* *Teleworking increases participant`s motivation, job satisfaction and job performance.*

*H5a* *Participants do not feel isolated at home or work while teleworking.*

### 3.5.2 Social relations and communication

Telework may have a negative impact on the participant's social environment by adversely affecting their interactions with peers, effectiveness of communication and co-worker

support. In addition telework may be seen to lead to isolation from close colleagues. (Kerrin & Hone 2001, 133.)

Baileys and Kurkland (2002, 390) continue, that teleworkers´ social and professional isolation might result in teleworkers becoming invisible at the workplace, missing out on office news and gossip, be forgotten in the distribution of more formally constructed information and receive poor evaluations. Over time teleworkers may resign from the organisation, return to the office or stay at home with high levels of dissatisfaction.

Several studies reveal the limited impact of telework in samples where it is practiced infrequently. Bailey and Kurkland (2002, 391) continues with Bèlanger's findings (1999) stating, that employees who telework part-time are not left out of the office network, nor does telework make a difference in determining which individuals communicate with each other. In addition, finding a social life outside of the working environment and by using an infrastructure that supports the teleworkers´ social network environment and communication can prevent possible isolation.

**Strong and weak ties**

When using an electronic infrastructure for teleworking communication, face-to-face communications (P-ties) are replaced by electronic communications (E-ties) which interacts with the strong and weak ties (Arling 2004, 6).

Strong and weak ties are seen as the relationships between the individual workers. The difference between strong and weak ties is shown in Figure 5 and explained further in Table 6.

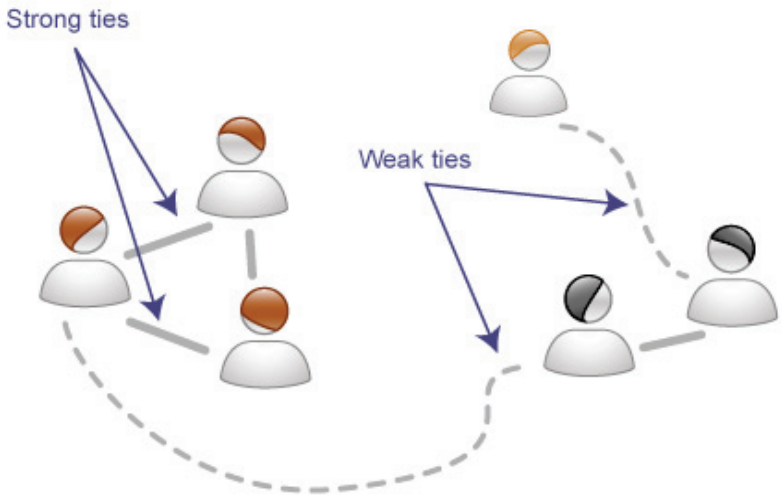


Figure 5: Differences between strong and weak ties (Filev 2008)

When replacing the P-ties with E-ties teleworkers do not communicate as frequently on-line with co-workers or supervisors (strong ties) than similarly occupied non-teleworkers. Tele-working leads to a more structured and formalized communication with supervisors and to a lesser extent, with co-workers. (Dimitrova, Garton, Gulia, Haythornthwaite, Salaff, & Wellman 1996,, 229).

Professor Kaski emphasises the importance of weak ties. According to his research, weak ties are the lifeline for an individual's social network. They keep the net together even if the strongest ties fall. This was also predicted by Mark Granovetter in the 1970s. Granovetter claimed that in order for a community to stay bonded together, it needs incidental, weak ties. Regarding this, casual friends and meetings are more important for nets than old stable friends. (Paukku 2007.)

| COMPARISON BETWEEN WEAK AND STRONG TIES | |
|---|---|
| **WEAK TIES** | **STRONG TIES** |
| ❑ Acquaintances, casual contacts, others in an organisation.<br>❑ Tend to be unlike each other.<br>❑ Travel in different social circles. | ❑ Friends, close friends, co-workers, team-mates.<br>❑ Tend to be like each other.<br>❑ Travel in the same social circles.<br>❑ Experience, information, attitudes and resources, contacts come from same pool. |
| RESOURCES AND INFROMATION EXCHANGES | |
| ❑ Infrequent, primarily instrumental.<br>❑ Share few types of information or support.<br>❑ Low motivation to share information, resources etc. | ❑ Frequent, multiple types, emotional as well as instrumental.<br>❑ High level of intimacy, self-disclosure.<br>❑ Reciprocity in exchanges. |
| STRENTH OF WEAK AND STRONG TIES | |
| ❑ Experience, information, attitudes, resources and contacts comes from different social spheres | ❑ High motivation to share what resources they have |

Table 6: Comparison between weak and strong ties (Haythornthwaite 2005, 128)

**Computer-supported social networks (CSSNs)**

Electronic communication tools, such as the internet and computer software have helped to maintain teleworkers´ social networks and their infrastructure. A computer-supported social network (CSSN) enables teleworkers to connect within and between the organisations when they are physically dispersed. CSSN sustains strong, intermediate, and weak ties that provide information and social support in both specialised and broadly based relationships. (Dimitrova et al 1996, 213.)

One of the most famous social network sites is Facebook, which exceeded 300 million users in September 2009 (Helsingin Sanomat 2009). Facebook was set up in 2004 by Mark Zuckerberg with his two student friends from Harvard University and it was intended for internal use in the University. After a short time, Facebook was expanded to Stanford, Columbia and Yale Universities and eventually to external users. (Tikkanen 2009.)

Facebook is seen as a multifunctional site with different utensils, emails, instant messaging, calendar invitations and discussion functionalities etc. The site is seen as a competent package deal to divert communicational necessities and its strength is its scope, where almost everyone is available for private and professional contact. (Tikkanen 2009.)

According to Tikkanen (2009) the Facebook site is an ideal base for the housewife, individuals who live in remote districts and whose close friends are living far away, individuals who have lost contact with someone over the years, employees who seek additional workers for their projects, expatriates who want to keep contact with their homeland and individuals who find it difficult or are unable to create social contacts in normal life. (Tikkanen 2009.)

According to Nielsen`s recent research, over two third of internet users are surfing through blogs and social networks. Social networks are becoming more and more frequent among internet users and are surpassing email usage. Nielsen continues that the common user of social networks such as Facebook is no longer popular only among teenagers. According to the above mentioned research, the common user nowadays is a 35-49 year old adult. 50-64 year old people visited the page twice as often compared to teenagers under 18 years old. Social networks have also made a breakthrough in increasing mobile-internet, a study carried out in the United Kingdom shows that over 23 percent of mobile-internet users visited social networks using their mobile. The amount has increased by over 249 percent in the past year. (Tietokone 2009.)

The aim of professional social network sites is to create business contacts either to create business in the current environment or to create possibilities for the individuals themselves. These professional sites are an easy way of keeping weak ties active; even if there is no

active communication. These sites also maintain the contact information of one's weak ties, which are difficult to keep up-to-date in more traditional ways.

Consequently the following hypotheses are formulated on the social relations and communication:

*H3a* *The participant feels it is important to be at the heart of the unit/directorate while teleworking*

*H3b* *The participant does feel a part of the team while teleworking.*

*H4a* *Verbal communication between colleagues is very important to participant while teleworking.*

*H4b* *Communication has improved with distant and close colleagues as well as with managers while teleworking.*

*H4c* *In case of non-work and work related discussions participants contacts their colleague/acquaintances from home rather than waiting for the next office day.*

*H4d* *Participants do feel up-to-date with office policies/rumours/changes while teleworking.*

*H4e* *The communication methods have not changed with close or distant colleagues while teleworking.*

*H5b* *The optimum time to telework is 2 days a week to maintain a participant`s social contacts while teleworking*

## 3.6 Summary

The decision to implement telework often consists of several variables that influence the implementation process. From an organisation's perspective, teleworking will only be offered as an option to an individual worker if a minimum set of technological, institutional and organisational requirements are fulfilled. From an individual's perspective, teleworking will only be considered if a number of drivers to adopt the practise are present in the individual-employees situational characteristics, perceptions and attitudes as seen in Figure 6 . (Illegems et al. 2001, 277.)

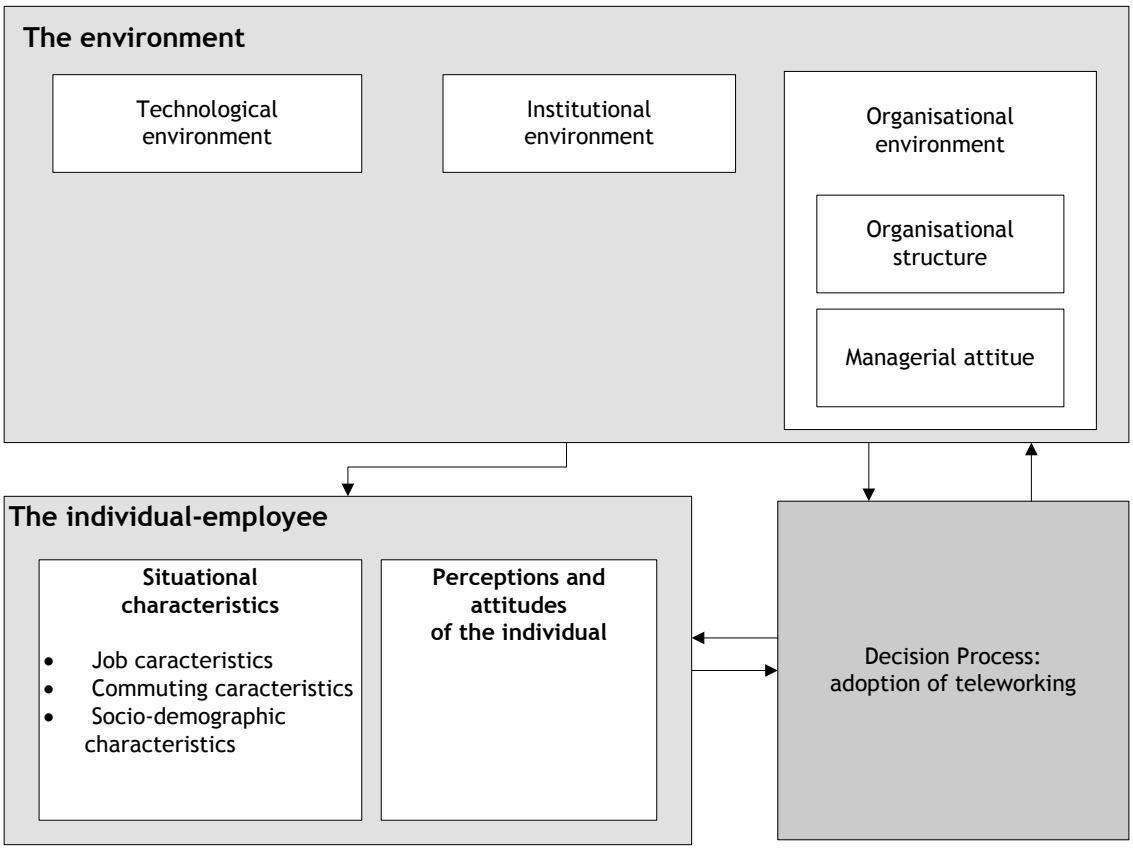


Figure 6: Basic conceptual framework for modelling the implementation process of teleworking (Bernardino et al. 1992, 20-30)

The final decision to telework or not is potentially influenced by a variety of drivers and constraints. The aim of the study is to evaluate and analyse different drivers and constraints in an individual employee's socio-demographic characteristics throughout the 12 hypotheses (H1a-H5b). These hypotheses are based on an earlier research and literature and focus on participant's work-life balance which is believed to add to teleworkers´ motivation and performance as well as social relations and communication which may in the worst-case scenario lead to teleworkers isolation as seen in Figure 7.

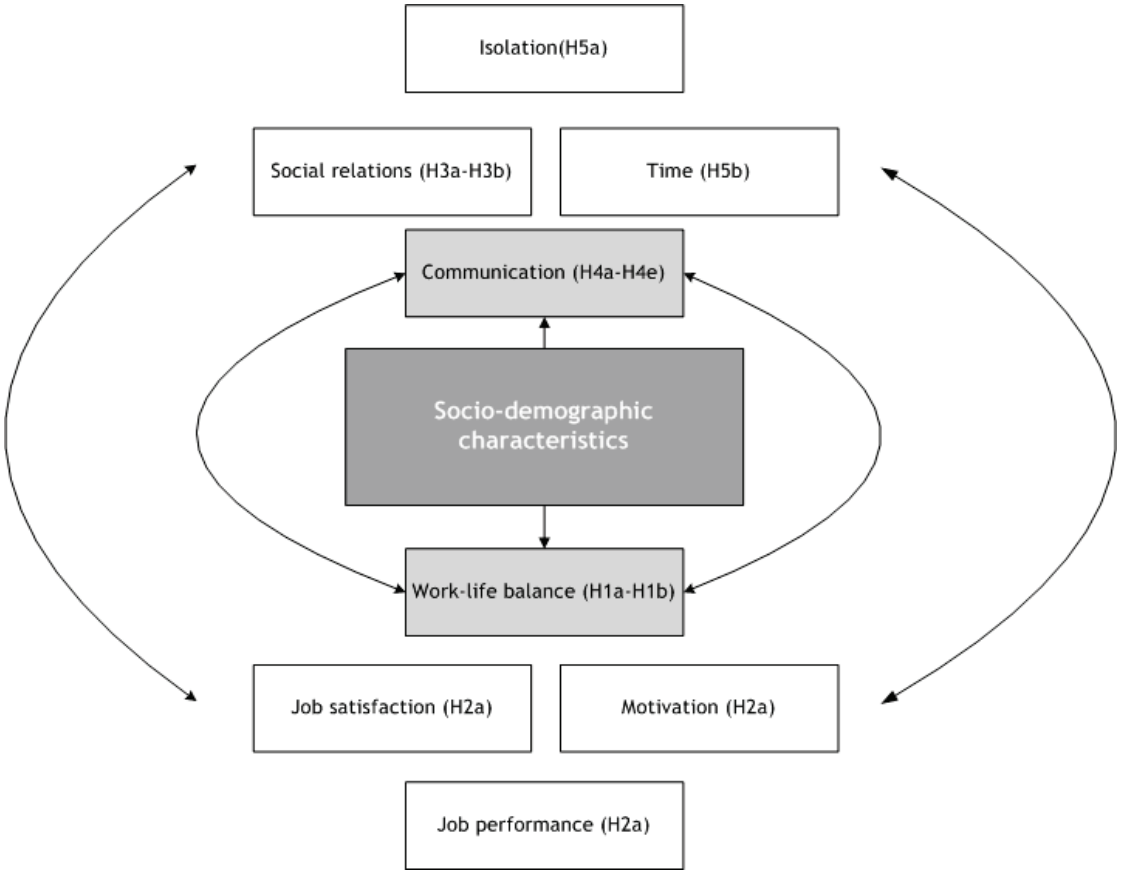


Figure 7: Theoretical framework: Individual teleworker`s socio-demographic characteristics

The European Patent Office has started a teleworking pilot project focused on part time working. What makes the European Patent Office an interesting study target is the fact that approximately 70% of the European Patent Office's workforce are expatriates. Socio-demographic aspects including work-life balance, strong and weak ties, as well as the social networks of expatriates are different compared to local employees. Therefore this study aims to measure the socio-demographic variables in the European Patent Office's pilot project.

# 4 Research and development project

Structured project management means managing the project in a logical, organised way, following defined steps (PRINCE2 2009a). The project's life cycle contains diverse steps, where project ideas, expectations and possibilities are recognised, where the project is implemented and supported and finally evaluated (Artto, Martinsuo & Kujala 2006, 47).

This research study is a part of a larger pilot project called Part Time Home Working, which aims to implement teleworking as a new working method in the European Patent Office. Teleworking is not new but already exists in management level at the European Patent Office. However, Part Time Home Working will be a new concept for the European Patent Office's

entire staff dealing with patent applications, as it will offer its employees a more flexible way to combine work and family life.

The Part Time Home Working pilot project is designed according to PRINCE2 (Projects in Controlled Environment). The project management is based on a variety of phases, including start up, initiation, controlling stage, managing product delivery, managing stage boundaries and closing the project (PRINCE2 2009b.)

Pelin (2008, 85) separates project planning and control into two processes; process control and implementation process. Process control contains project start-up, project design, project monitoring as well as project closure and handover. Implementation process contains project implementation and project evaluation as shown in Table 7.

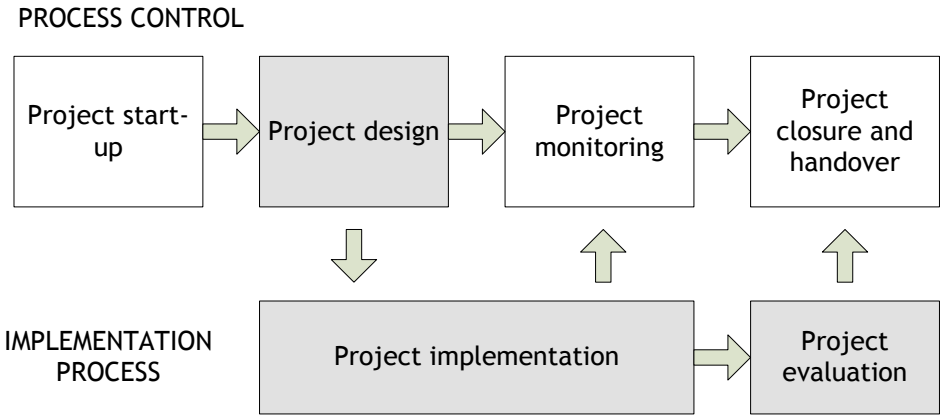


Table 7: Project planning and control (Pelin 2008, 85)

This research and development project is designed according to Pelin's project planning and control method including project design, project implementation and project evaluation which are seen as the main three elements of the project management.

## 4.1 Project design

Project design includes introduction, the project objectives, project phases and schedule, project resources and control as well as risk evaluation and evaluation plan.

### 4.1.1 Introduction

The global market change is forcing organisations to move away from an industrial economy towards a knowledge based economy. A knowledge based economy requires companies and organisations to view and reconstruct their operations through strategic renewal (Hannus, Lindroos & Seppänen 1999, 153). The critical resource lies in knowledge and competence and

where the technology allows new structures and value mechanisms to be implemented (Hannus etc. 1999, 1).

Mostly the strategy is defined as a direction and scope of an organisation over the long term, which achieves advantage in a changing environment through its configuration of resources and competences (Johnson, Scholes & Whittington 2008, 3). The implementation of the new strategic renewal process requires a wide-ranging research and development programme, which enables the organisations to go through the goals and concrete effects as well as build the necessary know-how. (Hannus 2004, 394.)

Due to the global market change, a strategic renewal process was launched in spring 2006 in the European Patent Office to develop an understanding of the challenges and the direction of the Office. The Strategic Renewal Portfolio Group (SRPG) was established and consists of a variety of domains. The domains are seen as areas which will have the greatest contribution to the future of the office.

One of the domains is called Future of Work and addresses the question of what the work of the patent process areas will look like in the future and how organisational structures can support it. The Future of Work includes different projects, one of them being the Part Time Home Working Pilot Project (PTHW).

### 4.1.2 Project objectives

The purpose of the Part Time Home Working pilot project is to implement a new flexible working model in the European Patent Office. The aim is to clarify different motivating factors and constraints before implementing the model office wide. The project's focus is on efficiency and motivation and the drivers and constraints are believed to be in terms of autonomy, work/family interaction, space and resource sharing, available capacity, efficiency and productivity, interaction with colleagues and third parties, interaction with manager, sickness and stress, career, isolation, technical areas, motivation, and an improved balance between private and professional life.

The possible benefits likely to arise during the project cannot be easily estimated due to the complex interaction between teleworkers, projects, colleagues, family and their line managers. In addition, motivating factors can turn into constraints, which emphasises the importance of the pilot project to get a better understanding of these interactions and their effects.

In relation to this, the aim of this research study is to test the hypotheses in the theoretical part and measure the pilot project tester's subjective view on the socio-demographic charac-

teristics apart from work-life balance, social relations and communication. The research study is part of the Part Time Home Working pilot project initial test phase, which aims to give results for the next evaluation phase by evaluating and studying if something can be done in between to prove the pilot project and to prevent possible isolation and imbalance in the participants' social network.

### 4.1.3 Project phases and schedule

The Part Time Home Working pilot project is divided into five phases as seen in Table 8. The research study is implemented in Phase II.

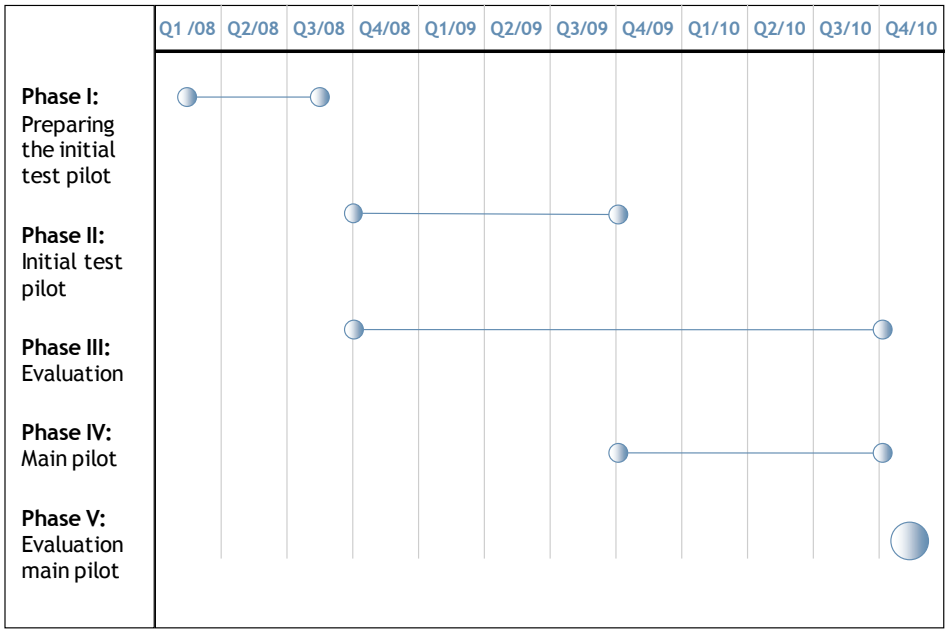


Table 8: The Part Time Home Working pilot project phases and schedule

**Phase I: Preparing the initial test pilot**

Preparations for the initial test pilot started in early 2008. Phase I included planning, preparing and technical and physical equipment for the initial test pilot.

**Phase II: Initial test pilot**

Phase II included the initial test of 15 testers from Munich and the Hague offices at the end of 2008. The focus lies on testing the equipment and technologies, which were planned for the main pilot. The impact on the occupational health of the teleworkers were addressed at all levels, including home visits and inspection of the working environment. The 15 testers comprised of examiners and formalities staff, who use tools requiring heavy use of the PC and IT-networks.

**Phase III: Evaluation**

Phase III includes evaluation of the results of the initial test pilot and aims to define the first version of an office-wide policy of teleworking. One aspect is to find out who would be allowed to telework indicating the specific conditions for Part Time Home Working. Furthermore the main success criteria will be defined, which helps to answer the questions if the project has been successful for both sides, the staff member and the office. Phase III runs concurrently with phase IV until the end of the 2010.

**Phase IV: Main pilot**

Phase IV includes the main phase, which is due to start at the end of 2009 and will last for one year. It comprises 100 staff from all areas of the office. This phase will concentrate less on the technical aspects and more on the organisational aspects. Feedback will be gathered on different variables and the results from this phase will help the project board to measure key indicators from teleworking, its impact on the work itself for the individual unit and the required changes to the office infrastructure to accommodate such a working method if extended to the whole office.

**Phase V: Evaluation main pilot**

Phase V includes evaluation of the findings of the main pilot, a decision by the President and drafting guidelines for the introduction of teleworking and individual agreements. The timeframe is estimated to be in place by the end of 2010.

**Development of the research process**

This research study is being performed during phase II and comprises 15 testers. The aim is to provide results for the Phase III evaluation that prepares for the Phase IV main pilot comprising 100 staff members. The research study measures the tester’s socio-demographic characteristics and the effect on the person who is working remotely from the main office.

The research and development process is divided into five phases; thematic analysis, design, implementation, evaluation and the publication part as shown in Table 9.

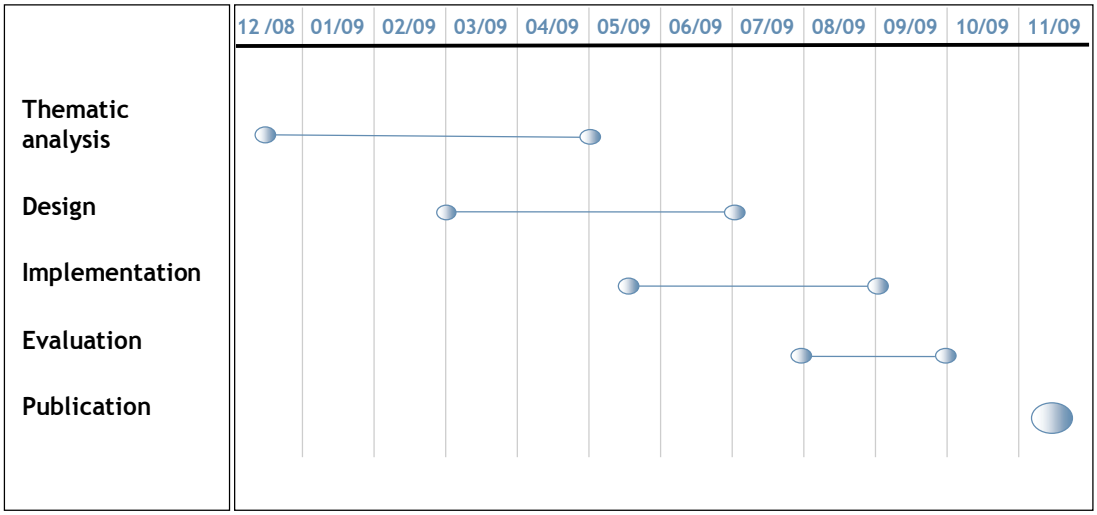


Table 9: Research project phases and schedule

The thematic analysis part consists of familiarisation with the phenomenon, theoretical data collection and topic selection. The design part contains information derived from the research process and the preparation of the research plan, which includes research approach, method selection, the implementation and the evaluation plan. The implementation part contains the estimation and monitoring of the research study and carrying out of the research process according to the plan. The implementation part includes the methodological research and the results from the research. The evaluation part contains the reliability of the research process and the ethics and usefulness of the study. The final publication part contains delivery and publication of research study. (Laurea 2007, 5.)

### 4.1.4 Project resources and control

The Part Time Home Working project is controlled in line with PRINCE2 methodology including a project board, a project manager and project members.

In the immediate term most of the costs will fall in the form of initial design and implementation of the system and the additional hardware purchases and installation thereof as well as the costs of support and maintenance of the new system. All major financial costs will be reported to and approved by the project board prior to investment.

The project board authorises the acceptance of all major products with each stage before the project is allowed to move to the next phase. The project manager controls the day-to-day activities on the project throughout the maintenance and management of the project plan, risk log, issues log and quality log. In addition, the Project Manager will provide the project board a monthly highlight report detailing progress being made, budget and resources status and any new issues that may have arisen plus an end stage report of each distinct project

stage. In addition, the project contains several project members who have their own responsibility in terms of IT, legal issues and occupational health etc.

The thesis writer is responsible for the outlined analysis and evaluation of the different drivers and constraints in the individual employee's socio-demographic characteristics in Phase II, which is then reported to the PTHW programme manager in the Hague and Laurea University of Applied Science's thesis advisor. From the outlined analysis the final report is drawn up, which is the basis of this thesis.

### 4.1.5 Risk evaluation

A well designed project plan may prevent many forthcoming complications and risks, but in addition the project plan should be able to be adjusted according to the project target needs. (Ruuska 2007, 248.)

Ruuska (2007, 248) defines the Risk Management to include four tasks. These are:

- Risk Analysis.
- The drawing up of a list of risks.
- Agreement on action points and monitoring.
- Maintenance of the risk list.

Risk Analysis can be carried out in project meetings, where the risk list is drawn up and scored by percentages according to their probability and impact on the project. The higher score the risk receives, the more impact it has on the project as seen in Table 10.

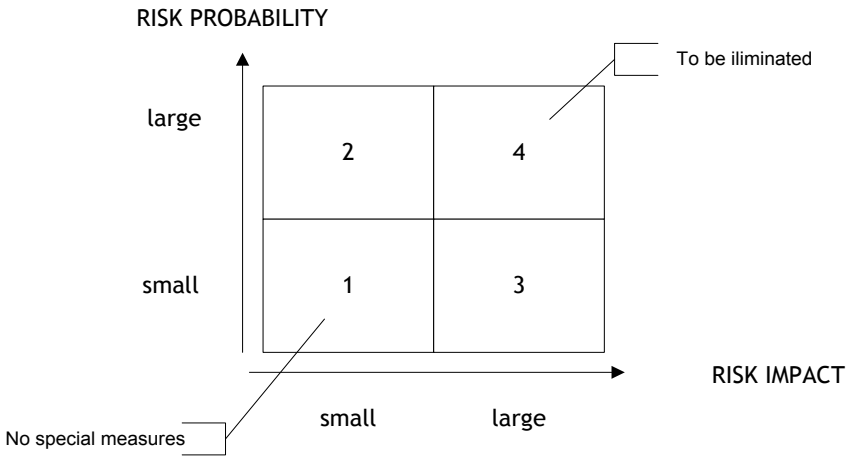


Table 10: Risk chart (Ruuska 2007, 253)

The risk evaluation and the risk chart of the outlined research project can be seen in Table 11 and Table 12. The charts Indicates that the two main potential drawbacks in the research project are in the information flow and the reply rate from the participants.

As the European Patent Office is a large international organisation with different country locations in Europe (five sites in four countries: Germany, The Netherlands, Austria and Belgium), the information flow may not be as frequent and sufficient as if it would be if the location would be just in one place. The prevent measures are seen to set up a regular contacts with Project Manager via video conferencing, e-mailing and phone discussions. Further personal meetings are also planned, when the Project Manager visits the Munich location.

Additionally a major potential drawback is seen in the response rate, where not all of the participants would reply to the survey. An extra risk impact is gathered from the tight schedule which has steered the survey to be submitted close to holiday periods. The prevent measures are seen to set up the survey before holiday periods with specific data information when the survey is valid and the closing data. Necessary reminders are also sent if necessary.

| Nr. | Potential drawbacks | Probable cause of drawback | P * I | Prevention measures |
|---|---|---|---|---|
| 1 | Project ramble | Unclear limitations and targets | 0,4*0,7= 0,28 | Targets should be clearly written down |
| 2 | Elongation of the Thesis schedule | Error on estimation of hours worked | 0,4*0,8= 0,32 | Realistic project plan that allows small variations on the time scale |
| 3 | Elongation of the previous project phase | Budgetary and reasons, law and regulation reasons | 0,2*0,9= 0,18 | *Cannot be influenced* |
| 4 | Information flow | Large international organisation with different country locations and directors | 0,7*0,7= **0,49** | Regular contacts with project management via video conferencing, e-mailing and phone discussions. |
| 5 | Security data leaks on survey results | Data handled in different computers | 0,1*0,7= 0,07 | To store the survey results to secured data base which is protected by password |
| 6 | Not everyone replies to the survey | Tight schedule that steer survey to be submitted close to holiday periods | 0,8*0,9= **0,72** | Survey will be sent before the holiday periods with specific data when the survey is valid and reminders will be sent if necessary |

( P= Probability 0-1, I = Impact 0-1)

Table 11: Risk list and evaluation of the research project

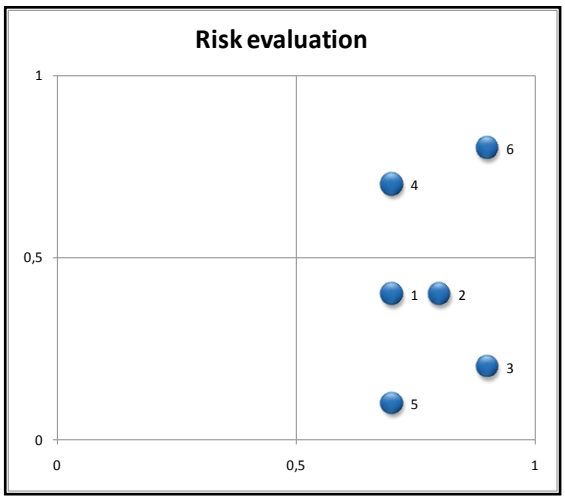


Table 12: Risk chart of the research project

### 4.1.6 Evaluation plan

The research evaluation plan includes the reliability, the exploitability and impressiveness of the research. The research reliability is evaluated throughout reliability and validity of the research results by designing the research survey in a manner that confirms the accuracy of the measurements. The survey is additionally pre-tested prior to the survey being sent out to the participants.

The research results on the participants' work-life balance and social environment are sent to the program manager at the end of October 2009 to discuss and evaluate the outcome of the research analysis. According to the research results a development plan is set up in cooperation with the project manager to exploit the results for the evaluation Phase III and the main pilot Phase IV of the Part Time Home Working pilot project.

Additionally according to the research findings, further qualitative and quantitative surveys are set into Phase IV of the Part Time Home Working main pilot to include the supplementary research on the given subject matter. The further surveys will also test the tendency of the previous replies, whether the replies will be similar or identical as in the previous survey.

## 4.2 Research implementation and results

Research implementation and results include research problem, target group and research methodology, data collection and data analysis of the research.

### 4.2.1 Research problem

The research problem is to explore the Part Time Home Working pilot project participants' subjective view on the socio-demographic characteristics apart from their work-life balance, social relations and communication throughout the theoretical 12 hypotheses. The research question and sub-questions aim to evaluate and study whether something can be done in between the project phases to improve the pilot project and to prevent possible isolation and imbalance in the participants' social environment before continuing to the next phase.

The main research question is as follows:

- What can be done to maintain the participants' socio-demographic characteristics while teleworking?

The sub questions, which help to construct a picture of the participants' socio-demographic characteristics, are the following:

- Have the participants` work life balance improved while teleworking?
- Have the participants' motivation, job satisfaction or performance improved while teleworking?
- When teleworking, is there a change in the participants´ social relations and communication in the international working environment?

### 4.2.2 Target group and research methodology

The target group contains the Part Time Home Working pilot projects Phase II 15 testers. From these 15 testers, 10 are examiners and 5 are formalities officers working in the Hague and in Munich at the European Patent Office.

The chosen research study does not aim to generalise the analysed results to all the staff working at the European Patent Office. Instead the study aims to understand the teleworking phenomenon's affect on the participant's socio-demographic aspects.

The chosen empirical research method in this study is a design action research one. A design action research aims to create or plan a new operation model, which is based on a theoretical planning process. The focus is on a post-trial reflection and evaluation of the continued development of the model. (Heikkinen, Rovio & Syrjälä 2006, 67.)

Design action research examines a series of entangled variables affecting the wholeness of the project and includes both quantitative and qualitative research methods (Heikkinen et al 2006, 70). The qualitative research can be used as a preliminary clarification for a larger quantitative survey. In addition, the quantitative survey can be used as a preliminary clarification to create the grounds for a smaller qualitative research. (Hirsjärvi, Remes & Sajavaara 2008, 132-133.) This study has chosen an internet based survey as the quantitative research method to receive preliminary clarification for the further qualitative and quantitative surveys.

The advantages of the internet based surveys are cost, speed, effectiveness and the fact that the schedule and costs can be evaluated fairly accurately. The disadvantages of the internet based surveys are the seriousness of the replies, how well the question is understood and that it contains high possibility of non-response. (Hirsjärvi et al. 2008, 190-191.)

### 4.2.3 Data collection

Due to the fact that the participants live in different countries, the empirical investigation in this study concentrates on a quantitative internet based survey. The quantitative internet based survey consists of 33 questions and it aims to answer the questions relating to the participants' socio demographic situation (see Annex 1).

The internet based survey was carried out in the middle of July 2009 before the summer vacation period and was extended to the end of August to include a few participants' answers who had been absent during the summer period. The survey was tested and conducted throughout the Laurea University of Applied Science's E-form, which guarantees the respondents anonymity and secures the data collection. The results were analysed through Excel and the SPSS statistical analysis programme in September 2009.

### 4.2.4 Data analysis

Data analysis includes entering the data into computer files, inspecting it for errors and running tabulations and various statistical tests (Burns & Bush 1998, 69). The results from the survey were coded and analysed throughout two steps in the Excel software and the SPSS statistical analysis program shortly after the participants had answered the questions in September 2009.

In the first step, electronic survey data was converted to an Excel spreadsheet program. Excel software has been used to create one dimensional charts as well as for analysing simple variables. These simple variables included, for example, average time in the office. Additionally the one dimensional charts were made using bar diagrams of Excel to show distributions of the each answer.

In the second step data was converted from the Excel spreadsheet to the SPSS analysis program. First three variables were defined as string variables: gender, expatriate status and marital status. For the multiple choice questions, the answers were converted to integer based, as seen in Table 13.

| Conversion |
| --- |
| 0=”Don’t know” |
| 1=”Strongly Disagree” |
| 2=”Slightly Disagree” |
| 3=”Remains the same” |
| 4=”Slightly agree” |
| 5=”Clearly agree” |

Table 13: Conversion table from text strings to integers for further analysis in the SPSS

SPSS software can only handle number based data as one cannot calculate correlations based on strings. After importing and converting data into SPSS programs, analysis of the data was performed. Basic data was extracted using function frequencies, which analyses the content of the data as seen in Table 14. For further data mining, correlations between all integer variables were calculated into a table, as shown in Annex 2. Correlation between working years in the office and being up-to-date in the office policies were plotted on the XY-chart to show correlation, as seen in Table 26.

The number of received responses from the internet based survey at the end of July 2009 was 11 valid responses. After two reminders, two additional valid responses were received, increasing the total responses to 13 out of 15, leading to a response rate of 87% which confirms the reliability of the research.

# 5 Data analysis and findings

The research question and sub questions aimed to evaluate and study if something could be done in between to prove the Part Time Home Working pilot project in the European Patent Office and to prevent possible isolation and imbalance in the participants’ social environment before continuing onto the next phase of the project.

The questionnaire aimed to achieve the teleworkers subjective views on three goals related to the socio-demographic characteristics of teleworking. Firstly, to identify whether the balance of work-life has improved because of teleworking. Secondly, to measure the change in the teleworkers’ job satisfaction, performance and motivation. Thirdly, to investigate the teleworkers’ social relations and communication with the international working environment.

In this chapter these questions will be answered based on the research data. The data has been gathered from the conducted internet survey by the Laurea University of Applied Sciences E-form. The gathered data was then inserted into two programmes: Excel and SPSS 17 - an analysis tool for data handling and data mining. Excel was used for direct analysis,

whereas SPSS was utilised for looking at the correlation between the questions and hypothesis.

Pearson's $x^2$ test is used to find the correlation between different variables. The questionnaire used only dichotomous variables and therefore each hypothesis can be analysed utilising $x^2$ test. Pearson's $x^2$ test is based on the equation:

$$X^2 = \sum \frac{(observed - expected)^2}{expected}$$

The correlation values were calculated automatically utilising the SPSS programme. The correlation which received a value of more than 0,60 was evaluated in this study to determine the teleworking effect on the participant's socio-demographic characteristics. Due to the limited number of questions and answers, all the variables were analyzed against each other to find correlations, see Annex 2.

In addition, the internet survey included one open question to determine what in the participants own opinion could be done to prevent an imbalance in one's social environment. The results have been listed at the end of the chapter and conclusions are made accordingly. The findings have implications for the design and promotion of the Part Time Home Working pilot project Phases III and IV.

## 5.1 Descriptive statistics in the sample population

A total of 15 pilot workers took part in the Part Time Home Working project. The research questionnaire was sent to all 15 of the Part Time Home Working pilot project members in Phase II. 13 responses were received; there were 2 non responses due to the vacation period.

The background information of the 13 responded participants in the Part Time Home Working (PTHW) pilot project can be seen in the following Table 14.

| | | Frequency | % | | Frequency | % | Total N |
|---|---|---|---|---|---|---|---|
| **Gender** | Female | 9 | 70% | Male | 4 | 30% | 13 |
| **Expatriate** | Expatriate | 10 | 77% | Non-expatriate | 3 | 23% | 13 |
| **Marital status** | Married | 10 | 77% | Single | 3 | 23% | 13 |
| **Family phase** | Young children | 9 | 70% | Adult or no children | 4 | 30% | 13 |
| **Working in EPO since** | 6 to12 years | 10 | 77% | Over 20 years | 3 | 23% | 13 |
| **Working experience related to close colleagues** | More experienced | 7 | 54% | Same experience | 6 | 46% | 13 |
| **Percentage of working hours before PTHW** | 100% | 10 | 77% | 60-80% | 3 | 23% | 13 |

Table 14: PTHW participants` background information

## 5.2 Balance between work and life

Research suggests that teleworking increases the teleworker's work-life balance, which may result in an increase of the teleworker's motivation, job satisfaction and performance. In addition a better work-life balance from teleworking may increase part-time employees working hours.

The research questions asked were the following: ***Has the participants` work life balance improved while teleworking and has the participants' motivation, job satisfaction and job performance improved while teleworking?***

The following three hypotheses were created in relation to the balance of work-life:

*H1a* *Teleworking increases a participant's work-life balance*

*H1b* *A better work-life balance while teleworking will increase a part-time employee's working hours.*

*H2a* *Teleworking increases a participant's motivation, job satisfaction and job performance.*

### 5.2.1 Work-life balance with working hours

*H1a* *Teleworking increases a participant's work-life balance.*

The empirical findings partly support the H1a hypothesis. The majority of the participants clearly agreed with the given hypothesis, that teleworking increases their work-life balance although one slightly disagreed as shown in Table 15. There were no high correlations found on the SPSS in relation to the participant's work-life balance.

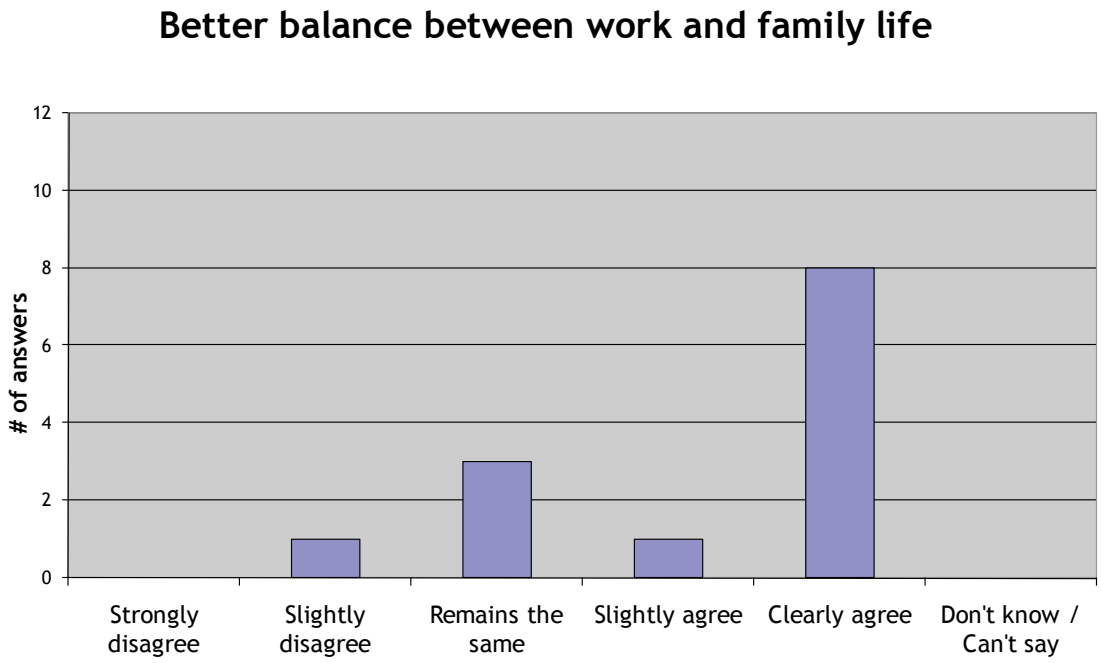


Table 15: Participant's working-life balance after PTHW

*H1b* *A better work-life balance in teleworking will increase the part-time employee's working hours.*

The empirical findings give a variety of results to the H1b hypothesis, showing that one part-time employee increased her working hours by 5 or more hours/week. In addition it is important to state that 10 of the participants already worked 100% so only 3 of the participants had the opportunity to increase their working hours as shown in Table 16.

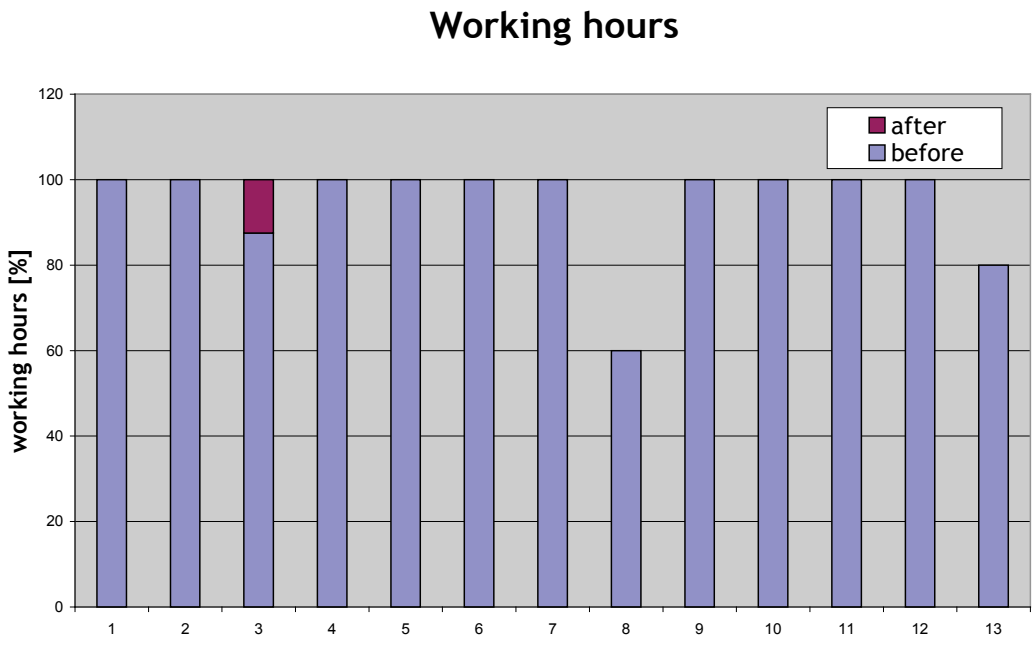


Table 16: Participant’s working hours before and after PTHW

### 5.2.2 Motivation, job satisfaction and job performance

*H2a* *Teleworking increases a participant's motivation, job satisfaction and job performance.*

The empirical findings of this survey support the H2a hypothesis, indicating that for over half of the participants their motivation and job satisfaction increased as a result of teleworking, whereas for a few participants it remained the same. In addition the empirical findings partly support the statement that the participant's job performance increased due to teleworking, by indicating that for the majority there was no change in the job performance as shown in Table 17.

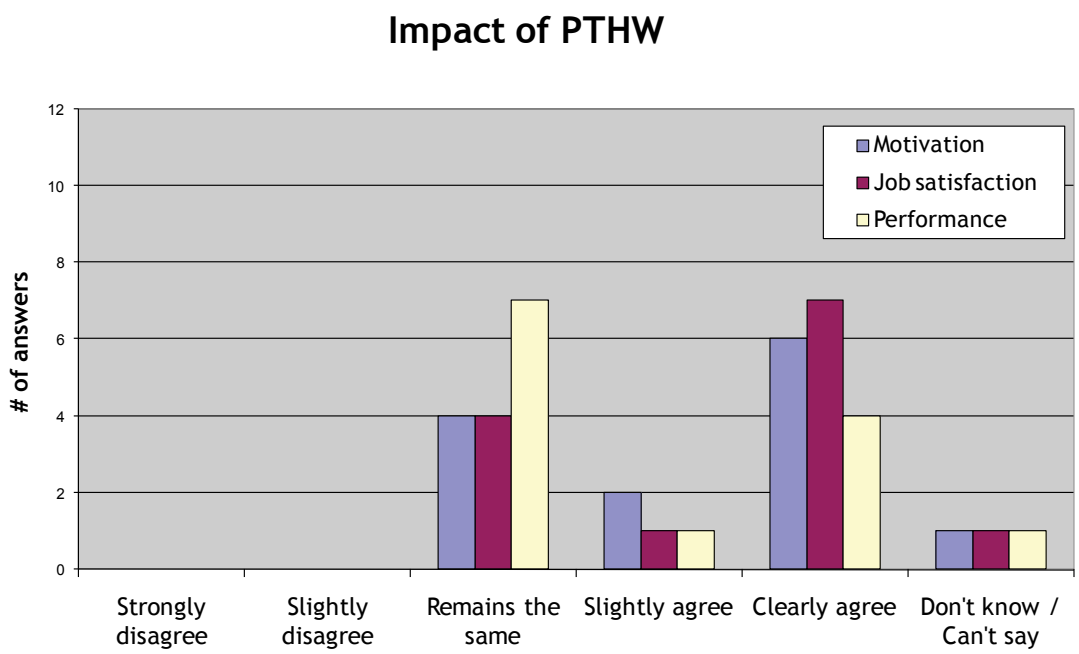


Table 17: Participants motivation, job satisfaction and performance while teleworking

SPSS analysis indicated that job satisfaction ($x^2$=0,698 and p=0,008) and motivation ($x^2$=0,775 and p=0,002) correlated well with job performance. In addition job satisfaction and motivation are interpreted as being similar from the test persons point of view ($x^2$=0,945 and p=0,000).

**Conclusion**

The conclusion with regard to work-life balance, motivation, job satisfaction and performance in the three hypotheses is as follows. The majority of the participants feel that their work-life balance improved due to PTHW. Nevertheless the expected increase of the working hours of the part-time employees did not occur as only one of the three part-timers only

increased his/her working hours by 13 %. More than 50% of the test participants believed that their job performance, motivation and satisfaction had increased due to the Part Time Home Working pilot project. In addition the SPSS analysis revealed a strong correlation between job satisfaction and motivation, which indicates that when a participant is motivated and has positive job satisfaction, their job performance increases. A summary of the hypotheses (H1-H2) of the balance between work and life can be seen in Table 18.

| Code | Hypotheses (H1-H2 hypotheses) of balance between work and life | Empirical test results |
|---|---|---|
| **1** | **Work-life balance with working hours** | |
| 1a | *Teleworking increases a participant's work-life balance.* | Partly supported |
| 1b | *A better work-life balance while teleworking will increase a part-time employee's working hours* | Not supported |
| **2** | **Motivation, job satisfaction and job performance** | |
| 2a | *Teleworking increases a participant's motivation, job satisfaction and job performance.* | Supported |

Table 18: Summary of the test results concerning hypotheses of work-life balance, motivation, job satisfaction and job performance

## 5.3 Social relations and communication

As indicated earlier in the theoretical part of the research, the lack of social relations and communication may result in professional isolation, as the teleworkers could become invisible in the workplace, miss out on office informal information and be left off distribution lists (Bailey & Kurkland 2002, 390).

The research theory suggested that isolation can be prevented by developing a social life outside of the working environment and by using an infrastructure that supports the teleworkers social network and communication. In addition, theory suggests that part-time teleworking reduces the impact of teleworking and according to Bèlanger´s findings (1999) employees are not left out of the office network when teleworking part-time (Bailey and Kurkland 2002, 391). One of the main Part Time Home Working pilot project constraints is the lack of participant's social relations and communication which may lead to isolation among teleworkers.

The research question relating to the participants social relations was the following*: **when teleworking, is there a change in the participants social relations and communication in the international working environment?*** In addition the diverse communication methods were studied in the survey to find out how these methods have changed while teleworking. At the end of the chapter an open question from the survey to look at what could be done to prevent an imbalance in social relations is presented and evaluated.

The following nine hypotheses were created relating to togetherness, communication, isolation, time and maintaining social relations:

*H3a* *The participant feels it is important to be at the heart of the unit/directorate while teleworking.*

*H3b* *The participant does feel a part of the team while teleworking.*

*H4a* *Verbal communication between colleagues is very important to the participant while teleworking.*

*H4b* *Communication has improved with distant and close colleagues as well as with managers while teleworking.*

*H4c* *In case of non-work and work related discussions participants contact their colleague/acquaintances from home rather than wait for the next office day.*

*H4d* *Participant do feel up-to-date with office policies/rumours/changes while teleworking.*

*H4e* *The communication methods have not changed with close or distant colleagues while teleworking.*

*H5a* *Participants do not feel isolated at home or work while teleworking.*

*H5b* *The optimum time to telework is 2 days a week to maintain a participants social contacts while teleworking*

### 5.3.1 Togetherness

*H3a* *The participant feels it is important to be at the heart of the unit/directorate while teleworking.*

The empirical findings confirm the H3a hypothesis stating that participants need to feel part of the team while teleworking as shown in Table 19. In the SPSS analysing tool, there were no high correlations found in the participant's feeling to be part of the unit/directorate while teleworking with other parameters.

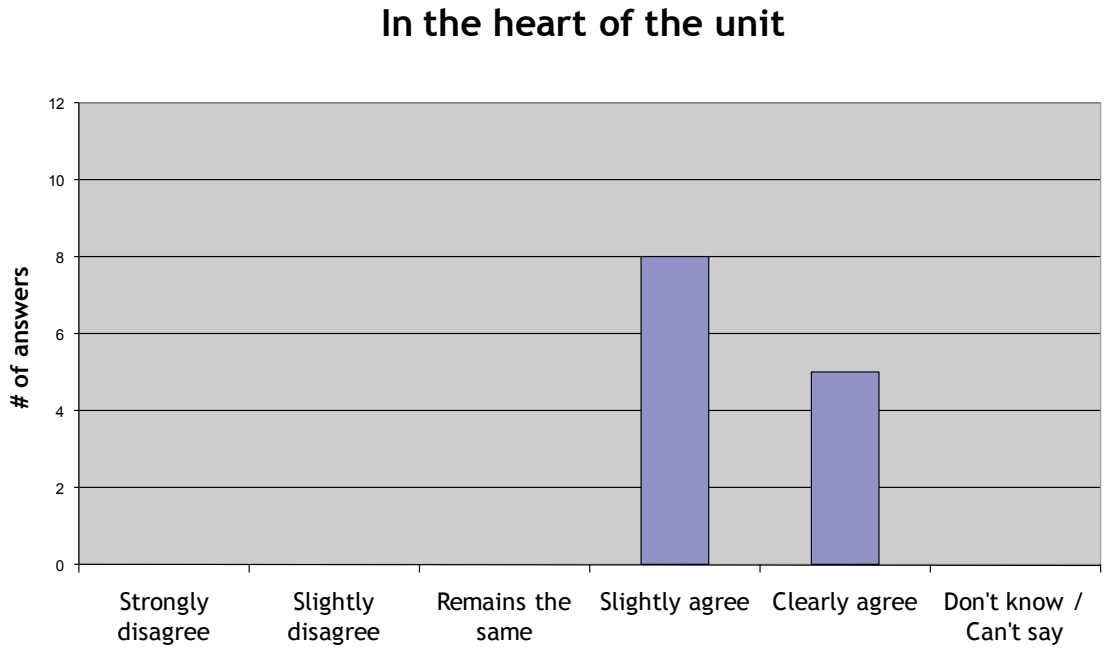


Table 19: Participant feeling important to be part of the unit while teleworking

*H3b* *The participant does feel part of the team while teleworking.*

The empirical findings partly support the H3b hypothesis, as the majority of the participants indicated that they did feel part of the team while teleworking, although a few participants slightly disagreed as shown in Table 20.

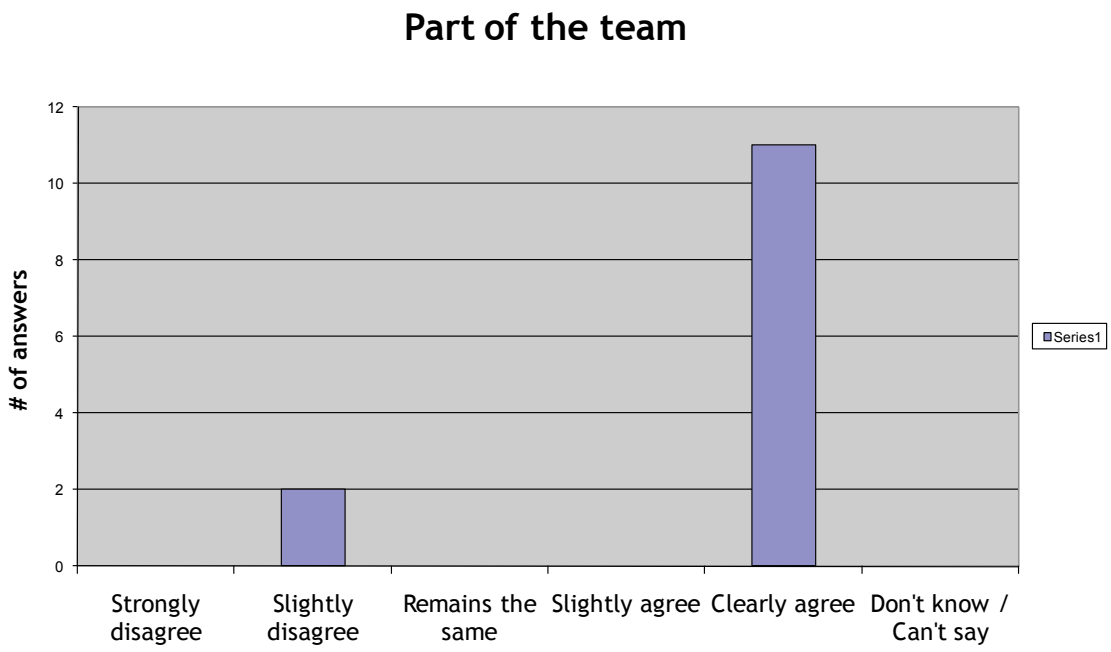


Table 20: Participant feeling part of the team while teleworking

SPSS analysis indicated that job performance ($x^2$=0,626 and p=0,022) and job satisfaction ($x^2$=0,718 and p=0,006) as well as motivation ($x^2$=0,712 and p=0,006) correlated well with part of the team.

**Conclusion**

The conclusion in togetherness of the two hypotheses H3a and H3b can be seen that participants, both expatriates and non-expatriates feel it is important to be part of the team/unit. In addition the SPSS analysis reveals a strong correlation in job satisfaction and motivation, which indicates that when a participant feels they are part of the team, their motivation and job satisfaction increases. Nevertheless a cautious look must be taken at the two answers, where the participants stated that they did not feel part of the team and additional indications that there was no improvement in job satisfaction and motivation, whereas the other 62% found that their job satisfaction and motivation had increased due to teleworking. The summary of the hypotheses (H3) of togetherness can be seen in Table 21.

| Code | Hypotheses (H3 hypotheses) of social relations and communication | Empirical test results |
|---|---|---|
| **3** | **Togetherness** | |
| 3a | *The participant feels it is important to be at the heart of the unit/directorate while teleworking* | supported |
| 3b | *The participant does feel a part of the team while teleworking* | Partly supported |

Table 21: Summary of the test results concerning hypotheses of togetherness

### 5.3.2 Communication

*H4a* *Verbal communication between colleagues is very important to the participant while teleworking.*

The empirical findings confirm the H4a hypothesis stating that the participants feel it is important to maintain verbal communication between colleagues while teleworking as shown in Table 22 . In the SPSS analysing tool, there were no high correlations found in verbal communication relation to other questions in this study.

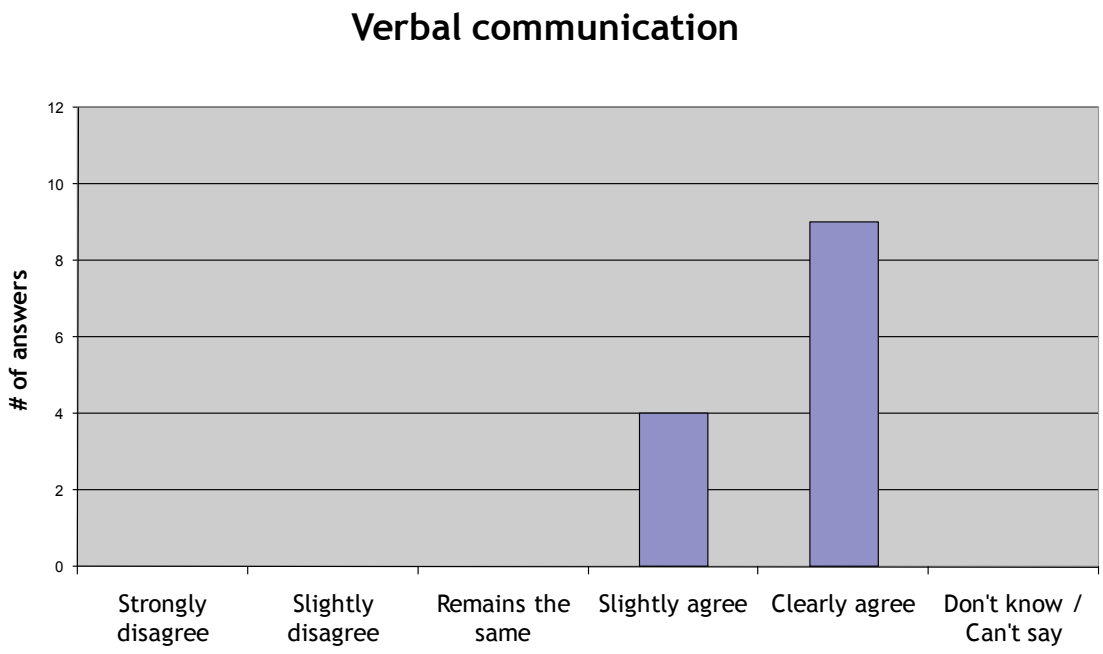


Table 22: Participant feels it is important to have verbal communication between colleagues while teleworking

*H4b Communication has improved with distant and close colleagues as well as with managers while teleworking.*

The empirical findings do not confirm the H4b hypothesis. On the contrary, the majority of the participants stated that the level of communication with colleagues and their manager remained the same. In addition, 3 of the participants indicated that communications had improved and 5 participants indicated that communication has gone worse as shown in Table 23.

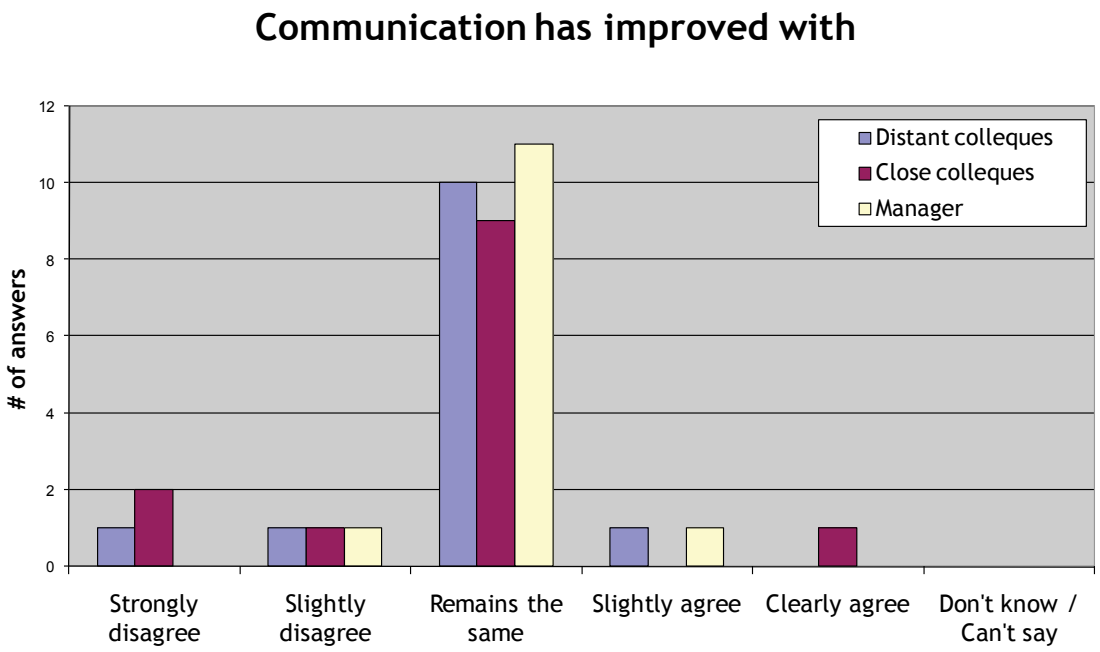


Table 23: Participants communication has improved with colleagues and manager while teleworking

SPSS analysis indicated that job performance ($x^2$=0,734 and p=0,004), job satisfaction ($x^2$=0,681 and p=0,010) and motivation ($x^2$=0,698 and p=0,008) correlates well with the communication with manager. A note is to be made to an additional finding, that the non expatriates state that communication has remained the same with distant and close colleagues, as the diverse answers come from the expatriates.

*H4c* *In case of non-work and work related discussions participants contact their colleague/acquaintances from home rather than wait for the next office day.*

The empirical findings partly support the H4c hypothesis; the majority agreed with the statement, one slightly disagreed on work related discussions and three strongly disagreed on non-work related matters as shown in Table 24. As the sample was fairly small, it is noted that a few participants disagreed with the hypothesis, and would prefer to wait for the next office day.

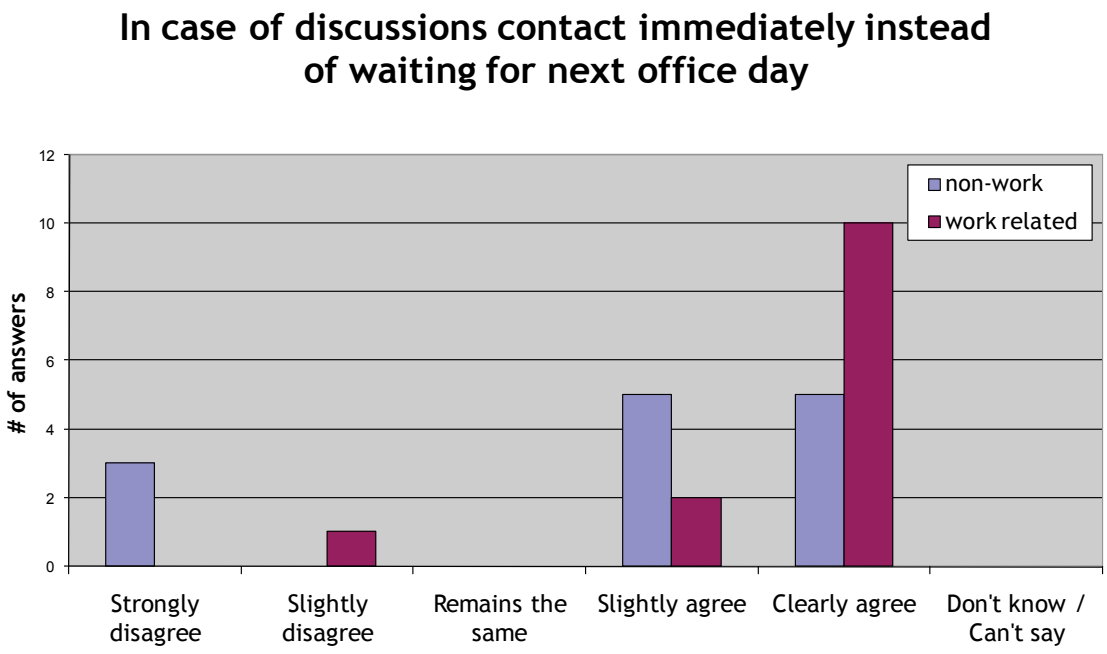


Table 24: Participants contact work and non-work related questions from home

The SPSS analysis shows that communication with distant colleagues/acquaintances correlates well with contact close colleagues/close friends from home ($x^2$=0,728 and p=0,005). In fact this shows that while teleworking, it is easier for the teleworker to obtain information from distant colleagues while working at home, rather than having a short meeting in the office. An additional notion is to be made to the finding, that the non expatriates confirm the given hypothesis that they would contact the colleagues from home instead of waiting for the next office day, as the diverse answers came from the expatriates. This seems to imply that the expatriates seem to prefer to wait for the next office day.

*H4d* *Participants do feel up-to-date with office policies/rumours/changes while teleworking.*

The empirical findings gives a various result to the H4d hypothesis. From the analysed results, the majority of the participants state that the status remains the same, three participants indicate that it has got slightly worse and four participants agreed as shown in Table 25. As to this the empirical research cannot make a clear indication and can only partly support the H4d hypothesis.

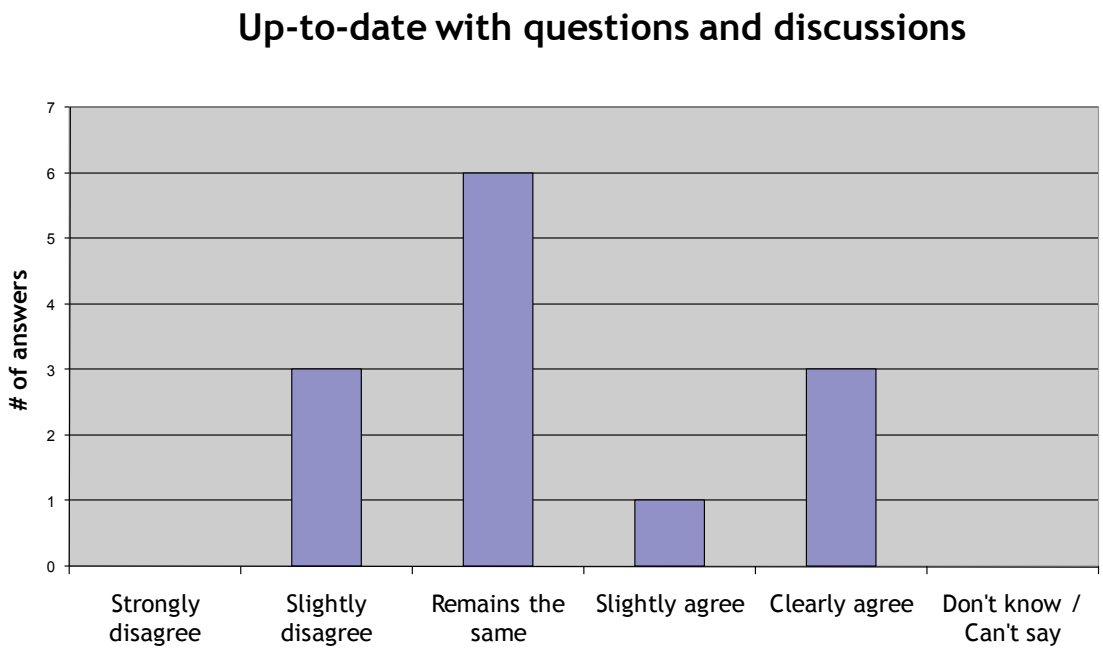


Table 25: Participant is up-to-date with questions and discussions while teleworking


Table 26: Expatriates correlation with information

The SPSS analysis shows a strong correlation between the number of years employed at the European Patent Office as compared to those more recently employed with regard to the latest news and rumours in the office ($x^2$=0,706 and p=0,007).This indicates that the longer the participant has been in the office, the more social contacts they have, which in turn affects the communication as shown in Table 26.

*H4e* *The communication methods have not changed with close or distant colleagues teleworking.*

Two charts were drawn up, as shown in Table 27 and Table 28 to measure information flows before and after. The empirical findings do not confirm the H4e hypothesis. On the contrary the main focus seems to be on the electronic communication methods in both formal and informal information flows. E-mail seems to be the strongest communication method which emphasises the importance of the weak and strong links. In the SPSS analysing too there were no correlations found between the communication before and after the Part Time Home Working pilot project.

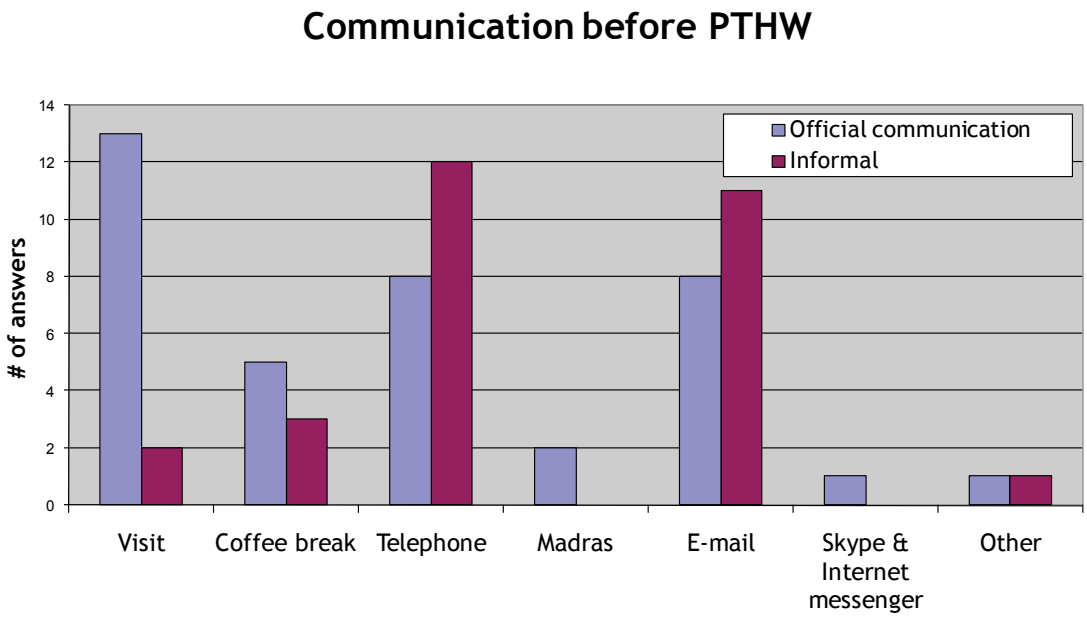


Table 27: Communication methods before the Part Time Home Working pilot project

In Table 27 the methodological findings indicate that official information was previously circulated through visits, telephone and email. In the other column the participant specified that informal communication was circulated via meetings and lunch appointments which also included coffee breaks and visits to colleagues' rooms. The majority of informal information has been transmitted mostly by telephone and email. The explanation to this may lay in the fact that the majority of the participants were expatriates, and therefore close relatives and friends do not live nearby.

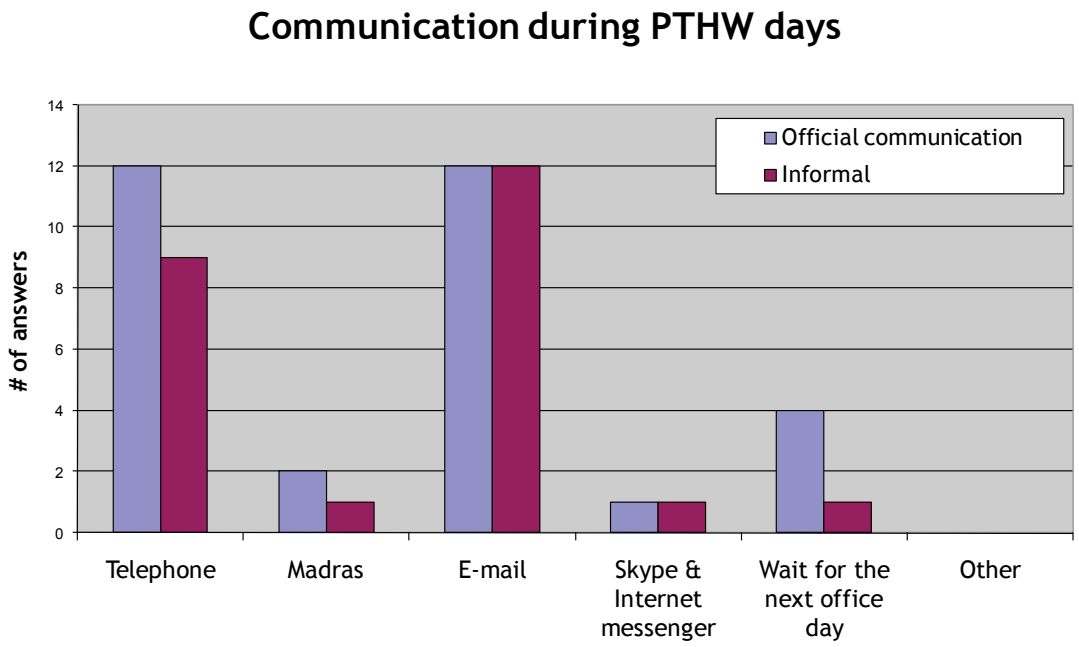


Table 28: Communication methods after the Part Time Home Working pilot project

In Table 28 the methodological findings indicate that both official and informal communications are now mainly carried out electronically by telephone and email. In addition, waiting for the next office day has been added indicating that a few of the participants are more likely to postpone making the communication to the next office day.

**Conclusion**

The conclusion on communication relating to the H4a-H4e hypothesis shows that participants feel that verbal communication is either important or very important for them. Nevertheless the empirical findings reveal that while teleworking, levels of communication have remained the same and in few cases, for the expatriates it has got worse. In addition it was noted that the participants who stated that communication with their manager and colleagues remained the same or has got worse also stated that they do not feel part of the team. In addition the SPSS analysis revealed a strong correlation between job performance, job satisfaction and motivation and communication with their manager. This emphasises that functional communication with the manager also increases a participant's motivation, job satisfaction and job performance.

The empirical findings reveal that the majority of the participants would rather contact colleagues and acquaintances directly from home, with an additional note that four expatriate participants preferred to wait for the next office day. In addition the SPSS analysis revealed that while teleworking, it is easier for the teleworker to ask for information from

distant colleagues from home rather than having a short meeting in the office which confirms the relationship of weak links.

The communication methods have partly changed after teleworking. The official communication visits have fallen by 67% transferring the communication towards waiting for the next office day. This supports the earlier finding where four expatriates stated that in the case of non-work and work related discussions the participant would not contact the colleague from home but rather wait for the next office day. In addition, telephone conversations and e-mail messages have increased by 34% in the official communication flows and changed from telephone conversations to e-mail in informal communication methods.

The empirical findings did not give any clear indication whether the participants were up-to-date with questions and discussions while teleworking. The SPSS analysis indicated that longer the participant has been working in the office, the better the social contacts that were created. This supports the hypothesis of being up-to-date in relation to official and unofficial information.

One can state that verbal communication will remain important for the teleworkers, which requires careful planning for communication tools. Careful consideration is to be made with regard to expatriates, where the social relations are not as strong as for non-expatriates. The expatriates seem to lack communication with colleagues and their manager and therefore do not feel part of the team. The longer working history may support the building of social relations and preventing a feeling of being left out. The summary of the hypotheses (H4) of communication can be seen in Table 29.

| Code | Hypotheses (H4 hypotheses) of social relations and communication | Empirical test results |
|---|---|---|
| 4 | **Communication** | |
| 4a | *Verbal communication between colleagues is very important to the participant while teleworking* | Supported |
| 4b | *Communication has improved with distant and close colleagues as well as with managers while teleworking* | Not supported |
| 4c | *In case of non-work and work related discussions participants contacts their colleague/acquaintances from home rather than wait for the next office day* | Partly supported |
| 4d | *Participants do feel up-to-date with office policies/rumours/changes while teleworking* | Partly supported |
| 4e | *The communication methods have not changed with close or distant colleagues while teleworking* | Not supported |

Table 29: Summary of the test results concerning hypotheses of communication

### 5.3.3 Isolation and optimum time

*H5a* *Participants do not feel isolated at home or work while teleworking.*

The empirical findings partly support the H5a hypothesis as over half of the participants confirmed that they did not feel isolated at home, whereas three slightly disagreed. A similar finding is made in the hypothesis that the participants do not feel isolated at work, as more than half of the participants agreed with the statement with only two disagreeing. Nevertheless, attention is drawn to the two results, where participants state that they feel isolated at work. The correlation with these answers were that both of the participants had been working less than average number of years in the Office as shown in Table 30.

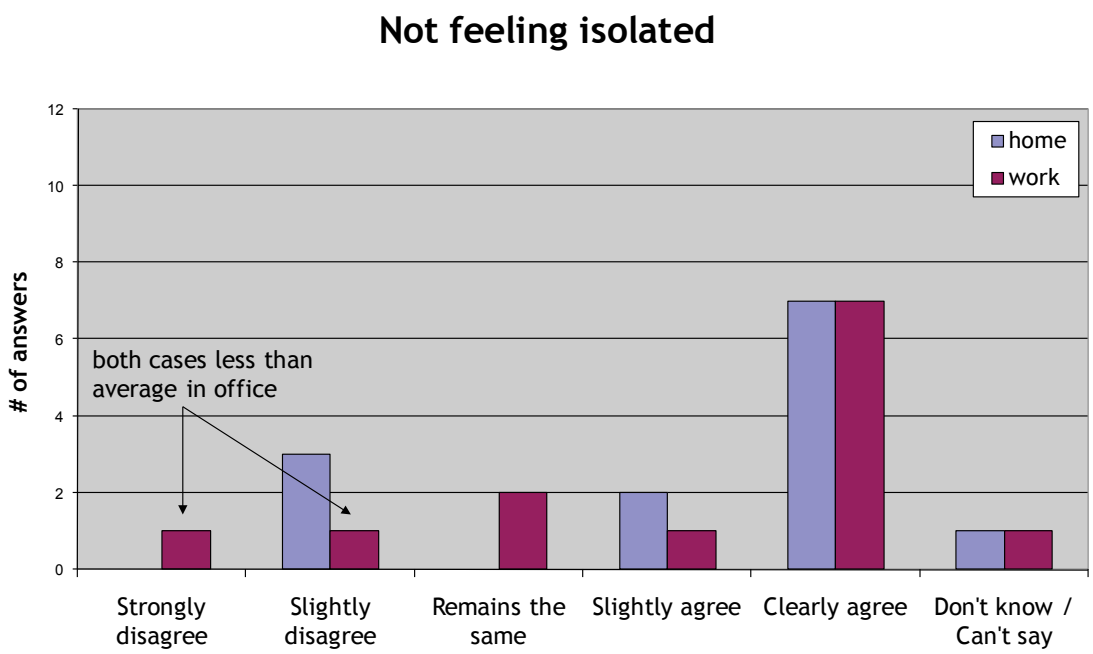


Table 30: Participant's isolation at home and work while teleworking

SPSS analysis indicated that isolation at home and isolation at work ($x^2$=0,847 and p=0,000) correlated well with each other. In addition there is some correlation between job satisfaction, motivation and being isolated at home or at work ($x^2$=0,618 and p=0,025), ($x^2$=0,658 and p=0,015), ($x^2$=0,658 and p=0,014), and ($x^2$=0,566 and p=0,044) respectively.

*H5b* *The optimum time to telework is 2 days a week to maintain a participant's social contacts while teleworking.*

The methodological findings support the H5b hypothesis by indicating that the optimum time to telework is 2 to 3 days a week as shown in Table 31. The SPSS analysis does not show any correlation with time.

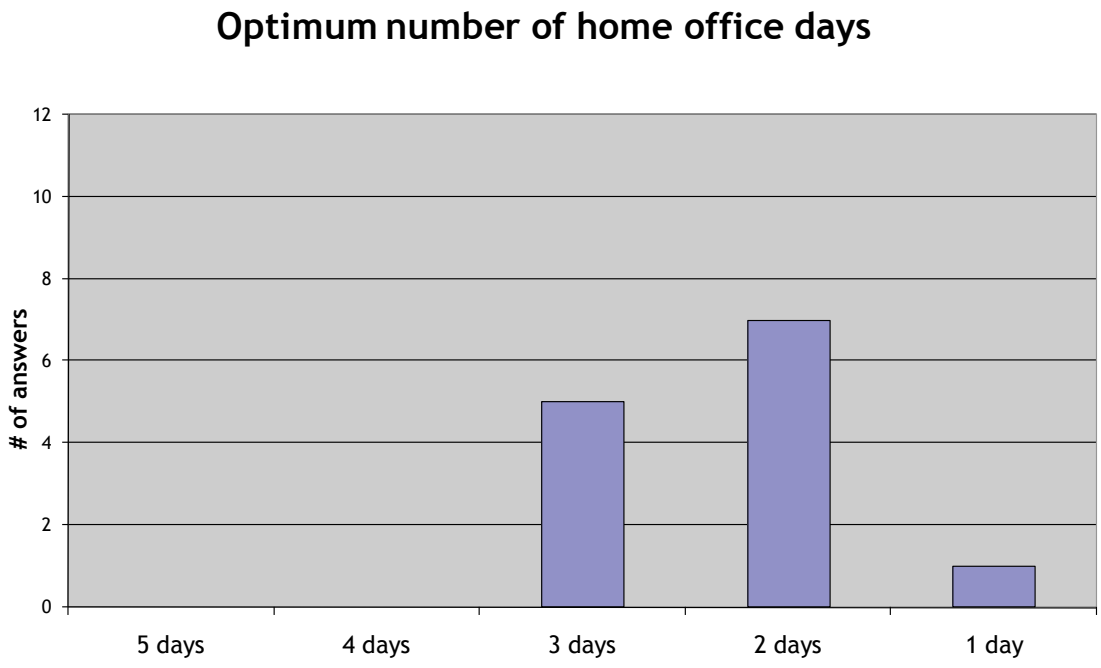


Table 31: Participant's optimum time spend teleworking

**Conclusion**

The conclusion on isolation and optimum time of the two hypotheses H5a and H5b shows that 70% of the participants did not feel isolated at home/work while teleworking. A note is to be made relating to 30% of the participants who stated that they felt slightly or strongly isolated at home/work. A part of these 30% also indicated that they did not feel part of the team and disagreed that communication had got better with colleagues and managers. The same negative connection was seen with this group of 30% of the participants who additionally felt they were not keeping up-to-date with official and unofficial information. Also some would rather wait for the next office day with their questions and discussions. The summary of the hypotheses (H5) of isolation and optimum time to telework can be seen in Table 32.

| Code | Hypotheses (H5 hypotheses) of social relations and communication | Empirical test results |
|---|---|---|
| **5** | **Isolation and optimum time** | |
| 5a | *Participants do not feel isolated at home or work while teleworking* | Partly supported |
| 5b | *The optimum time to telework is 2 days a week to maintain a participant's social contacts while teleworking* | Supported |

Table 32: Summary of the test results concerning hypotheses of isolation and optimum time

### 5.3.4 Maintaining social relations

The survey included one open question; what in the participant's opinion could be done to keep up with social relations and networks while teleworking. Here is the summary of the results:

*"For me PTHW has improved my social networks since my working hours are no longer as limited as before since I know that I can finish something from home if I don't manage to do it in the office. Therefore, when in the office I can socialise with friends/colleagues without feeling that I'm taking time off from work".*

*"Try to see people when in the office so as not to lose contact".*

*"On office days have a fixed room within the directorate ie. no hotelling, especially not on a different floor with colleagues from various directorates. Take coffee breaks and lunch with colleagues on office days. Contact colleagues by visiting on office days. Contact colleagues also from home and don't wait for office days".*

*"When you are not present or visible at the EPO, colleagues think that you don't want to be disturbed or that you are on holydays or sick. Therefore, they don't contact you, and after a while they forget you.... I don't really see what could be done to change this except coming back full time at the EPO".*

*"You have to be socially active when you are in the office. But much of the social networking is anyway done over the phone and with e-mail, so there nothing really changed with PTHW".*

*"I should probably have an automatic call forwarding from my office telephone to my mobile phone. I should leave a message on my office door to inform my visitors that I'm not absent but I'm working from home, so that they contact me per e-mail or per telephone for any urgent matter".*

*"Installing Skype or similar software, with video".*

**Conclusion**

The conclusion drawn from the holding social relations open question, is that the empirical study reveals that being socially active and visiting colleagues during the office days as well as keeping contact while teleworking via electronic communication tools will help to maintain strong and weak links in social relations and networks. Recommendations were made to install Skype or a similar contact software with a media device, leave a note on the office door when teleworking and forwarding calls from the office phone to one's mobile phone in order to be more visible to fellow co-workers.

## 5.4 Reliability of the research

The research study was based on an internet based quantitative research which aimed to receive preliminary clarifications of the participants´ socio-demographic characteristics while participating in the Part Time Home Working pilot project. Hirsjärvi et al (2008, 225-226) determines the overall reliability of the quantitative research method to be determined throughout validity and reliability of the research.

### 5.4.1 Validity of the research

Burns and Bush (1998, 310) describe validity as the accuracy of the measurement. It is an assessment of the exactness of the measurement relative to what actually exists.

The development of the survey used in the Part Time Home Working pilot project was based objectively on the existing literature and earlier surveys in the given subject matter. The questionnaire replies were submitted anonymously which guaranteed the truthfulness and accuracy of the participants´ subjective views. The questionnaire was additionally designed in English which is one of the three official working languages of the European Patent Office to avoid any misunderstandings or misinterpretations.

### 5.4.2 Reliability of the research

Burns and Bush (1998, 307-308) continue describing reliability as the tendency in a respondent to respond in the same or in a very similar manner to an identical or near-identical question. To state the concept of reliability somewhat differently, a measure is reliable when it elicits an identical or very similar response from the same person with successive administrations.

The questionnaire used in the Part Time Home Working pilot study was developed prior to the one used in the main study and pre-tested to check for reliability of the questionnaire. As the respondents lived in different countries, internet based questionnaire were selected in order to capture the entire target group. The received responses of the questionnaire were 13 out

of 15, resulting in an 87% response rate. The answers were submitted to SPSS analysing tool which created a Pearson's correlation ($x^2$) and correlations significance-rate (p) to prove the reliability.

At this point it is also essential to emphasise that this research study does not attempt to create any generalizations of the European Patent Office employees. The aim is to measure the Part Time Home Working pilot projects participants' subjective view on their socio-demographic change in the test configuration. The questionnaire's reliability will be measured again in Phase IV of the Pilot Project by submitting the same questions in a larger survey to the 100 participants at the end of 2009.

# 6 Summary and conclusions

This chapter includes summaries of the research done and it's most important results, as well as conclusions reached. It also includes development proposals (P1-P2) for the next phase of the Part Time Home Working pilot project and for the final implementation of teleworking (P3-P4). Additionally this chapter includes discussion and suggestions for further research (F1-F6) in the next phase, IV of the Part Time Home Working pilot project. In the final part of the chapter, the research and development plan as well as an evaluation of the research study is presented.

## 6.1 Summary of the research project

This research study is a part of a larger pilot project called Part Time Home Working, which aims to implement teleworking as a new working method in the European Patent Office in 2011. The Part Time Home Working pilot project aims to clarify different motivating factors and constraints of teleworking before implementing the new working model office wide. The pilot project consisted of five phases; Phase I Preparing the initial test pilot, Phase II Initial test pilot, Phase III Evaluation, Phase IV Main pilot and Phase V Evaluation of the main pilot. The overall project is estimated to be completed by the end of 2010.

This research study was performed during the initial test phase II of the Part Time Home Working pilot project and was designed according to the main three elements of project management; project design, project implementation, and project evaluation. The aim of the research was to study how the 15 participants of the pilot project subjectively view those socio-demographic characteristics, in terms or their work-life balance, which are believed to add to teleworkers motivation and performance as well as those social relations and communication aspects which may in the worst-case scenario lead to teleworkers dissatisfaction and isolation. The research is tested with 12 theoretical hypotheses based on earlier research and literature on the topic.

The research was based on one main research question and three sub-questions. The questions aimed to evaluate whether something can be done in between the project phases to improve the pilot project and to prevent possible isolation and imbalance in the participants' social environment before continuing to the next phase. The main research question was the following:

- What can be done do to maintain the participants` socio-demographic characteristics while teleworking?

The three sub-questions were as follows:

- Have the participants` work-life balance improved while teleworking?
- Have the participants' motivation, job satisfaction or performance improved while teleworking?
- When teleworking, is there a change in the participants social relations and communication in the international working environment?

The chosen empirical research method in this study was a design action research which included a quantitative internet base survey with 33 questions. The survey was carried out using Laurea University of Applied Science's E-form, which guaranteed the respondents' anonymity. The response rate of the empirical research was 87%, which is considered to be an excellent response rate.

The empirical research results have been analysed with Microsoft Excel and SPSS statistical analysis software during September 2009. Excel software was used to create charts and analyse questions one dimensionally whereas the SPSS software has been used to find correlations between the hypotheses and to analyse questions more thoroughly. Additionally open opinions of the survey have been analysed and reported.

## 6.2 Summary on major findings

The following summary on work-life balance, social relations and communication on the set 12 hypotheses (H1-H5) is described in Table 33 and described in more detail below.

### 6.2.1 Work-life balance

The empirical findings partly support the H1a hypothesis as the majority of the participants clearly agreed that teleworking improves a participant's work-life balance and only one slightly disagreed.

In addition, teleworking has been stated to be able to increase part time employees' working hours due to greater flexibility concerning the working hours at home as well as less time wasted in commuting between home and work. This hypothesis H1b received varied results as only one of three former part time workers has been able to return to full time working hours due to PTHW. Due to this, the empirical findings do not support the H1b hypothesis.

One of the main hypotheses of the study is that the Part Time Home Working pilot project increases the participants' motivation, job satisfaction and job performance. The empirical findings support the hypothesis H2a as all the participants have answered that all these three topics have either remained the same or improved during teleworking. In addition the SPSS analysis found a strong correlation between job satisfaction and motivation, which indicates that when a participant is motivated and has positive job satisfaction, the participant's job performance also increases.

### 6.2.2 Social relations and communications

The empirical study clearly confirms the H3a hypothesis, stating that all the employees feel it is important to be in the centre of the unit / directorate while teleworking. This is loosely related also to the hypothesis H3b of feeling part of the team while teleworking. The participants of the study have given mixed feedback; the majority feeling to be part of the team, whereas a minority of two participants do not feel part of the team while teleworking. In this the hypothesis H3b is partly supported. Additionally the SPSS analysis revealed a strong correlation on job satisfaction and motivation, which indicates that when a participant feels they are part of the team, also their motivation and job satisfaction increases.

Communication plays a key role in the case of teleworking, where the success of teleworking lies in successful communication between the participants. The key for the success is the verbal communication between colleagues, which has been confirmed by the study in hypothesis H4a. What has also been noted is that communication is a key for success; it does not automatically improve during teleworking. The hypothesis H4b reveals that while teleworking, communication has remained the same and in few expatriate cases got worse. In addition the SPSS analysis revealed that functional communication with the manager increases also a participant's motivation, job satisfaction and job performance.

The empirical findings partly support the H4c hypothesis by revealing that the majority of the participants would rather contact colleagues and acquaintances directly from home rather than wait for the next office day. A minority (four expatriates) did not fully support this finding. In addition the SPSS analysis revealed that while teleworking, it is easier for the teleworker to ask for information from distant colleagues from home rather than having a short meeting in the office, this confirms the relation of weak links.

The empirical findings gave various results to the H4d hypothesis regarding being up-to-date with questions and discussions while teleworking and therefore partly supporting the given hypothesis. Additionally, the SPSS analysis indicated that the longer the participant had been working in the office, the better the social contacts that had been created among participants, which supports the hypothesis of being up-to-date on the official and unofficial information.

The empirical findings do not support the H4e hypothesis, since the communication methods have partly changed after teleworking and more emphasis is now on electronic communication tools. Telephone conversations and e-mail messages have increased by 34% in the official communication flows and changed from telephone conversations to e-mail in informal communication methods.

Feeling isolated while teleworking decreases the benefits of teleworking. In the hypothesis H5a 4 out of 13 participants indicated that they felt isolated at home or at work during teleworking and the hypothesis is therefore partly supported. An additional finding was made based on the participants´ length of service in the Office; both participants who felt isolated at work had worked less than average in the Office.

Finally, the empirical findings in the hypothesis H5b show that for more than 90% of the participants, the optimum number of teleworking days is either two or three working days per week. This is consistent with the literature.

| Code | Hypotheses (H1-H2 hypotheses) of balance between work and life | Empirical test results |
|---|---|---|
| **1** | **Work-life balance with working hours** | |
| 1a | *Teleworking increases a participant's work-life balance.* | Partly supported |
| 1b | *A better work-life balance while teleworking will increase a part-time employee's working hours* | Not supported |
| **2** | **Motivation, job satisfaction and job performance** | |
| 2a | *Teleworking increases a participant's motivation, job satisfaction and job performance.* | Supported |
| **Code** | **Hypotheses (H3-H5 hypotheses) of social relations and communication** | **Empirical test results** |
| **3** | **Togetherness** | |
| 3a | *The participant feels it is important to be at the heart of the unit/directorate while teleworking* | supported |
| 3b | *The participant does feel a part of the team while teleworking* | Partly supported |
| **4** | **Communication** | |
| 4a | *Verbal communication between colleagues is very important to the participant while teleworking* | Supported |
| 4b | *Communication has improved with distant and close colleagues as well as with managers while teleworking* | Not supported |
| 4c | *In case of non-work and work related discussions participants contacts their colleague/acquaintances from home rather than wait for the next office day* | Partly supported |
| 4d | *Participants do feel up-to-date with office policies/rumours/changes while teleworking* | Partly supported |
| 4e | *The communication methods have not changed with close or distant colleagues while teleworking* | Not supported |
| **5** | **Isolation and optimum time** | |
| 5a | *Participants do not feel isolated at home or work while teleworking* | Partly supported |
| 5b | *The optimum time to telework is 2 days a week to maintain a participant's social contacts while teleworking* | Supported |

Table 33: Summary of the empirical test results

## 6.3 Conclusions and development proposals

The aim of this research study was to measure the Part Time Home Working pilot project tester's subjective view against the 12 hypotheses in the socio-demographic characteristics in relation to work-life balance, social relations and communication. In addition, this study aimed to identify if something could or should be done in between the project phases to prove the pilot project and to prevent possible isolation and imbalance in the participants' social environment. In the following pages, some recommendations for management are presented for the next phase of the pilot project in order to lead to a successful implementation of teleworking. Recommendations are based both on empirical research findings of the study and the author's own perceptions.

### 6.3.1 Recommendation P1: Communication

The empirical findings confirmed the theoretical suggestion in the work-life balance, which suggested that a person's motivation and work satisfaction increases throughout teleworking. In addition, feeling part of the team and having a functional communication with the manager also increases teleworkers motivation and work satisfaction and has a positive effect on teleworkers job performance.

However the empirical findings identified further isolation among 30% of the participants, who either felt isolated at home or at work. Of this 30%, 15% indicated that they were being left out of their team and 23% of the participants indicated that communication with colleagues and manager had deteriorated while teleworking. Additionally 23 % found they were not being kept up-to-date with official and unofficial information and 15% preferred to postpone their questions and discussions to the next office day. It is noted that of all the dissenting opinions to the given hypotheses 91% came from the above mentioned 30% of the participants, where a strong correlations was found with the expatriates.

Therefore a recommendation (P1) to pay special attention to the managers' communication with the teleworkers in the next phase of the pilot project is made. Managers should provide the necessary support and have regular interactions with their teleworkers via email or telephone to create an atmosphere where the teleworker feels they are part of the team when working remotely from the main office. In addition, the participants should be informed about the important aspect of maintaining good communications with their colleagues and managers in their PTHW-meetings.

### 6.3.2 Recommendation P2: Implementation of VoIP

The empirical findings further discovered that the focus on both formal and informal information flows are via electronic communication tools. E-mail is now the strongest communication method not requiring any physical contacts. In a social network aspect, the question has to be asked, whether the computer-supported network in teleworking will be able to maintain the existing social network in the workplace. One can state that verbal communication will remain important for teleworkers and therefore this has to be taken into account especially when planning the provision of communication tools.

With regard to this a recommendation solution (P2) to improve the communication of the teleworkers and rest of the team would be to provide corporate chat software. A good example is VoIP (voice over internet protocol) which would provide an easier way to communicate with colleagues. VoIP systems can have features such as presence information, multiparty conversations, and direct selection of the party, all of which can make communi-

cation easier than via traditional phone discussions. The benefits of VoIP include the easier user-interface and software compared to POTS (Plain old telephone system). Another example is IRC (internet relay chat), which is widely used as a free time tool to chat all over the world. The IRC has separated chat rooms called channels, which could be used in the corporate world to separate different teams. Such a tool would additionally allow better integration of team members located in separate buildings. One of the disadvantages of corporate chats is that it may divert attention away from real work, although it improves communications especially when dealing with questions and solving problems.

### 6.3.3 Recommendation P3: Working experience

Literature suggests that, social disadvantages could be eliminated if teleworking is implemented on a part-time basis. However the empirical findings reveal that even if teleworking is performed on a part-time basis, it does not prevent social isolation. The participants´ work experience in the office prior to telework, has a major influence on their social communication and consequently the possibility of isolation.

The current pilot participants have a long working history in the office, ranging from six to over twenty years. A longer working history may support the building and development of social relations and prevent feelings of being left out. As a response to this, a recommendation (P3) for the final implementation of the Part Time Home Working project, is that a participant should have at least five years working experience in the office prior to starting teleworking.

### 6.3.4 Recommendation P4: Optimum time

The current amount of teleworking time in the Part Time Home Working pilot project varies from two to three days per week, depending on the participant’s own choice. In the light of the current empirical findings with regard to the participants’ social environment, a recommendation (P4) for the final implementation of the Part Time Home Working project is to limit the number of teleworking days to two days per week.

Finally, the overall methodological research covered showed that nearly 70% of the pilot participants felt that an increase in their work-life balance had a positive effect on motivation, job satisfaction as well as job performance throughout the period of teleworking. According to the pilot project, participants who are socially active and visit colleagues during the office days, and also maintain contact while teleworking via electronic communication tools will be able to maintain strong and weak links in their social relations and network. In addition teleworking is best introduced with mutual understanding and having policies which

meet both the employers´ and employees´ needs are key factors in implementing home working successfully.

## 6.4 Discussion and suggestions for further research

This research study has explored the 13 participants' socio demographic characteristics while participating in the Part Time Home Working pilot project Phase II.

### 6.4.1 Further study F1 - F2: Social isolation and working experience

Even though the empirical findings revealed some amount of isolation and imbalance in the pilot project participant's social environment, one has to emphasise that this target group does not represent the overall employees of the European Patent Office, also one cannot be certain of the truthfulness of the answers. Additionally the limited amount of literature available on the employees' socio-demographic characteristics narrowed the perspective of the research study. In response to this, further research on the participant's social environment and isolation at the end of Phase IV with 100 pilot participants is recommended (F1).

It has been discovered that the work experience received in the office prior to telework, provides a major influence on the participants' social communication, relations and therefore isolation. In Phase IV, the 100 participants will have various years of service working in the office; some with less than six years which was the minimum in the studied research in Phase II. Regarding this, one should continue investigating the effect of the number of working years with a correlation to expatriates and non-expatriates for the final implementation of the pilot project (F2/P3).

### 6.4.2 Further study F3 – F4: Optimum time and suitable tasks

Additionally the time spent teleworking affects a participant's social environment and possibility of isolation. As to this, the proposal for the final implementation of the Part Time Home Working pilot project was that teleworking days should be limited to two days per week. Since the target group were fairly small, a further recommendation on the optimum time is emphasised (F3/P4).

The current pilot project Phase II included two working groups; examiners and formalities officers, both of whom use tools requiring a heavy use of the PC and IT-networks. In Phase IV the 100 pilot project participants will be from various areas of work, which will require comprehensive investigation as to whether all tasks are suitable for teleworking (F4).

### 6.4.3 Further study F5 – F6: Part-timers hours and value received

Furthermore, the empirical research discovered that only one of the three part-time participant increased his/her working hours. A further investigation on the given cause is promoted and further research on the 100 participants' part-time workers increased working hours is recommended (F5).

Finally the value received at the European Patent Office throughout the new working model of teleworking should be measured in the last phase prior to implementing teleworking office wide (F6). The question to be asked is whether the new flexible working model eventually adds the expected value in terms of higher productivity, an increase in part-time workers' working hours, reduces the pilot participant's number of days sick and provides cost savings in office space. Even thought the upcoming trial of "hotelling" in Phase IV is set to measure possible savings in office space, one should emphasise the danger of the loss of the social aspect where communication with close colleagues and manager may suffer from a lack of social presence.

## 6.5 Research and development plan

The research study is a further development plan of the Part Time Home Working pilot project initial test Phase II. The aim was to give results for the next evaluation phase by evaluating and studying if something can be done in between to prove the pilot and to prevent possible isolation and imbalance in the participants' social environment before continuing the project.

### 6.5.1 Research and development plan of the PTHW

The development and further investigation of the research findings were held in a videoconference between the project manager and the author at the end of October 2009. The following development plan and further research in phase IV was produced as seen in Figure 8 and explained in more detail below.

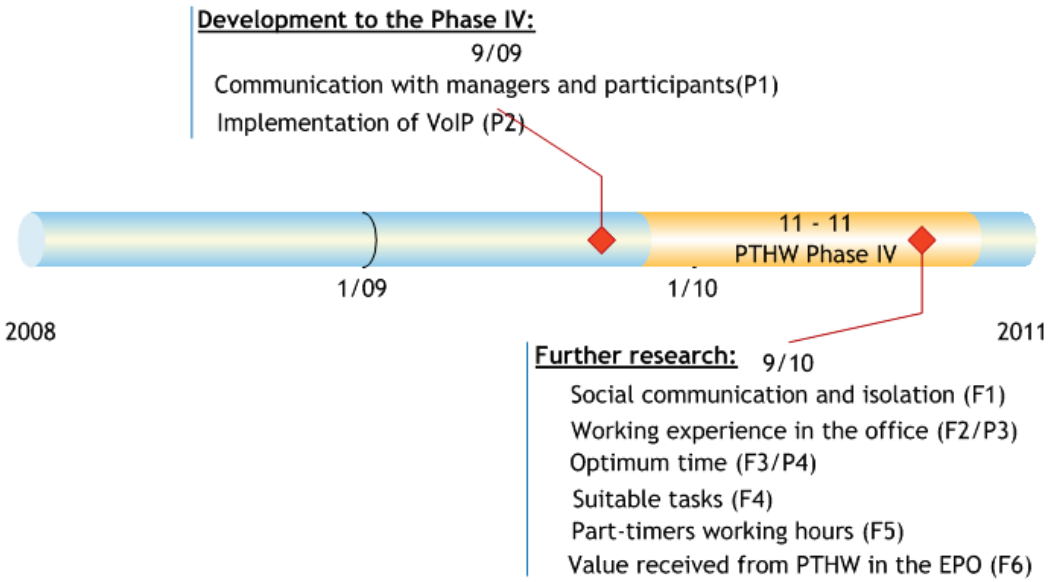


Figure 8: Research and development plan of the PTHW

The development plan of the next phase of the Part Time Home Working pilot project has been made based on the following aspects:

- (P1) In the next Part Time Home Working presentations to the managers and meetings with the 100 participants, special attention is to be paid to the aspect of communications. Managers will be informed how necessary it is to provide support and communication with teleworkers to allow them to feel part of the team. In addition participants will be informed of the necessity to maintain communication with close colleagues, managers and outside world when teleworking. This will decrease the feeling of being isolated or being left out of the team when working remotely from the main office. Participants are also advised to contact the pilot team leader or the manager in case of a sense of imbalance in one's social relations and communications in order for the Office to be able to release the participant from the pilot project to prevent possible isolation.

  Further the Occupational health and safety (OHS) package will provide guidelines on the necessary steps to be undertaken by the participants to ensure that any work done from home is safe and within normal, recognised conditions. In addition the participant will maintain a log-book that shall be used to record each working day and note both positive and negative aspects of teleworking; technical, managerial and emotional aspects.

- (P2) VoIP (voice over internet protocol) is already foreseen for the next phase of the pilot project and the current empirical findings confirmed this

decision. VoIP telephony will allow a teleworker participant to be reachable as if they were inside the Office. So a participant working from home can contact and be contacted by colleagues and attorneys in a transparent manner. This will also extend to video services later in the project.

The further research into the next phase of the Part Time Home Working pilot project will be made on the following aspects:

- (F1) Expatriates and non-expatriates participants' social environment and isolation will be further investigated.
- (F2/P3) Close attention and further research on the working experience in the European Patent Office prior to start the Part Time Home Working Pilot project will be made.
- (F3/P4) The optimum time to telework will be looked at in more detail, whether it should be 2 or 3 days.
- (F4) The different tasks will be further studied, to establish whether any tasks are not suitable for teleworking.
- (F5) Part-timer employees' working hours will be further studied, as to whether or not they will increase in the next phase of the pilot project.
- (F6) The final value received at the European Patent Office from the Part Time Home Working pilot project will be studied at the end of the pilot in 2010 to find out if the pilot project is going to be implemented office wide.

At the end of 2009, the research study will be presented to the Project team and to the Project Board. Additionally an internal news article on the studied research will be published in an in-house magazine to promote teleworking at the European Patent Office.

### 6.5.2 Implementing telework at the organisational level

Well planned and implemented teleworking results in a gain for teleworkers, organisations and customers as well as the community. The Finnish Ministry of Employment and Economy has set up basic guidelines to ensure the successful implementation of teleworking (Heinonen & Saarimaa, 2009, 37-38):

1. Careful planning in both individual as well on organisational level (facts, training, and negotiation) should be performed.

2. Telework should be tried out on pilot basis with a small sample of the employees.

3. Teleworkers' remote workstations should be planned ergonomically.

4. Teleworkers' social presence and information flow (official and unofficial) should be made available electronically.

5. Due to a lack of contribution in the working community, new employees are not recommended to start telework even if they would have teleworked previously.

6. Employees work tasks, personal and environmental aspects should be tested prior to the start.

7. Teleworkers' childcare and other caretaking responsibilities should be in a well-developed stage, as teleworking does not cover childcare, even though it supports it.

8. The time spent teleworking is recommended to be restricted to 1-2 days per week in order to minimise teleworking risks and complications.

9. Teleworking should be implemented ecologically, to prevent half day teleworking.

10. Telework days should be agreed prior to starting to telework. In case the teleworking days are defined in fixed weekdays, they should be able to be adjusted in case of meetings. In case of multiple teleworkers in the same unit, it is advisable to fix teleworking days to certain dates. Tuesday, Wednesday and Thursday are recommended for teleworking days in order to differentiate weekends from working time.

11. Teleworking tasks should be agreed in writing prior to the commencement of teleworking and performance should be measured instead of working time.

These guidelines are in line with the Part Time Home Working project, which has carried out careful planning and testing with a smaller group prior to starting the pilot in various fields on individuals as well as on an organisation level (1-2,6,11). Teleworker's workstations have been ergonomically planned and office desks and chairs are made available for participants to choose the most suitable one for his/her needs. Additional ergonomic training is planned for

each participant to be aware of the possible disadvantage that may occur through teleworking (3).

The information and communication flows have been set on different meetings between the participants and the installation of VoIP and video conferencing (4). In Phase IV of the pilot project, the participants have at least two years of experience within the Office and are not in the initial training phase (5), additionally a recommendation to final implementation is to have at least five years of working experience and to limit the teleworking to two days per week as a result of this research study (8).

Teleworking days are currently not fixed, and will be measured in the Phase IV of the pilot project (10). Different scenarios on half/full days are tested as well as the difference if a participant is working from an old office, shared office or testing the hotelling, where participants share a larger office space (9).

### 6.5.3 PTHW's Basic conceptual framework model

Illegems, Verbeke and S`jegers (2001, 276) refered to Bernandinos, Beb-Akiva and Salomons (1992) Basic conceptual framework model for a successful implementation process of tele-working as seen in Figure 9. The Basic conceptual framework is a combination of different components that influence the implementation decision including the environment and the individual-employee. The environment includes technological environment, institutional environment and organisational environment and the individual-employee includes situational characteristics and perceptions and attitudes of the individuals.

In the individual-employee's domain, the current study focused on the participant's socio-demographic characteristics apart from work-life balance, social relation and communication characteristics. The job characteristics, commuting characteristics as well as perceptions and attitudes of the participant, manager and a co-worker will be tested in the following Phase IV of the Part Time Home Working pilot project in 2010. In May 2009 the Central Staff Committee performed a small survey among European Patent Office employees taking part in the Part Time Home Working to study whether employees were generally interested in the pilot project. The total response rate was 3874, of which over 52% indicated they were either interested and very interested in the new working method. (CSC 29.05.2009.)

In the environment domain, the organisational structure, technological and institutional environments have been studied to modify the organisational guidelines CODEX which is a collection of the EPO's major non-patent legal text for employees to include teleworking. Additionally the Office is currently in the process of modifying the main business procedure to enhance the efficiency of the work carried out.

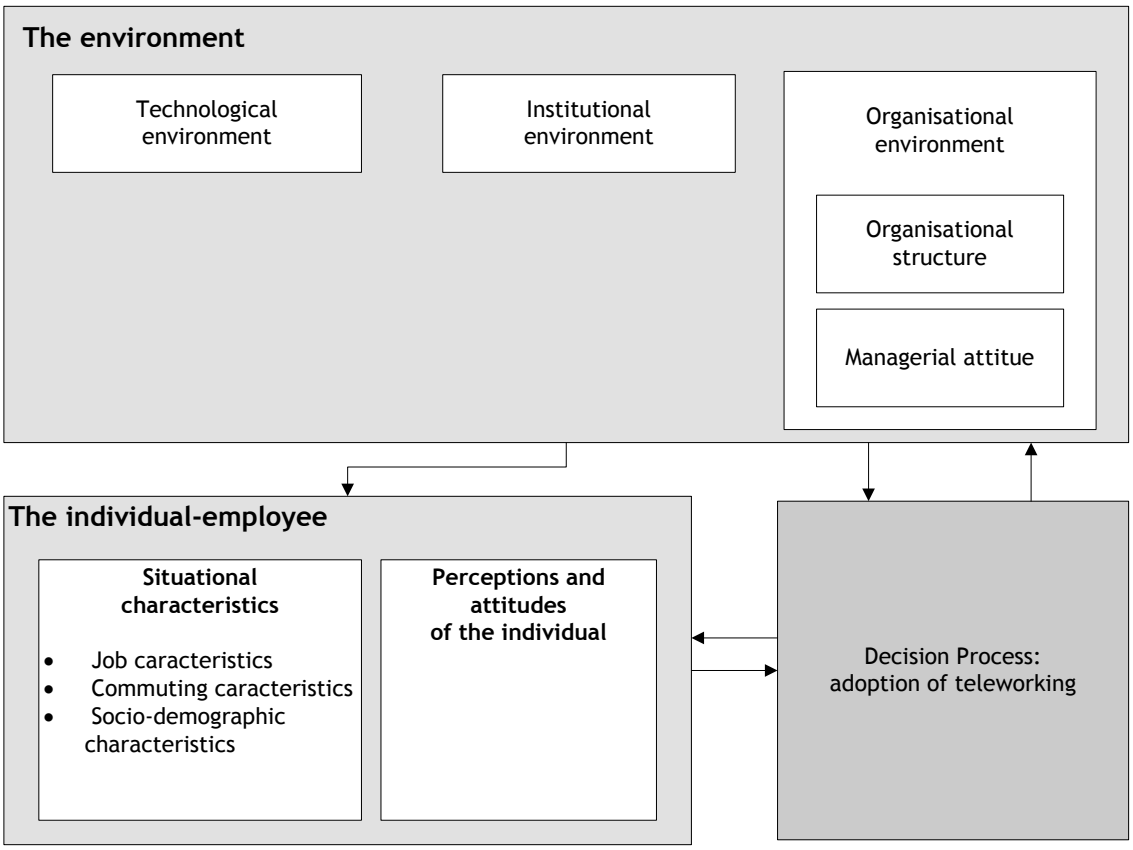


Figure 9: Basic conceptual framework for modelling the implementation process of teleworking (Bernardino et al. 1992, 20-30)

Waves of development, such as globalization, climate change and growing complexity shape the operating environment in relation to how we work, what organisations and companies do and what industries produce. The future is hard to predict, however one trend is in learning networks, where we will respond to the effects of these waves by developing networks with a range of other experts and actors. (Juva 2009, 1.)

Juva (2009, 22) describes the future of work as similar to a jazz- improvisation, where work is carried out in projects whose composition changes time to time. A strong knowledge is a base for the composition and amount of willingness to try out something new. It is predicted that in the future two fields of know-how will be emphasised: cooperation and the ability to grasp the problems to find solutions.

William Gibson a science-fiction writer believes that the future is already here but I would have to add that the challenge lies in the harnessing of global trends and innovations. To give a chance to those with new ideas requires courage, determination and perseverance in order to create new and innovative working models in collaboration with today´s digitally aware generation.

## 6.6 Evaluation

### 6.6.1 Effectiveness, usefulness and reliability of the research

The researcher, the interviewee and the reader might analyze and interpret the research results differently from each other. The reason for this lies in the fact that we do not interpret things the same way, so even based on the pure facts, one may reach different conclusions and interpretations. The multiple layers of the interpretations can be seen in the Figure 10. The pattern is based on a theoretical construction, where the researcher has to take into account several views and interpretations. (Hirsjärvi et al. 2008, 224-225.)

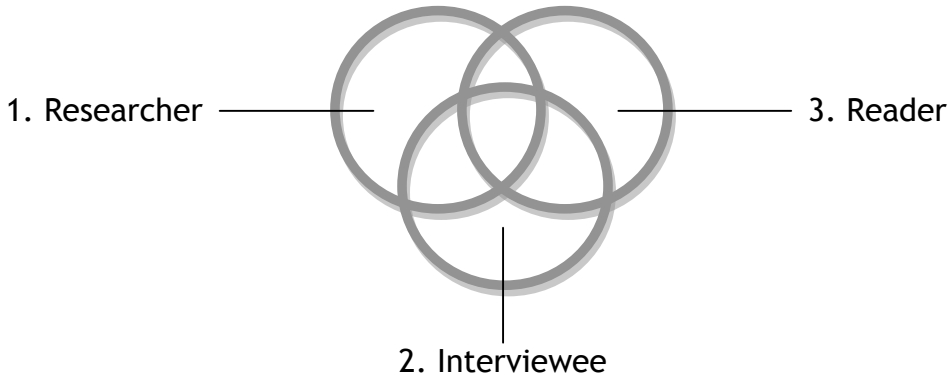


Figure 10: The multiple layers of the interpretations (Hirsjärvi et al. 2008, 224)

In this research the analysis of the effectiveness, usefulness and reliability of the study has been measured through various statements from the Program manager as well as from a colleague in the European Patent Office.

**Program Manager**

*"The Thesis presents a balanced and complete picture of the socio-demographic aspects within the EPO staff taking part in the test phase of the teleworking project. The thesis shows a careful treatment of the data and raises a number of interesting observations which will be addressed later in the extended project."*

"*This thesis will form a discussion document within the project team and it is expected that observations found therein will be considered in detail. The statistical methodology used will also be studied and some aspects applied later in the project. The thesis will also be presented to more senior management levels within the organisation."*

**Reader**

*"The thesis was very interesting and informative and the points were very well covered. I personally learned a lot of it, and additionally learned that PTHW would not work for me as I feel I might be too easily distracted if I worked from home. In addition I would also like to keep my home and work as two separate places, both mentally and physically. I haven't been in the Office too long so I am a good example of someone who hasn't got enough of strong and weak ties to cope with social isolation."*

To conclude, one can confirm that the research contained the effectiveness and usefulness for the management and included the reliable information and detail for the third party as a reader.

### 6.6.2 Self evaluation

The research study is being valued by applying the Learning by Developing evaluation criteria including authenticity, research orientation, novelty and the applicability of the thesis (Laurea 2007, 7-9).

**Authenticity**

The Part Time Home Working pilot project aims to introduce a new working model for teleworking in the European Patent Office by 2010. The aim of the thesis was to fairly and faithfully develop Phase II of the Part Time Home Working pilot project, by studying different motivating factors and constraints in the participants' socio-demographic characteristics to prove the pilot project and to prevent possible isolation and imbalance in the participants' social environment. The development documentation structurally shows the learning processes of the pilot project.

**Research orientation**

The theoretical framework of the socio-demographic characteristics is justified according to a variety of critical resources used in earlier research and studied literature. The research process is planned according to three main elements of project management methods including project design, project implementation and project evaluation. In addition, the methodological findings are compatible with the purpose of the research and explained in a methodologically appropriate manner using the SPSS analysing tool which utilises the hypotheses throughout the $x^2$ test. The reliability and validity of the quantitative internet based research survey has been studied throughout the methodological literature and reported extensively.

**Novelty**

The thesis conclusions and development proposals are based on earlier research and analysed research results. The development proposals are based on regular meetings with participants who have a long working history in the office prior to starting teleworking and a recommendation that teleworking should be restricted to a maximum of two days per week. The results and proposals are reported to the Project Manager to develop the next phase of the Part Time Home Working Pilot Project.

New ideas regarding the social relationships of expatriates and non-expatriates in teleworking situations have been developed in the course of the research study. In addition, the thesis promotes the use of a new communication tool VoIP (voice over internet protocol) for the Part Time Home Working participants which would enable the better integration of the members into their team. This tool could additionally be used in the European Patent Office governmental environment where employees work in different buildings and locations.

**Applicability**

This research study presents results that are applicable and transferable to and have been implemented in Phase IV of the Part Time Home Working pilot project. Additionally, the study suggests further investigations to be carried out regarding the participants' socio-demographic situation beyond the issues of isolation and the social environment to cover work experience, optimum time to telework, part-time workers working hours, and suitable tasks to telework in the next phase as well as studying the benefits brought by teleworking in the European Patent Office.

The work on this thesis proceeded under the auspices of Laurea University of Applied Sciences as a research and development task, which emphasizes sector and regional development as well as the challenges of working life and the growth of expertise (Laurea 2008, 31). The research and development process was divided into five phases; thematic analysis, design, implementation, evaluation and publication. The preparation and thematic analysis of the thesis started at the beginning of studies at the end of 2008 and finished with the publication of the thesis at the end of 2009, covering over 1000 hours spent on the study.

The research questions were answered throughout the 13 responses from the Part Time Home Working participants (87% response rate), which conforms with the requirements of the problem set for this research. In addition, close cooperation with the project manager on the Part Time Home Working pilot project is acknowledged with gratitude. It has enabled the thesis to cover the set target of the research study.

References

**Books and articles:**

Aho, P. & Korhonen, P. 2008. Laurea Fakta 2008-2009. Vantaa, Finland: Opetushallinto

Artto, K., Martinsuo, M. & Kujala, J. 2006. Projektiliiketoiminta. Helsinki: WSOY

Arling, P. 2004. The Impact of Telework on Performance: A Social Network Approach. University of Minnesota 24.02.2004.

Avery, C & Zabel, D. 2001. The flexible workplace. A Sourcebook of Information and Research. Westport: Quorum Books.

Bailey, D. & Kurkland N.B. 2002. A review of telework research: findings, new directions, and lessons for the study of modern work. Journal of Organisational Behaviour 23, 383-400.

Bèlanger, F. 1999. Communication patterns in distributed work groups: a network analysis. IEEE Transactions on Professional Communication 42, 261-275.

Bernardino, A., Ben-Akiva, M. & Salomon, I. 1992. Stated preference approach to modeling the adoption of telecommuting. Transportation Research Record 1413, 22-30.

Blanpain, R. 1995. The legal and contractual situation of teleworkers in the European Union. The law aspects including self-employed. Consolidation Report. Dublin, Ireland: EUROPEAN FOUNDATION for the Improvement of Living and Working Conditions.

Brimelow, A. 2008. A happy anniversary for the European patent system. Patents in Europe IAM 2008, 5-7.

Burns, A.C., Bush, R.F. 1998. Marketing Research, 2nd edit. New Jersey: Prentice-Hall

Chrissafis, T. 2000. Benchmarking Progress on New Ways of Working and New Forms of Business Across Europe. ECaTT Final Report. IST Programme. Bonn, Germany: empirica GmbH

Dimitrova, D., Garton, L., Gulia, M.,Haythornthwaite, C., Salaff, J. & Wellman, B. 1996. Annual Reviews Sociology 22, Computer networks as social networks. Toronto: Annual Reviews Inc.

Förster, W., Elahi, S., & Terzic, K. 2007. Scenarios for the future. Munich: European Patent Office

Gani, Z., Toleman, M. 2006. Success factors and barriers to telework adoption in e-business in Australia and Singapore: the influence of culture and organizational culture. Journal of Theoretical and Applied Electronic Commerce Research volume 1, No. 3, 81-92. Chile: Universidad de Talca

Hannus, J. 2004. Strategisen menestyksen avaimet. Tehokkaat strategiat, kyvykkyydet ja toimintamallit. Jyväskylä: Pro Talent Oy.

Hannus, J., Lindroos, J. & Seppänen, T. 1999. Strateginen uudistuminen osaamisen ajan toimintaympäristössä. Helsinki: HM&V.

Haythornthwaite, C. 2005. Social networks and internet connectivity effects, Information, Communication & Society Vol. 8, No. 2, June 2005.

Heikkinen, H.L.T., Rovio, E. & Syrjälä, L. 2006. Toiminnasta tietoon. Toimintatutkimuksen menetelmäüt ja lähestymistavat. Helsinki: Kansanvalistusseura

Heinonen, S. 1998. Kestävä kehitys, etätoiminnot ja liikenne. Sitra 169. Helsinki: SITRA.

Heinonen, S., Saarimaa, R. 2009. Työelämän laadulla parempaa jaksamista- Kuinka etätyö voi auttaa? Työ- ja elinkeinoministeriön julkaisu. Työ ja yrittäjyys 25/2009. Helsinki: Työ- ja elinkeinoministeriö.

Hirsjärvi, S., Remes, P. & Sajavaara, P. 2008. Tutki ja kirjoita. Helsinki: Tammi.

Illegems, V., Verbeke, A. & S`Jegers, R. 2000. The organizational context of teleworking implementation. Technological Forecasting & Social change 68/2001, 275-291.Brussels: North-Holland.

Johnson, G., Scholes, K., Whittington, R. 2008. Exploring corporate strategy, 8th Edition. Essex: Pearson Education Limited.

Juva, K. 2009. Oivallus. Uudet ideat syntyvät rajapinnoilla. Tulevaisuudessa haasteet ratkotaan oppivissa verkoissa. 1. Väliraportti 11/2009 Elinkeinoelämän keskusliitto EK. Helsinki: EK

Kerrin, M & Hone, K.2001. Job seeker`s perceptions of teleworking: A cognitive mapping approach. New Technology, Work and Employment 16:2. Oxford: Blackwell Publishers Ltd.

Khalifa, M & Etezadi, J. 1997. Telecommuting: a study of employees` beliefs`, Journal of Computer Information Systems, 38/1, 78-85.

Khan, M., Lamb, R., Le Feuvre, B., Meredith, W., Calais Regnier, C., Riechel, A. and Zhou, H. 2008. World patent report. A statistical review 2008. Geneva: World Intellectual Property Organization.

Laurea. 2007. Ylemmän ammattikorkeakoulututkinnon opinnäytetyöohje 01.11.2007. Vantaa: Laurea-ammattikorkeakoulu Oy.

Laurea 2008. Yrittäjyyden ja liiketoimintaosaamisen koulutusohjelma. Teollinen palveluliiketoiminta. Liiketalouden ylempi ammattikorkeakoulututkinto, Tradenomi (ylempi AMK), Master of Business Administration. Opetussuunnitelma versio 3.0 15.5.2008. Vantaa: Laurea-ammattikorkeakoulu Oy.

Nilles, J. 1999. What does telework really do to us? Word Transport Policy and Practice, volume 15, No.2, 1-2.

Paukku, T. 2007. Heikot linkit- verkon elinehto. Helsingin Sanomat 29.02.2007 D1.

Pekkola, J., Useklin L. 2005. Etätyöopas työnantajille. Helsinki: Työministeriö.

Pelin, R. 2008. Projektin johtamisen käsikirja. 5 painos. Jyväskylä: Gummerus Kirjapaino Oy.

Raij, K. 2007. Learning by developing. Laurea Publications A-58. Helsinki: Edita Prima Oy.

Ruuska, K. 2007. Pidä projekti hallinnassa – Suunnittelu, menetelmät, vuorovaikuts. Helsinki: Talentum.

Schröder, O. 2008. Facts and figures 2008. Munich: European Patent Office

Schröder, O. 2009a. Annual Report 2008. Munich: European Patent Office

Schröder, O. 2009b. Facts and figures 2009. Munich: European Patent Office

USPTO. 2009. Performance and Accountability Report 2008. Alexandria, VA, USA: United States Patent and Trademark Office

Wild, J. 2008. The changing face of Europe`s patent landscape. Patents in Europe 2008 IAM, 8-12.

Vittersoe, J., Akseler, S., Evjemo, B., Julsrud, T., Yttri, B.& Bergvik, S. 2003. Impacts of home-based telework on quality of life for employees and their partners. Quantitave and

qualitative results from a European survey. Journal of Happiness Studies 4: 201-233. Netherlands: Kluwer Academic Publishers.

Wells, S. 2001. Making telecommuting work. HR Magazine volume 46, No.10, 34-54.

**Internet sources:**

Business Link. 2009. Practical advice for business. BIS Department for Business Innovation & Skills. Referred 21.02.2009
http://www.businesslink.gov.uk/bdotg/action/layer?topicId=1074446319

European Patent Office. 2009a. European Patent Organisation. Referred 30.08.2009.
http://www.epo.org/about-us/epo.html

European Patent Office. 2009b. Legal foundations. Referred 30.08.2009.
http://www.epo.org/about-us/epo/legal-foundations.html

European Patent Office. 2009c. Member states of the European Patent Organisation. Referred 30.08.2009. http://www.epo.org/about-us/epo/member-states.html

European Patent Office 2009d. Activities. Referred 30.08.2009. http://www.epo.org/about-us/office/activities.html

European Patent Office 2009e. Patent trends. Referred 30.08.2009.
http://www.epo.org/patents/patent-information/east-asian/helpdesk/trends.html

Filev, A. 2008. Project Management Software, Mind mapping, Weak Ties and the Human Brain. Referred 12.09.2009.
http://www.wrike.com/projectmanagement/07/28/2008/Project-Management-Software-Mind-Mapping-Weak-Ties-and-the-Human-Brain

Helsingin Sanomat. 2009. Facebook ylitti 300 miljoonan käyttäjän rajan. Helsingin Sanomat online news on 16.09.2009. Referred 16.09.2009.
http://www.hs.fi/ulkomaat/artikkeli/Facebook+ylitti+300+miljoonan+k%C3%A4ytt%C3%A4j%C3%A4n+rajan/1135249354251

ILO. 2009. INFORM Bureau of Library and Information Services.
http://www.ilo.org/public/libdoc/ILO-Thesaurus/english/tr2259.htm

PRINCE2. 2009a. PRINCE2- The Method. Referred 25.09.2009. http://www.prince-officialsite.com/AboutPRINCE2/PRINCE2Method.asp

PRINCE 2. 2009b. Project Management – PRINCE2. Referred 26.09.2009 http://www.best-management-practice.com/Knowledge-Centre/Best-Practice-Guidance/PRINCE2/

Tikkanen, J. 2009. Oletko Facebookissa? Helsingin Sanomat Kuukausiliite 04.09.2009. Referred 16.09.2009. http://www.hs.fi/artikkeli/1135249030284

United States Patent and Trademark Office. 2009a. USPTO Celebrates a Decade of Telework 05.06.2007. Referred 01.09.2009.
http://www.uspto.gov/main/homepagenews/bak2007jun05.htm

United States Patent and Trademark Office. 2009b. USPTO Deputy Director Peterlin testifies at house co9mmittee hearing on telework 06.11.2007. Referred 01.09.2009.
http://www.uspto.gov/web/offices/com/speeches/07-45.htm

Telework Guidance. 2003. CBI, TUC & CEEP UK. Referred 04.09.2009.
http://www.berr.gov.uk/files/file27456.pdf?pubpdfdload=03%2F1201

Tietokone. 2009. Sosiaaliset verkostot sähköpostiakin suositumpia 11.03.2009. Referred 16.09.2009.
http://www.tietokone.fi/uutiset/2009/sosiaaliset_verkostot_sahkopostiakin_suositumpia

Whiten, L. 1996. Telecommuting “Information technology lets workers stay home”. Referred 05.09.2009. http://www.ddirectory.net/telecomm.htm

**Other sources:**

Chang-kyun Jung. 2009. IT Strategy Team, Korean Institute of Patent Information. Personal notification via Email ktikka@epo.org 14.05.2009. Printed 14.05.2009.

Presentation on the EPO, 2008. The European Patent Office. An introduction to the EPO and the European patent system. Munich: EPO

SCS. 2009. EPO Central Staff Committee. Results of the survey on part time home working. Personal notification via Email ktikka@epo.org 29.05.2009. Printed 13.11.2009.

Figures



Tables

Annexes

The purpose of this survey is to study whether current working time and methods in PTHW are suitable to ensure participants social networks in place.

It is not necessary nor desirable to spend a long time on any one question or on the entire questionnaire.
Provide an answer that reflects your initial reaction.
(Time approximately 5 minutes)

# Part Time Home Working questionnaire

Form is timed: publicity starts 22.7.2009 8.00 and ends 31.8.2009 14.00

## Demographic information

Gender ?

| | Male | Female |
|---|---|---|
| Select | ○ | ○ |

Are you expatriate ?

| | Yes | No |
|---|---|---|
| Select | ○ | ○ |

Marital status ?

| | married / partner | single |
|---|---|---|
| Select | ○ | ○ |

Family phase with ?

| | no children | young children | adult children | carer |
|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ |

Working hours [%] efore joining the PTHW ?

| | Up to 60% | Up to 70% | Up to 80 % | Up to 90 % | Up to 100 % |
|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ |

Has your working hours changed after joining the PTHW ?

| | No change | 1 - 2 h/wk | 3 - 4 h/wk | 5 or more h/wk | got less |
|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ |

Years in the office ?

| | year |
|---|---|
| Working in EPO since: | |

How experienced do you feel relative to your immediate colleagues ?

| | Less experienced | Same experience | More experienced | Don`t know/Can`t say |
|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ |

Next >>

# Part Time Home Working questionnaire

Form is timed: publicity starts 22.7.2009 8.00 and ends 31.8.2009 14.00

## Environment

After joining the PTHW, my job performance has got better ?

| | Strongly disagree | Slightly disagree | Remains the same | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ | ○ |

My job satisfaction has increased due to PTHW ?

| | Strongly disagree | Slightly disagree | Remains the same | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ | ○ |

My motivation has increased due to PTHW ?

| | Strongly disagree | Slightly disagree | Remains the same | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ | ○ |

<< Previous | Next >>



# Part Time Home Working questionnaire

Form is timed: publicity starts 22.7.2009 8.00 and ends 31.8.2009 14.00

## Work life balance

After joining the PTHW I have found better to separate balance between work and family life ?

| | Strongly disagree | Slightly disagree | Remains the same | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ | ○ |

After joining the PTHW I do not feel isolated at home ?

| | Strongly disagree | Slightly disagree | Remains the same | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ | ○ |

After joining the PTHW I do not feel isolated at work ?

| | Strongly disagree | Slightly disagree | Remains the same | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ | ○ |

<< Previous | Next >>

Järjestelmänä Eduix E-lomake 3.1, www.e-lomake.fi

# Part Time Home Working questionnaire

Form is timed: publicity starts 22.7.2009 8.00 and ends 31.8.2009 14.00

## Social network

It is important to me to be at the heart of my unit/directorate ?

| | Strongly disagree | Slightly disagree | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ |

I feel part of the team while working in PTHW ?

| | Strongly disagree | Slightly disagree | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ |

Verbal communication between colleagues is very important to me ?

| | Strongly disagree | Slightly disagree | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ |

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# Part Time Home Working questionnaire

Form is timed: publicity starts 22.7.2009 8.00 and ends 31.8.2009 14.00

## Social network

Communication with distant colleagues/acquaintances has got better after joining the PTHW ?

| | Strongly disagree | Slightly disagree | Remains the same | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ | ○ |

Communication with close colleagues / close friends has got better after joining the PTHW ?

| | Strongly disagree | Slightly disagree | Remains the same | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ | ○ |

Communication with my manager has got better after joining the PTHW ?

| | Strongly disagree | Slightly disagree | Remains the same | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ | ○ |

In case of non-work related discussions I contact my distant colleagues/acquaintances from home rather than wait for the next office day ?

| | Strongly disagree | Slightly disagree | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ |

In case of work related questions/discussions I contact my close colleagues / close friends from home rather than wait for the next office day ?

| | Strongly disagree | Slightly disagree | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ |

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## Learning cafe

I am up-to-date with office policies/rumours/changes after joining the PTHW ?

| | Strongly disagree | Slightly disagree | Remains the same | Slightly agree | Clearly agree | Don`t know / Can`t say |
|---|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ | ○ |

What was your main communication method with close colleagues before joining the PTHW ?

- ☐ Visit
- ☐ Coffee break
- ☐ Telephone
- ☐ Madras
- ☐ E-mail
- ☐ Skype & Internet messenger
- ☐ Other

If you selected other, please specify

What was your main communication method with your distant colleagues/acquaintances before joining the PTHW ?

- ☐ Visit
- ☐ Coffee break
- ☐ Telephone
- ☐ Madras
- ☐ E-mail
- ☐ Skype & Internet messenger
- ☐ Other

If you selected other, please specify

While working from home, what is your main communication method with your close colleagues ?

- ☐ Telephone
- ☐ Madras
- ☐ E-mail
- ☐ Skype & Internet messenger
- ☐ Wait for the next office day
- ☐ Other

If you selected other, please specify

While working from home, what is your main communication method with your distant colleagues/acquaintances ?

- ☐ Telephone
- ☐ Madras
- ☐ E-mail
- ☐ Skype & Internet messenger
- ☐ Wait for the next office day
- ☐ Other

If you selected other, please specify

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## Part Time Home Working questionnaire

Form is timed: publicity starts 22.7.2009 8.00 and ends 31.8.2009 14.00

### Time and recommendations

In your opinion, what is the optimum number of days at PTHW in order for you to keep contact with your social network ?

| | 0 | 1 | 2 | 3 | 4 | 5 | Don`t know / Can`t say |
|---|---|---|---|---|---|---|---|
| Select | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

What in your opinion could be done to keep up with your social networks while working in PTHW ?

<< Previous | Next >>

Thank you for your time in completing this questionnaire.



## Part Time Home Working questionnaire

Form is going to be submitted.

Proceed

<< Previous | Finish (Send all Data)

**Correlations**

| | | Years_in_EPO | Experience | After_PTHW_Perf | Job_satisfaction_PTHW | Motivation_after_PTHW | Better_balance | Not_isolated_at_home | Not_isolated_at_work | Heart_of_unit | part_of_the_team | verbal_communication | comm_dist_coll | comm_close_coll | comm_manager | cont_nonwork_home | cont_work_home | rumors | Optimum_days_home |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Years_in_EPO | Pearson Correlation | 1 | ,002 | -,063 | ,171 | ,046 | -,217 | -,284 | -,185 | -,007 | ,179 | -,048 | ,056 | ,044 | ,035 | ,102 | -,029 | ,706** | ,241 |
| | Sig. (2-tailed) | | ,995 | ,839 | ,577 | ,881 | ,476 | ,348 | ,545 | ,983 | ,558 | ,876 | ,856 | ,887 | ,909 | ,740 | ,925 | ,007 | ,427 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| Experience | Pearson Correlation | ,002 | 1 | -,142 | ,165 | ,008 | ,057 | ,153 | ,289 | ,098 | ,033 | -,283 | ,484 | ,601* | ,000 | -,185 | ,128 | -,022 | -,294 |
| | Sig. (2-tailed) | ,995 | | ,643 | ,590 | ,978 | ,854 | ,617 | ,338 | ,751 | ,915 | ,349 | ,094 | ,030 | 1,000 | ,545 | ,677 | ,942 | ,330 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| After_PTHW_Perf | Pearson Correlation | -,063 | -,142 | 1 | ,698** | ,775** | -,076 | ,510 | ,303 | -,036 | ,626* | -,019 | ,080 | ,100 | ,734** | ,032 | ,090 | ,224 | -,080 |
| | Sig. (2-tailed) | ,839 | ,643 | | ,008 | ,002 | ,805 | ,075 | ,315 | ,906 | ,022 | ,950 | ,794 | ,746 | ,004 | ,918 | ,770 | ,461 | ,794 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| Job_satisfaction_PTHW | Pearson Correlation | ,171 | ,165 | ,698** | 1 | ,945** | -,090 | ,618* | ,658* | ,262 | ,718** | ,080 | ,311 | ,185 | ,681* | -,150 | ,039 | ,467 | ,115 |
| | Sig. (2-tailed) | ,577 | ,590 | ,008 | | ,000 | ,770 | ,025 | ,015 | ,387 | ,006 | ,795 | ,302 | ,545 | ,010 | ,626 | ,898 | ,108 | ,707 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| Motivation_after_PTHW | Pearson Correlation | ,046 | ,008 | ,775** | ,945** | 1 | ,128 | ,658* | ,566* | ,311 | ,712** | ,164 | ,223 | ,071 | ,698** | -,022 | ,081 | ,391 | ,146 |
| | Sig. (2-tailed) | ,881 | ,978 | ,002 | ,000 | | ,676 | ,014 | ,044 | ,300 | ,006 | ,592 | ,465 | ,818 | ,008 | ,943 | ,794 | ,187 | ,634 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| Better_balance | Pearson Correlation | -,217 | ,057 | -,076 | -,090 | ,128 | 1 | ,076 | -,091 | ,128 | -,313 | ,147 | -,170 | -,212 | ,000 | ,187 | -,162 | -,339 | ,251 |
| | Sig. (2-tailed) | ,476 | ,854 | ,805 | ,770 | ,676 | | ,804 | ,769 | ,678 | ,298 | ,633 | ,578 | ,488 | 1,000 | ,541 | ,597 | ,258 | ,407 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| Not_isolated_at_home | Pearson Correlation | -,284 | ,153 | ,510 | ,618* | ,658* | ,076 | 1 | ,847** | ,112 | ,464 | -,197 | ,325 | ,137 | ,362 | ,372 | ,218 | ,085 | ,385 |
| | Sig. (2-tailed) | ,348 | ,617 | ,075 | ,025 | ,014 | ,804 | | ,000 | ,715 | ,110 | ,518 | ,279 | ,656 | ,224 | ,211 | ,474 | ,781 | ,194 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| Not_isolated_at_work | Pearson Correlation | -,185 | ,289 | ,303 | ,658* | ,566* | -,091 | ,847** | 1 | -,043 | ,302 | -,221 | ,372 | ,290 | ,350 | ,082 | ,025 | ,182 | ,395 |
| | Sig. (2-tailed) | ,545 | ,338 | ,315 | ,015 | ,044 | ,769 | ,000 | | ,888 | ,315 | ,468 | ,210 | ,336 | ,241 | ,789 | ,935 | ,553 | ,182 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| Heart_of_unit | Pearson Correlation | -,007 | ,098 | -,036 | ,262 | ,311 | ,128 | ,112 | -,043 | 1 | ,337 | ,527 | -,055 | -,365 | ,000 | -,150 | ,175 | -,080 | -,141 |
| | Sig. (2-tailed) | ,983 | ,751 | ,906 | ,387 | ,300 | ,678 | ,715 | ,888 | | ,260 | ,064 | ,858 | ,220 | 1,000 | ,624 | ,568 | ,795 | ,647 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| part_of_the_team | Pearson Correlation | ,179 | ,033 | ,626* | ,718** | ,712** | -,313 | ,464 | ,302 | ,337 | 1 | ,178 | ,545 | ,277 | ,544 | ,192 | ,569* | ,523 | -,135 |
| | Sig. (2-tailed) | ,558 | ,915 | ,022 | ,006 | ,006 | ,298 | ,110 | ,315 | ,260 | | ,561 | ,054 | ,360 | ,055 | ,530 | ,042 | ,067 | ,659 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| verbal_communication | Pearson Correlation | -,048 | -,283 | -,019 | ,080 | ,164 | ,147 | -,197 | -,221 | ,527 | ,178 | 1 | -,407 | -,505 | ,000 | -,242 | -,107 | -,120 | ,064 |
| | Sig. (2-tailed) | ,876 | ,349 | ,950 | ,795 | ,592 | ,633 | ,518 | ,468 | ,064 | ,561 | | ,168 | ,078 | 1,000 | ,426 | ,727 | ,695 | ,837 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| comm_dist_coll | Pearson Correlation | ,056 | ,484 | ,080 | ,311 | ,223 | -,170 | ,325 | ,372 | -,055 | ,545 | -,407 | 1 | ,805** | ,296 | ,331 | ,728** | ,394 | -,266 |
| | Sig. (2-tailed) | ,856 | ,094 | ,794 | ,302 | ,465 | ,578 | ,279 | ,210 | ,858 | ,054 | ,168 | | ,001 | ,325 | ,269 | ,005 | ,182 | ,380 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| comm_close_coll | Pearson Correlation | ,044 | ,601* | ,100 | ,185 | ,071 | -,212 | ,137 | ,290 | -,365 | ,277 | -,505 | ,805** | 1 | ,368 | ,036 | ,385 | ,354 | -,330 |
| | Sig. (2-tailed) | ,887 | ,030 | ,746 | ,545 | ,818 | ,488 | ,656 | ,336 | ,220 | ,360 | ,078 | ,001 | | ,216 | ,907 | ,194 | ,235 | ,271 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| comm_manager | Pearson Correlation | ,035 | ,000 | ,734** | ,681* | ,698** | ,000 | ,362 | ,350 | ,000 | ,544 | ,000 | ,296 | ,368 | 1 | -,127 | ,000 | ,184 | ,000 |
| | Sig. (2-tailed) | ,909 | 1,000 | ,004 | ,010 | ,008 | 1,000 | ,224 | ,241 | 1,000 | ,055 | 1,000 | ,325 | ,216 | | ,678 | 1,000 | ,547 | 1,000 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| cont_nonwork_home | Pearson Correlation | ,102 | -,185 | ,032 | -,150 | -,022 | ,187 | ,372 | ,082 | -,150 | ,192 | -,242 | ,331 | ,036 | -,127 | 1 | ,626* | ,198 | ,349 |
| | Sig. (2-tailed) | ,740 | ,545 | ,918 | ,626 | ,943 | ,541 | ,211 | ,789 | ,624 | ,530 | ,426 | ,269 | ,907 | ,678 | | ,022 | ,516 | ,242 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| cont_work_home | Pearson Correlation | -,029 | ,128 | ,090 | ,039 | ,081 | -,162 | ,218 | ,025 | ,175 | ,569* | -,107 | ,728** | ,385 | ,000 | ,626* | 1 | ,306 | -,374 |
| | Sig. (2-tailed) | ,925 | ,677 | ,770 | ,898 | ,794 | ,597 | ,474 | ,935 | ,568 | ,042 | ,727 | ,005 | ,194 | 1,000 | ,022 | | ,310 | ,208 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| rumors | Pearson Correlation | ,706** | -,022 | ,224 | ,467 | ,391 | -,339 | ,085 | ,182 | -,080 | ,523 | -,120 | ,394 | ,354 | ,184 | ,198 | ,306 | 1 | ,092 |
| | Sig. (2-tailed) | ,007 | ,942 | ,461 | ,108 | ,187 | ,258 | ,781 | ,553 | ,795 | ,067 | ,695 | ,182 | ,235 | ,547 | ,516 | ,310 | | ,766 |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| Optimum_days_home | Pearson Correlation | ,241 | -,294 | -,080 | ,115 | ,146 | ,251 | ,385 | ,395 | -,141 | -,135 | ,064 | -,266 | -,330 | ,000 | ,349 | -,374 | ,092 | 1 |
| | Sig. (2-tailed) | ,427 | ,330 | ,794 | ,707 | ,634 | ,407 | ,194 | ,182 | ,647 | ,659 | ,837 | ,380 | ,271 | 1,000 | ,242 | ,208 | ,766 | |
| | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |

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

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