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Master Thesis

*Impacts of working from home on employee's performance  
during the COVID-19 pandemic*

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# Abstract

The COVID-19 novel pandemic has succeeded an unprecedented change in the global workplace, when the restrictions by government have forced employees to work from home in order to protect their health and to minimize the outspread of the virus. Remote work was an unexplored path for many global enterprises. Undoubtedly, it constitutes also a historic global future-of-work experiment. Through the implementation of telework, organizations and employees have discovered from their personal experience the benefits and risks. This empirical study is based on a literature review and the survey responses of a sample size of  $n=89$  employees from Munich, who work in the automotive industry. The purpose of this study is to shed light on the most important factors, which have an impact on the employee performance amid the pandemic. The data were analysed using statistical measures and regression analysis. Three main hypotheses were examined E-leadership, work relationships and social relationships regarding employee performance. For instance, it was examined, how the isolation and the lack of social relationships may affect the employees' motivation. On the other hand, the lack of face-to-face communication makes team collaboration difficult. According to the survey results, the majority of participants believe that they are more productive and motivated when they are working from home. Good collaboration, effective communication and transparency of information between team members are the fundamental foundations for productivity. So, managers and human resources should pay attention to build strong work relationships among team members. Post COVID-19 era requires managers, who use their E-leadership skills and focus on the needs, interests and goals of their employees in order to keep them motivated. Based on these findings, discussions, limitations and future research suggestions have been provided.

# Περίληψη

Η πανδημία του νέου COVID-19 επέφερε μια απρόσμενη αλλαγή στον παγκόσμιο χώρο εργασίας, καθώς οι περιορισμοί από τις κυβερνήσεις ανάγκασαν τους εργαζόμενους να εργάζονται από το σπίτι για την καλύτερη δυνατή προστασία της υγείας τους και για την μείωση της εξάπλωσης του ιού. Η τηλεργασία αποτελούσε μια ανεξερεύνητη διαδρομή για πολλές παγκόσμιες επιχειρήσεις. Αναμφίβολα, η νέα πραγματικότητα θεωρείται ένα ιστορικό παγκόσμιο πείραμα για το μέλλον της εργασίας. Μέσω της τηλεργασίας, οι οργανισμοί και οι εργαζόμενοι έχουν ανακαλύψει τα οφέλη και τους κινδύνους. Η εμπειρική μελέτη της παρούσας εργασίας βασίζεται σε μια ανασκόπηση της βιβλιογραφίας και στις απαντήσεις της έρευνας ενός μεγέθους δείγματος  $n=89$  εργαζομένων από το Μόναχο, οι οποίοι εργάζονται στον κλάδο της αυτοκινητοβιομηχανίας. Σκοπός της παρούσας μελέτης είναι να ρίξει φως στους σημαντικότερους παράγοντες που επηρεάζουν την απόδοση των εργαζομένων. Προκειμένου να επιτευχθεί αυτό, τα δεδομένα αναλύθηκαν χρησιμοποιώντας στατιστικές μετρήσεις και ανάλυση παλινδρόμησης. Τρεις βασικές υποθέσεις εξετάστηκαν: η ηγεσία, οι εργασιακές σχέσεις και οι κοινωνικές σχέσεις σχετικά με την απόδοση των εργαζομένων. Για παράδειγμα, εξετάστηκε το ερώτημα, πώς η απομόνωση και η έλλειψη κοινωνικών σχέσεων μπορεί να επηρεάσουν τα κίνητρα των εργαζομένων. Αντιθέτως, η έλλειψη επικοινωνίας πρόσωπο με πρόσωπο μπορεί να δυσχεραίνει την ομαδική συνεργασία. Η πλειονότητα των ερωτηθέντων θεωρούν ότι είναι πιο παραγωγικοί και έχουν περισσότερα κίνητρα, όταν εργάζονται από το σπίτι. Η καλή συνεργασία, η αποτελεσματική επικοινωνία και η διαφάνεια της ενημέρωσης μεταξύ των μελών της ομάδας αποτελούν τις θεμελιώδεις βάσεις για την παραγωγικότητα. Τα διευθυντικά στελέχη και το ανθρώπινο δυναμικό θα πρέπει να επικεντρωθούν στη δημιουργία ισχυρών εργασιακών σχέσεων μεταξύ των μελών της ομάδας. Η εποχή μετά τον COVID-19 απαιτεί διευθυντές, οι οποίοι χρησιμοποιούν τις δεξιότητες ηλεκτρονικής ηγεσίας τους και επικεντρώνονται στις ανάγκες, τα ενδιαφέροντα και τους στόχους των υπαλλήλων τους, προκειμένου να τους κινητοποιήσουν. Με βάση τα ευρήματα παρουσιάζονται περιορισμοί και προτάσεις για μελλοντικές ερευνητικές συζητήσεις.

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Sincerely,

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# Contents

Abstract .....	2
Περίληψη.....	3
Acknowledgements.....	4
1. Introduction.....	7
2. Theoretical Background and Literature Review .....	9
2.1 Telework.....	9
2.2 Remote Work and COVID-19.....	11
2.3 Working Conditions .....	12
2.4 Mental Health.....	14
2.5 Employee Performance .....	16
2.6 Motivation .....	18
2.7 E-Leadership .....	21
2.8 Virtual team.....	23
3. Methodology .....	25
3.1 Research Design and Objectives.....	25
3.2 Survey Design – Questionnaire .....	26
3.3 Validity and Reliability .....	27
3.4 Descriptive Statistics.....	27
3.5 Ordinal Regression .....	28
4. Results & Analysis.....	28
4.1 Validity and Reliability .....	28
4.2 Descriptive Statistics.....	34
4.3 Regression Analysis .....	53
5. Discussions .....	60
6. Limitations .....	65
7. Conclusions.....	65
Appendix I.....	67
Bibliographical References .....	73

## Table of Figures

Figure 1: Conceptual Framework .....	26
Figure 2: Respondents' percentages about the equipment.....	36
Figure 3: Respondents' percentages about the actions of the company.....	36
Figure 4: Respondents' percentages about the connection with the company. ....	37
Figure 5: Respondents' percentages about the trustworthiness.....	38
Figure 6: Respondents' percentages about the support from manager.....	38
Figure 7: Respondents' percentages about the constructive feedback from manager.....	39
Figure 8: Respondents' percentages about health and well-being.....	39
Figure 9: Respondents' percentages about monitoring.....	40
Figure 10: Respondents' percentages about delegating of tasks. ....	41
Figure 11: Respondents' percentages about the feeling of isolation. ....	41
Figure 12: Respondents' percentages about the transfer of information among colleagues.	42
Figure 13: Respondents' percentages about the effective communication among colleagues. .....	42
Figure 14: Respondents' percentages about the collaboration among colleagues. ....	43
Figure 15: Respondents' percentages about the social relationships.....	43
Figure 16: Respondents' percentages about the working position. ....	44
Figure 17: Respondents' percentages about the concentration at home. ....	45
Figure 18: Respondents' percentages about the workload. ....	45
Figure 19: Respondents' percentages about the duration of workload. ....	46
Figure 20: Respondents' percentages about the working hours at home.....	47
Figure 21: Respondents' percentages about the independency of tasks. ....	47
Figure 22: Respondents' percentages about the completion of tasks.....	48
Figure 23: Respondents' percentages about the work-life balance.....	48
Figure 24: Respondents' percentages about the motivation.....	49
Figure 25: Respondents' percentages about the production.....	49
Figure 26: Respondents' percentages about the cohabitants. ....	50
Figure 27: Respondents' percentages about the children. ....	50
Figure 28: Respondents' percentages about the experience.....	51
Figure 29: Respondents' percentages about the days of home-office. ....	51
Figure 30: Respondents' percentages about the gender.....	52
Figure 31: Respondents' percentages about the age.....	52
Figure 32: Respondents' percentages about the education level.....	53
Figure 33: Exploratory Factor Analysis .....	54
Figure 34: Ordinal regression analysis with dependent variable the productivity .....	55
Figure 35: Ordinal regression analysis with dependent variable the productivity according to motivation .....	56
Figure 36: Ordinal regression analysis with dependent variable the motivation .....	57
Figure 37: Ordinal regression analysis with dependent variable the motivation according to productivity .....	58
Figure 38: Ordinal regression analysis with dependent variable the productivity according to three factor variables .....	59

# 1. Introduction

In 24 January 2020, a worldwide coronavirus disease (COVID-19) emerged in Germany. From 13 March, German regulations obligated schools and universities to close temporarily and prohibited visits to hospitals to protect the elderly. From 20 March, the German government implemented a "lockdown", which included case isolation, social distancing of the entire population and quarantine (Imöhl, 2021). In a short time, the whole community should work from home in order to protect themselves and the people around them. These unexpectedly measurements were necessary for the effective suppression of COVID-19.

The majority of technological companies reacted very quickly and gave the opportunity to the employees to work from their home. Home-office was not a part of the daily routine, but it happened during an unprecedented crisis. Before the outbreak of the pandemic, working from home was remarkably little widespread in Germany (Rasenbach, 2020). A survey by Eurostat found that in 2019 only five percent of employees usually worked from home, seven percent occasionally and 87 percent never. However, not only companies but also employees were not ready for this change of work life. Some people transformed their kitchen tables or their living room into office. It was very common in meetings to hear from the background children' shouts or babies crying. Many parents should take care of their children at home and helping them with the home-schooling activities while concurrently working at the same time.

In the corona pandemic, 10.5 million professionals work exclusively from home. Another 8.3 million work partly in the home office. That is a total of 45 percent of all employed people (Bitkom, 2021). It is quite sure that even after the corona pandemic has ended, people would prefer to work from home. According to Bitkom calculations, 74 percent support that home office should be used much more in Germany, 85 percent believe that telework can reduce traffic and thus also relieve the climate. The possibility of remote working attracts younger professional to move away in a more attractive city or to live closer to friends and family. The new era opens new borders around the world and raises the chances for project outsourcing.

Many existing studies have investigated the impact of remote work on the productivity of employees (Bailey N., 1999). Some of them support that working increases employees' productivity, because remote work gives the employees more flexibility, work life balance and a feeling of trust from companies (Laihonen H., 2012). On the other hand, Kazekami claims that long working time of remote work would decrease teleworker productivity, as the efficiency and ease of communication has decreased and the working hours are too long (Kazekami, 2020). Moreover, research has shown that for employees with high emotional stability, working from home makes them more autonomous and fosters wellbeing. On the contrary, for people with low emotional stability, working from home worsens their physical, social and psychological strain (Perry S J, 2018). However, the majority of these studies have used a qualitative analysis method such as surveys and interviews, in which the participants did not actually work from home for a long uninterrupted period of time (Bao, 2021). Through the outbreak of the COVID-19 pandemic we can exploit the opportunity to investigate, whether working from home (WFH) positively or negatively affected the employees' productivity and motivation.

This study contributes to investigate the relationship between working from home and employee productivity during the COVID-19 pandemic. The results can be used in order to improve the management of companies, increase job satisfaction and motivate employees to be more productive. At the beginning of this research, a theoretical background from previous literature regarding the core subjects such as telework, working conditions, mental health and employees' performance is provided. The next chapter presents the methodology, followed for the collection of primary data and their analysis. It includes details about the data collection, questionnaire's structure, what factors were taken into account for this survey and how data analyzed through regression analysis. The presentation of the results of this research and their interpretation will be followed. The last chapter contains the limitations regarding the research data and how those possibly impacted the survey results.



## 2. Theoretical Background and Literature Review

In this chapter, previous related studies are presented regarding teleworking and its dimensions at the workplace, which have been taken in consideration in order to be examined in detail. Teleworking can improve the performance of organizations by increasing employee job satisfaction e.g., better work life balance can lead to better work discipline or less absenteeism (Smith).

### 2.1 Telework

Beginning with a historical retrospection, in 1970, Jack Niles invented the term Telework. Telework is used when someone works from a remote location other than office. Mobile work focuses on using mobile or tablet with the internet to work. Nowadays, the different terms "teleworking", "virtual work", "distance working", "remote work", "home office", and "flexible working" are commonly used to express similar meaning

In the past, most of the studies presented telework as a breakthrough win-win situation, as both employees and companies have benefits. Employers can improve morale, retain valuable employees and reduce absenteeism and turnover. Reduced absenteeism is a very important factor of improved productivity, because employees would not be absent from work because of caring a sick family member. Moreover, teleworking is beneficial for employers, because they save office spaces and reduce production costs. With reference to Potter, the concept of distance working predicted growth in business as it helps in cost reducing and increases the productivity of employees (Potter E. , 2013). In a different manner, working from home can impede managerial control and take more time to managers to control employees' productivity in comparison to work at the same traditional office environment. It is more difficult for the managers to control and monitor the employees' performance (Meier, 2017).

Employees are more flexible and can better balance work and family responsibilities, since telework gives them the opportunity to spend more time with family members. Employees save travel time and having a positive effect on work-life balance (Morgan, 2004). WFH

may enhance the flexibility, the wellbeing and reduce stress improving the quality of work (Potter E. E., 2005). Without doubt, a comfortable and relaxed environment may stimulate creativity, innovation and the mental health (Karácsony, 2021).

On the other hand, employees are isolated from their colleagues and managers concern about reductions in productivity, while they are working from home. The communication between the parties is not physical, but through IT tools, which drive to increase misunderstandings, omission details and social distancing. The lack of personal relationships and physical presence could cause feelings of social or professional isolation and psychological problems. Professionally, teleworkers fear reduced career possibilities, while socially, teleworkers lack informal interaction with others (Cooper & Kurland, 2002). The relationship between colleagues could also be harmed, because the small talks are decreased. The work atmosphere could be also harmed, because employees do not share their daily experiences and an invisible distance exists. When employees are working from their homes, there is a loss of teamwork, because they could not request colleagues' support in problem solving as they would, if they were physically present at work. However, workers may feel alone and getting bored working from home without socializing, reducing employee job satisfaction (Windeler, 2017). Furthermore, the lack of interaction with colleagues may diminish organizational knowledge transfer, co-learning and the transparency of ideas between employees (Taskin, 2010). As a consequence, innovation, productivity and long-term growth can suffer from telework, when workers do not physically meet each other.

Teleworkers have to bear the costs for electricity and the internet costs themselves. In order to work comfortably, they should have their own office and to buy the appropriate equipment such as screens, keyboard, printer, scanner, phone, tablets etc.

It is a common truth, that there is a blurred line between work and personal life boundaries and some employees cannot stop thinking about work after hours. Work equipment in bedroom or in kitchen does not allow workers to switch off mentally from work obligations and may stressed them more. They work overtimes and may be not able to disengage from work especially, when their personal afternoon is free (Francoise Contreras, 2020). A psychological detachment helps employees' well-being and mental health. Another

aspect is that home environment does not foster work concentration. Employees have easy access to social media, household chores and ambient noise. It is dependent on employees' personality and character, if they are concentrated on the work or they need a closely supervision. This situation requires e-leadership, which entails the development of distinct abilities to improve organizational functioning in virtual and remote work environments (Roman, 2019). Last but not least, people at home are more exposed at screen and they can suffer from screen fatigue, they should be very careful and try to prevent lassitude from occurring.

## 2.2 Remote Work and COVID-19

Telework was an effective action proposed by World Health Organization WHO (2020) and rapidly implemented by organizations worldwide, however, academics still search for its benefits and drawbacks (Francoise, 2020). In short time, companies should take care of the necessary infrastructure. Some public organizations were not ready for this big shift. For other companies, information and communication technologies (ICT) were existed and the adoption of this working style was relatively easy (Béland, 2020).

It is interesting to cite some survey results related to the impact of working from home on productivity during the COVID-19 pandemic. According to the survey of (Dahik, 2020), 75% of employees surveyed by the Boston Consulting Group reported having either maintained or improved their perceived productivity on individual tasks (such as analyzing data, writing presentations or executing administrative tasks) during the first few months of the COVID-19 pandemic (Sectigo, 2020). With reference to Sectigo, almost half of IT professionals (49%) saw an increase in employee productivity at their company during widespread remote working, and 35% felt that productivity remained consistent even after the initial set-up, based on a survey of 500 IT professionals at companies of at least 1,000 employees in the United States, Canada, Germany, France, Ireland and the United Kingdom. Reports by Aternity using a productivity tracker show that the total number of productive hours increased during the early days of pandemic (Aternity, 2020). The survey of Baidu Inc, one of the largest IT companies in China presented that working from home has both negative and positive impacts on productivity regarding different metrics (Bao, 2021). WFH has a negative impact on productivity for large projects and productivity

varies for different developers (Bao, 2021). The study of Business perspectives in Slovakia supports that teleworking had a clear positive effect on job satisfaction of the examined Slovakian employees. As a result of teleworking, the relationship between manager and subordinate has improved and work-life balance has also developed favorably (Karácsony, 2021). Additionally, (Azarbouyeh, 2014) claims that teleworking is effective in enhancing the quality of life and (Kazekami, 2020) found that teleworking improves employees' happiness and work satisfaction. It is very remarkable that, (Bloom, 2015) quoted the benefits of modern management practices such as WFH, which led to a significant improvement in the productivity of the company. On the contrary to 2015, in the current coronavirus crisis, the economist fears fall in productivity, because of the following four factors children, space, privacy and choice. "Many people I have been interviewing are now working in their bedrooms or shared common rooms, with noise from their partners, family or roommates," Bloom says. "I fear this collapse in office face time will lead to a slump in innovation," he says. "The new ideas we are losing today could show up as fewer new products in 2021 and beyond, lowering long-run growth (Gorlick, 2020)." Similar results are provided to The World Economic Forum (2020) reports that the majority of business leaders surveyed (78%) expect some negative impact of WFH on productivity, with 22% expecting a strong negative impact and 15% believing that WFH will have either no impact or a positive impact on productivity (Weimin, 2021).

## 2.3 Working Conditions

Working conditions means working environment, terms and conditions of employment, work activities; training, health, safety and well-being; and working time (EurWORK, 2011). Organizations should reconsider their existing working conditions, because workers' health and safety are the first priority in the light of the outbreak of the COVID-19 pandemic.

The majority of the companies offered medical masks for their employees and free rapid weekly tests. Some big companies, offered COVID-19 vaccination for free at the workplace. With reference to Rothstein, organizations should educate their employees about the benefits of vaccination and should facilitate it rather than impose it, for instance by offering time off for employees for vaccination purposes (Rothstein, 2021). Some industries, such as consulting,

financing and IT, encouraged their employees to work from home, when it was feasible in order to ensure their business will continuous to operate (Gourinchas, 2020).

Nevertheless, the companies should examine, if the necessary equipment at home is available and provide teleworkers with guidance on setting up a workstation at home that applies good ergonomics and frequent movement, as far as possible. If the workstations are not suitable, the employees' physical health is affected and results to poor posture and musculoskeletal disorders and therefore to reduced levels of job satisfaction (Mourão et al., 2021). According to the study by Moretti, 70.5% of participants reported pain, most frequently at the low back (41.2%) or neck (23.5%), and 23.5% in multiple sites, while they were teleworking during the pandemic (Antimo Moretti, 2020). Based on the survey by Moretti, 55,4% of participants agreed or totally agreed with the statement "My manager is concerned about the adequacy of my infrastructure to work remotely (computer, internet, furniture)" this means that the managers of the half of participants were not interested about it. A possible explanation would be that managers supposed that everyone has screen, mouse, internet and tables at home.

Nonetheless, IT or consulting work desks are usually equipped with two or three computer screens, which it is not often the case that employees are equipped with more than one computer screen, apart from the game players. So, some companies have allowed employees to take the necessary equipment from their workplace and transport it to their home. Some managers have predicted that this crisis would stay for a long time and they want to make sure that their employees could work safely and pleasantly from their home. However, companies should re-examine their assets and costs post-COVID, as employees should take over the costs, if they want to work remotely since it will be their choice and won't be obligatory.

Remote working conditions are challenging for the companies, managers and Human Resource Management Department. Companies should make available technological tools (e.g. Zoom, Microsoft Teams, Team Viewer), which were not widespread used before, that will facilitate communication between employees. Furthermore, managers should define new strategies in order to foster effective communication among workers, to ensure

supervision, support, performance for the employees, who work from home. Human Resource Management should cooperate with the managers with the common aim to keep their employees motivated and to care for their well-being, because of the lack of human interaction, peer support and physical communication, which might undermine employee's mental health (Prasad, 2020). This shared stressful experience can form an emotional bond between the employees and organization, as they work together to overcome the challenges associated with the environmental disruption (Mihalache, 2021). Moreover, managers need trainings how they can manage, coach, collaborate, evaluate performance and motivate their team remotely.

## 2.4 Mental Health

Mental health refers to cognitive, behavioral and emotional well-being. It affects how we think, feel and behave. Taking care of mental health and maintaining mental balance is a challenge during the isolation period because of COVID-19 (Felman, 2020). Stressful life events such as coronavirus pandemic, have significant effect on an individual's psychological functioning and well-being. The experience of pandemic may have negative impact on mental health of some individuals and can causes anxiety, mental confusion, social withdrawal and depression (Arslan G. , 2020). However, how a person responds to experiences depends on individual differences in perceptions. Positive psychological resources like resilience and hope can facilitate to promote well-being and psychological health of individuals (Snyder, 2000). According to the study of Arslan, Yildirim, and Wong (2020), resilience reduced the effect of negative affect and increased the effect of positive affect on psychological health (Arslan G. Y., 2020). Initial studies have shown negative impact of the pandemic outbreak and the following restrictions on physical and mental health in general populations have resulted in increased levels of stress, anxiety, and symptoms of depression (Petersen, 2021). In particular, Germany went into lockdown rapidly and managed to control the increase of infections effectively. The survey of Knolle and Ronan concluded, that German respondents were less hopeful at the end of the pandemic and more concerned about their life-stability. They found a doubling for depressive and dysthymic symptoms, for symptoms of social phobia and symptoms of mistrust (Knolle, 2021).

The fear of losing the job, anxiety of being infected and other factors create strong emotions, which can be overwhelming and in combination with work stress can lead easily to burnout. Adapting to a different workspace and/or work schedule may increase the stress levels, considering the different family distractions and the multiple roles that some employees may have while working from home (Prasad & Vaidya, 2020). The relationship between workload and performance is not a simple one, as workload should not impede performance as long as it is not too high (Pindek et al., 2019). However, when it is too high it hampers not only the performance, motivation but the private life as well.

The increased use of ICT can also lead to intense psychological demands due to expectations that employees should be constantly available and can also lead to perceptions, that every task is critically important (Molino, 2020). It is also stressful and time consuming the volume of information, which should be daily handled (Leonardi, 2020). It can undermine the psychological health of employees, especially those who isolate themselves by choosing only emails as a means of communication. Some authors refer to a technostress, which is increased among employees working remotely (Molino, 2020). Technostress is described as the mental stress that employees experience when they are asked to learn and use a new technology (Jimenez, 2021). Dealing with technical difficulties or learning new tools may become stressful for the workers, because of that they need support from the supervisors in the use of IT equipment and software. Managers should be vigilant and to communicate with their teleworkers in order to observe behavior changes. The common symptoms of stress are: feeling tired, overwhelmed, sad, nervous and have lack of motivation and concentration (CDC, 2020). Furthermore, managers should encourage teleworkers to take regular breaks (around every 30 minutes) to stand up, move and stretch (OSH WIKI, 2020). Deep, healthy breathing exercises will help them to feel a big relief and balance their work stress.

Managers should try to ensure job-related well-being, since it is associated with a wide range of positive work-related outcomes, such as greater commitment to work, less turnover, less absenteeism (Brief, 2002) and better organizational performance (Giorgi, 2017). Many HR departments have generated forums with the corona quotes "stay safe" or "stay strong" or "stay strong" and they communicate tips about mental health, well-being, how to occupy the children at

home or how to invest the time at home. They have organized socializing activities and events in order to cover the social distance among the employees, such as online board games, virtual lunches or coffee breaks. The aforementioned methods could not substitute for face-to-face conversations, but they were helpful in keeping people in visual contact, in bringing them out from their isolation and to in acquiring tacit knowledge related to the organization culture. These methods are appreciated by employees and strengthen their commitment to the organization (Rhoades, 2001). Managers should ensure that there is a good communication at all levels from strategic information provided by top-level management to line managers' duties. Strategic Information can be addressed in scheduled online meetings and the tasks through online chats or 'virtual coffee' meetings. Teleworkers should feel part of the team and have access to all information.

## 2.5 Employee Performance

According to Mehrzi and Singh performance is the level of success of a person during a specific period in executing tasks compared to work standards, targets or predetermined criteria which have been mutually agreed upon (Al Mehrzi, 2016). Performance is related to employee job satisfaction, motivation, rewards, engagement and influenced not only by individual skills, abilities but also by the organization culture.

Boxall and Purcell claim that the implementation of a well-defined evaluation process of employee performance can ensure the smooth operation of the company and even though its profitability (Boxall, 2011). Managers should be aware of their employees' capabilities in order to be able to delegate them properly and to align them with the firm's overall business strategy and goals. However, there are many factors, which affect the employee performance, such as firm/environmental, employee-related and job-related factors. Firm/environmental-related factors come from internal and external environment, e.g. management support, training culture, organizational climate. Job-related factors include communication, autonomy and environment. Finally, employee-related factors are intrinsic motivation, proactivity, adaptability, skill flexibility, commitment and skill level (Diamantidis A., 2018).

Another factor, which influences employee's performance, is employees' mental condition. During COVID-19 pandemic employees'



safety was the foremost priority of the companies. Hamouche supports that, concerns about safety, risk of virus, social exclusion, financial loss, and job insecurity are the main factors, which can cause stress to employees and may decrease their performance (Hamouche S. , 2020). Stress has a negative effect on the psychological, behavioral, and physiological aspects of the individuals (Musyoka, 2012). Engagement, motivation, morale, and performance of employees can be harmed in a stressful workplace. The stressed employees faced with bad health conditions, lower levels of energy and concentration on their work and thus their performances decrease. Moreover, the employees who experience high degree of stress may have low commitment and satisfaction from their job (Kuzey, 2018) that distracts their attention from their important work-related tasks and hampers their overall performance. Prasad and Vaidya (2020) report the main elements, which may affect employee performance, when they work from home, workplace isolation, lack of communication, family distractions, role overload, and occupational stress factors (role ambiguity, role conflict, career, and job-control), which have emerged due to COVID-19 (Prasad, 2020).

For all above mentioned factors, the close observation of employee's performance becomes necessary. During this crisis, employees' performance can be challenging taking into consideration the new working conditions. Some organizations may have reduced or omitted the performance management process because of the uncertainty of COVID-19. The traditional performance management processes may not be applicable to a dynamical changing modern workplace (WIGERT, 2020). Management by Objectives may be long-term and inflexible process, because the SMART goals may be forgotten for months until the next appraisal. On the contrary, COVID-19 era requires an agile, personalized and ongoing approach because of the uncertain and volatile climate. Agile goals are usually short to medium term and can be easily changed to ensure that they are relevant and motivate employee's performance. Companies should react forward-thinking and adopt an agile approach to goal setting in order to provide support to their employees to overcome the new working challenges. Managers should adopt an agile mindset that encourages employees to own their goals and expect change. Post-COVID effective management systems will incorporate strategies for monitoring and measuring workplace wellbeing, since coronavirus pandemic has prioritized employee health, safety and wellbeing.

When some employees work 100% remotely, some are on-site and some work hybrid (on- and off-site) makes the things more difficult for the managers. Working from home may engage or disengage the employees and it depends how their manager handles it. Managers should hold ongoing coaching conversations and informal dialogue on a weekly basis giving timely recognition and creating shared accountability for performance and development (WIGERT, 2020). They should communicate relevant information related to the business strategic goals, collect useful business data and to provide feedback to employees, which will help these organizations to retain their talents (Hamouche S. , 2021). Ngoc argues that the frequent appraising of employees' performance fosters their learning and sharing, that help organization to stay competitive in the market (Ngoc Su, 2021). The study by Sembiring showed that compensation might have a significant impact on employees' performance in the COVID-19 era. Hence, the organizations should be more concerned about employees' total compensation (financial and non-financial), and its fairness to sustain and improve their performance during crises (Sembiring, 2021).

## 2.6 Motivation

There is an extensive literature about motivational theories, some of the most recognized content theories are: the hierarchy of needs by Abraham Maslow, the two-factor approach by Herzberg, the ERG theory by Clayton Alderfer and the acquired needs by McClelland. According to Maslow, every manager should understand the hierarchy of human needs in order to motivate his subordinates because satisfying human needs continuously is the key to motivating employees so they want to perform well (Maslow, 1954).

Beginning with wide spreading Maslow's theory, which includes five stages of needs: physiological, safety, belongingness, esteem and self-actualization. Physiological needs consider water and food. In a business environment, physiological needs include working conditions and the compensation. Without sufficient human working conditions is difficult for the employers to attract work power. With reference to the survey by Elsafty and Ragheb, financial benefits such as bonuses during COVID-19 are affiliated significantly with employees' retention (Elsafty & Ragheb 2020). Compensation may influence employees' motivation and performance (Safuan & Kurnia, 202); however, it depends mostly on the individual. It was a

remarkable reaction to the COVID-19 outbreak, that some countries have enacted governmental policies to provide financial support for employees and organizations during this health crisis and to encourage them to comply with the stay-at-home orders. For example, in Germany parents who have to look after their children due to school closings during corona pandemic could receive child benefit (DGB, 2021). Moreover, amid corona pandemic businesses can financially support teleworkers to upgrade their domestic internet packages in order to fulfill their tasks without being hampered by slow speeds or virtual meeting drop-outs (Startup, 2021).

The second level includes safety needs such as safe work, fringe benefits and job security. For instance, health care and retirement benefits, child care subsidies, certain prescription of drugs or discounted prices, life insurance, phased in retirement. Employee safety became an utmost priority and companies should take the required safety precautions making sure, that the workplace is in compliance with state and federal guidelines (Scheven, 2020). Managers and supervisors should promote self-care and encourage their team to exercise at home, sleep well, step away from screens at meal time or suggest other ways of switching off. Managers should advice their teleworkers to separate the home "workspace" from the rest of the house in order to be foster the feeling like heading to the office.

The next need in the hierarchy involves belongingness and feeling accepted, this can be succeeded only through communication, since it is vital and brings people and groups together, it helps in the avoidance of problems such as loneliness, depression and anxiety. Employers focus on the belongingness needs, for instance the improvement of the relationships between coworkers, clients and supervisors. In new business world, businesses organize kick-off events, milestones parties, summer/winter events, sport activities in order to bring the employees together and create team spirit. Some online team-building suggestions are virtual breaks, lunches, home tours, cocktail/wine hour and board games. Through these proposals, employees do not become isolated or disconnected and will help them to calm down from stress or anxiety. It is very common event, that the employees underestimate the value to stay in contact with their colleagues, however managers should bear in mind that friendships boost employee satisfaction, team cohesiveness and collaboration

succeeding the stage of team performing and resulting in high productivity (McInnis-Day, 2017).

Esteem needs include the recognition, high status, and increased responsibilities. Appraisal performance and rewards theories are combined with esteem needs. Managers should offer praise, recognition, promotion opportunities and additional responsibility to employees when they perform good performance (Hartzell, 2012). Work assignments, rewards, workplace fairness, meaningful job title, job perks are important to an employee's esteem (Tanner, 2020).

Esteem needs include the recognition, high status, and increased responsibilities. Appraisal performance and rewards theories are related to esteem needs. Managers should offer praise, recognition, promotion opportunities and additional responsibility to employees when they perform good performance (Hartzell, 2012). Good managers foster respect between colleagues and encourage their colleagues to be honest, open and objective. So, employees are likely to be more productive and to work together effectively. Employees want to have the feeling that their managers would support them and listen to their needs and concerns. They feel part of the business and simultaneously the recognition about what they have succeeded, when they are informed about the company strategies and when they take part in decision making. In such difficult times, such as the outbreak of pandemic, managers should stay bonded with the employees in order to be motivated and productive. Managers should thank and praise employees for their performance, let them know that they are not alone and they should recognize and reward the good performance, which could offer encouragement, recognition and could prove that employees' role is meaningful for the company. It may be expressed by an email message or through a gift card. Rewards are not only when employees perform well or meet targets but also to celebrate birthdays, work anniversaries and retirement (Babbage, 2021). It shows kindness and promotes positive encouragement which motivate the employees. Employee Appreciation Day is the best opportunity to acknowledge the hard work and bring cheer and happiness to the workforce (news18, 2021). Moreover, promotions raise self-esteem of workers, who may put in more effort out of gratefulness.

The top level of Maslow's pyramid refers to the self-actualization needs which are opportunities for trainings, advancement, growth

and creativity. At this highest-level, employees are interested in challenging job to enrich their education increasing their freedom and autonomy satisfying their self-actualization needs. Job enrichment, job rotation, job enlargement and cross training are methods which help contemporary companies for making work more rewarding and less boring (Tanner, 2020). In the middle of pandemic, employees do not have an opportunity to visit courses because of that the organizations should provide them online training sessions to help them grow professionally. Online courses, seminars, workshops and online libraries would enhance the skills of employees and engage them to develop their career. However, they can apply the new skills and information helping the business to recover from the COVID19 crisis. Upskilling generates new ideas which could drive to innovative or creative projects, that provide the best opportunities to motivate employees in order to show their secret skills and passions.

In conclusion, it is the fact that, workers during pandemic outbreak need the support of their managers more than never in the past. Because of that, managers should stay calm, positive, supportive and transparent with their team. They should foster honest one-on-one conversations, provide regularly feedback and create a positive work environment in order to motivate them.

## 2.7 E-Leadership

Electronic leadership emerged and applied amid the pandemic in combination with the rapid growth of ICT. With reference to Roman, E-leadership is a set of technology-mediated social influencing processes intended to change attitudes, feelings, thinking, behavior, and performance, which are based on ability to communicate clearly and appropriately, provide adequate social interaction, inspire and manage change, build and hold teams accountable, demonstrate technological know-how related to ICTs, and develop a sense of trust in virtual environments (Roman et al., 2018).

Van Wart (2019) inserted six valid and reliable dimensions of e-leadership (Pitkänen, 2021).

- E-communications skills including clarity, precision and flow.
- E-social skills refer to team interaction.
- E-team building skills comprise bonding activities.
- E-change management skills contemplate monitoring success.

- E-technological skills incorporate technological development assurance.
- E-trustworthiness include professionalism, work–life balance expectations and diversity

All the above-mentioned skills will result in positive outcomes such as higher individual productivity and higher employee satisfaction.

The core drawback of the unexpected pandemic was that the majority of managers didn't know how to manage remotely their teams. Organizations were unprepared and they did not have taught their leaders, how to delegate a team virtually. The inadequate information could drive to isolated, neglected and demotivated remote workers, since E-leadership requires multiple competences to manage an effective and motivated remote team. Managers need to identify and be conscious of employees' difficulties because the need for support and building up competence in the use of technological tools is growing. It is imperative, that both leaders and teleworkers employees are technically savvy in order to proceed the work through technological platforms diminishing the potential barriers. It is not expected from e-leader to be "tech guru", but it is expected to make use of technological skills in order to provide support regarding technological problems and stay up-to date with new applications, which can ensure the smooth operation of team function.

(Cowan, 2014) stated that e-leadership is based on building trust with each member of the team and establishing a virtual "presence" preventing distance from becoming a barrier. E-leaders should apply e-communication skills in order to develop a trustworthy environment, in which team members can express their social-emotional needs and cultural differences will not be a communication barrier. Roman (2019) claimed that effective e-leaders should communicate openly, promote social interactions, use technological media, build responsible teams, inspire change, encourage information flow and develop trust virtually. In addition, E-leaders have to promote innovation, generate creative solutions and identify the need for change in alignment with company's strategy and mission (Cortellazzo, 2019).

The main difference between electronic and traditional leaders is that e-leaders coordinate their team virtually. (De Vries, 2019) indicates that hierarchical forms of leadership are less suitable in virtual work environments. However, the potential changes in behaviors,

emotions, thoughts, and performance of workers may be not immediately remarkable because of that, it is necessary that E-leaders establish social interaction with their employers to enlarge their safety, social and esteem needs preventing the decrease of employee's motivational levels (Contreras, 2020). With reference to the research of Lorinkova, directive and empowering leadership are widely used for working from home (Lorinkova, 2012). The study of Stocker shows that managers made changes in their own level of delegation and as a result, they observe an increase in the productivity of themselves and their employees (Stoker, Garretsen, & Lammers, 2021). Since employees work from home, they get autonomy and responsibilities about working time, place, results and methods (Contreras, 2020). Consequently, WFH cultivates the sense of autonomy, lower work-family conflict and productivity (Allen, 2015). There is a fear of losing control in the context of WFH, but this anxiety stems from external threat of the COVID-19 crisis and is remarkable to lower-level managers (Kniffin, 2021). The research of Stocker claims that managers perceive themselves to be less controlling and more delegating. On the contrary, employees observe a significant decrease in the exercise of control by their manager, but they do not perceive the change in delegation, this contrast may be due to the fact that it is more difficult to change leadership behaviors in times of a severe crisis, such as COVID-19. It was proved that the perceived change in control is not significantly correlated with productivity, as delegation though. Therefore, managers and employees still benefit from the empowering leadership, when they work from home. Empowering leadership can be defined as sharing or delegating power and allocating autonomy and responsibilities to employees. Undoubtedly, E-leadership may offer huge opportunities to companies and is the leadership of the future. On the other hand, it is quite challenging and demanding, because the e-leaders should lead their employees in a boundaryless environment through technology. Only if a leader uses the six competences, introduced by Van Wart et al (2019), virtual leadership can be attainable.

## 2.8 Virtual team

There are four different types of teams: project and development, management, parallel and transnational teams. Virtual teams belong to transnational teams, which are being multicultural, geographically dispersed and usually work on multiplex projects. Virtual teams communicate mostly electronically and cope with the challenge of

executing tasks across different locations, time zones, and cultures (Siebdrat, 2014). There is less social interaction among members and they tend to share less information overall. Beyond pandemic virtual teams are widely expanded and would persist in the future due to the opportunities they offer. In fact, virtual team is correlated with the concept of e-leadership building effective, autonomous, interdependent virtual teams and would offer enormous competitive advantages for the companies. Malhotra et al. (2007) supports that virtual teams embody the idea of thinking globally and acting topically, creating new opportunities for the companies to follow new strategies (Malhotra, 2007).

Due to the COVID-19 pandemic even more and more traditional teams are transformed to virtual teams, this opportunity can be considered for the leaders as a relaunch and reorient based on new realities. In virtual teams is very crucial, the roles and the processes of the tasks to be clarified in each employee preventing misunderstandings and escalations. Managers should discuss with employees, what they expect of employees, as well as what employees can expect from them as a manager (Gartner, 2020). It is also important for the smooth connection of the team, that all team members have decided to follow the same ground rules about team behaviors and practices, for instance that people are not talking at the same time. E-leader have to set milestones and when they are succeeded online virtual events could be organized. The celebration of the succession gives the team a big boost to be motivated. Moreover, team buildings activities are essential in virtual teams since foster collaboration and maintain the relationship levels among the team members.

Online meetings have another meaning by virtual teams in comparison to traditional teams. Traditional teams may have one or two online meetings in contrast to virtual teams, which may be continuously in meetings and sometimes there is no time for tasks. It may be a pitfall for the e-leaders that they cannot know exactly how much productive time for the employees is available for their tasks. Because of this occasion, e-leaders should track their employee capacity before assigning new work to reduce stress. Moreover, efficient meetings are the A and O for the virtual teams, clear meetings agendas should be attainable by everyone prior to the meeting. The timed agendas could have additional time per topic in addition to an open dialogue in order to foster creativity and



brainstorming. Daily stand-up meetings are suitable for discussions of project status, tracking of the tasks, potential barriers or escalations (Shivani, 2020). After the meetings, a protocol or minutes of meeting should be sent to the attendants summarizing discussion points or outcomes. A virtual facilitator would be helpful to moderate the conversation, set expectations and manage participation. Virtual facilitator encourages the team members to use videoconferencing, which can diminish the distance and keep the members in visual contact. The main drawback with teleconferences is the easily distraction of the attention. For example, through video, leaders can see, if the members are reading an email while another member of the team speaking. Video makes a much stronger connection than any audio conversation would make and can increase engagement and keep people focus (Jones, 2020). An online chat platform for ad-hoc team conversations is necessary for real time information sharing, personal updates, emerging issues and questions. There are many online project management tools, which help the managers to measure productivity and ensure that the important tasks are completed in a timely manner (Simon, 2020). For Brainstorming sessions, a virtual suggestion box is very helpful, team members can post their suggestions and ideas at the online board (EY, 2020). Last but not least, transparency is a prerequisite for high-performing teams. Remote members should sustain open communication channels and feel comfortable that they can share their thoughts or questions without anxiety (Gartner, 2020). Achieving improved results through virtual teams, managers should focus on establishing clear expectations, emphasizing performance outcomes and building open lines of communication.

## 3. Methodology

### 3.1 Research Design and Objectives

For the purpose of this study, quantitative research was implemented collecting primary data through an online survey. The data were analysed using statistical measures and regression analysis. Three main hypotheses were examined: E-leadership, work relationships

and social relationships regarding employee performance. The objective of the study is to identify the relation of the factors and their correlation to motivation and productivity of the employees amid COVID-19 pandemic, when they were working from home.

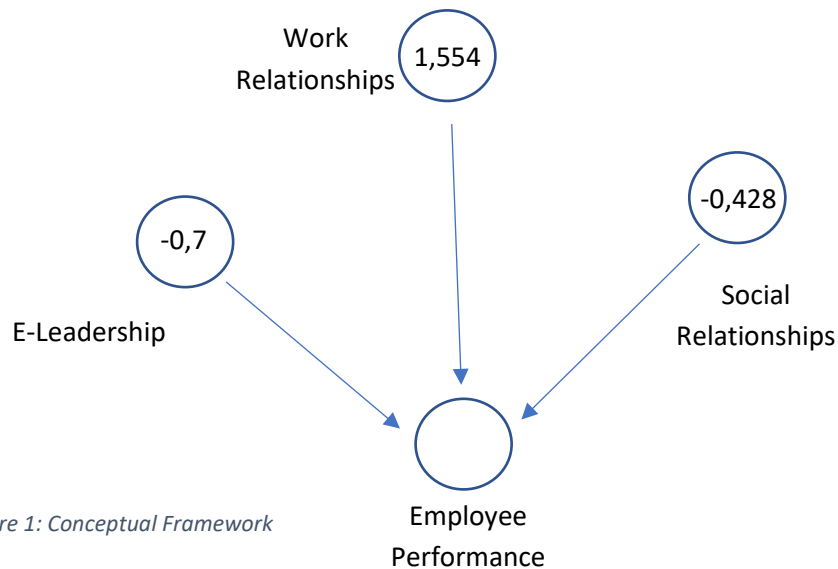


Figure 1: Conceptual Framework

## 3.2 Survey Design – Questionnaire

The study was conducted as an online survey and the questionnaire was developed in Google Forms and distributed via internal email and online social media platforms (e.g XING, LinkedIn). On the first page of the survey, participants were informed about the purpose of the study, the duration (approximately 10 minutes) and the contact research person. The research questions were chosen, taken into account the literature review. The closed-ended questionnaire consists of six main categories, which include statements a) about the company, b) related to manager, c) associated with colleagues, d) correlated with social relationship and well-being, e) linked with work productivity and finally demographic questions. The questionnaire is presented in Appendix I. All the statements were assessed in a five-point Likert scale varying from “Strongly disagree” to “Strongly Agree”, except the demographic variables. The respondents are main employees from different companies and age, marital groups, who work in the automotive industry in Germany and were working from home during the COVID-19 pandemic. The questionnaire was compiled in English language because the participants have enough educational background to understand the language. The questionnaire was sent to 110 employees, 90 of them willingly participated in the survey. The response rate was 81% and

the final usable sample size was 89. Data collection took place from 27/11/2021 until 20/12/2021. Although the data was collected in less than a month, it was the best fitted period, because home-office was again intensively suggested by the government. The quick collection of responses can be justified because the majority of the participants were informed about the entire process and how the data will be collected and handled. Participation in the survey was voluntary and participants were not compensated. The responses were kept confidential and anonymous which ensure an adequate and reliable sample for the analysis.

### 3.3 Validity and Reliability

Before the analysis of the primary data begins, the validity and reliability of the data should be examined. Statistical Package for Social Sciences (SPSS) was used to investigate the Pearson correlation and if the answers are reliable. Correlation coefficient formulas were used to find, if there is a relationship between the data. The correlation could be positive, negative or doesn't exist. Positive correlation means that for every positive increase in one variable, there is a positive increase of a fixed proportion in the other variable. Negative correlation means that for every positive increase in one variable, there is a negative decrease of a fixed proportion in the other (Statistics, 2021). No correlation means that two variables are not correlated. Cronbach's alpha is a s to assess the reliability or internal consistency of a set of scale or test items. It is widely used in multiple-question Likert scale surveys. A rule of thumb for interpreting alpha is a score of more than 0,7 is usually acceptable (Library, 2015).

### 3.4 Descriptive Statistics

Descriptive Statistics help to sum up a data set of the entire or a sample of a population. Descriptive statistics divided into measures of central tendency (mean, median & mode), variability (standard deviation, variance, minimum and maximum variables), kurtosis and skewness (Hayes, 2021). The measures of central tendency depict the center of a data set and the measures of variability or spread report the dispersion of data. The two most commonly used descriptive statistics are the mean and standard deviation, which are used in the study and will be represented in the results. Mean calculates the average level, while standard deviation shows the

variance, or how dispersed the data detected in that variable is allocated around its mean.

### 3.5 Ordinal Regression

Ordinal logistic regression is applied to forecast an ordinal dependent variable according to one or more independent variables. Ordinal regression utilizes interactions between independent variables to predict the dependent variable. It can define, if independent variables have a statistically significant effect on the dependent variable. Ordinal variables are rated on a 7-point scale from "strongly agree" to "strongly disagree" or ranking categories. It should exist one or more independent variables that are continuous, ordinal or categorical. Continuous variable is considered age, time, weight or performance (Laerd, 2022).

## 4. Results & Analysis

### 4.1 Validity and Reliability

Executing the Pearson correlation in SPSS to examine which variables are correlated with each other, how they hang together e.g., positive, negative or none. Equipment from the company has a positive correlation with the variables action, connection, support, caring and negative correlation with stress. If company provides the necessary equipment, employee feels connected with organization and less stress about the working position. The variable action is positive correlated with equipment, connection, support, feedback, caring, communication and negative connected with social relationship and stress. This result was expected because when the company takes enough action to connect its employees, their employees stay connected and the feeling of missing social relationships and the anxiety of losing their jobs can be decreased. The variable connection is related positive with action, feedback, caring, transfer, communication, collaboration, concentration, workload, less time, motivation and productiveness. It is negative correlated with isolation, social relationship and stress. The variable trust is positive associated with collaboration, concentration, work life balance and motivation.

The support variable is positive correlated with feedback, caring, communication, motivation and negative correlated with concentration. Employees, who receive enough support from their managers, feel that the managers care for them and have constructive communication with them. Feedback variable is positive combined with equipment, action, connection, delegation, communication, collaboration and negative combined with stress and completion. It was expected, that feedback from manager will have positive effect on communication and collaboration of the team. Caring about the health is positive correlated with equipment, action, connection, support, delegation, communication, collaboration, less time and negative with stress. Monitoring is positive correlated with delegation and negative with workload. Delegation is associated with feedback, caring, monitor and negative with time.

Isolation is negative related to connection, transfer, communication, collaboration, concentration, workload, time, completion, motivation and productive, however positive related to social relationships and stress. One of the first variable which is related with so many other variables. According to the result, the more isolated the employees, the more they miss social relationships and are stressed with their working position. Transfer of information is associated with equipment, connection, communication, collaboration, motivation and negatively with social relations and stress. If the transfer of information works good in a team, as a consequence the team cooperation and spirit are positively affected and the team members are more motivated. Moreover, communication variable is positive combined with equipment, action, connection, support, feedback, caring, transfer, collaboration, concentration, workload, time, motivation and negative combined with isolation, social relationships and completion. The effective communication is a remarkable factor for the motivation between the team members. The variable collaboration is correlated with connection, trust, feedback, communication, concentration, workload, time, work life balance, motivation and productivity. Social relationships are negative correlated with action, connection, transfer, communication, concentration, time and motivation. Stress is negatively combined with feedback, caring, communication, transfer, collaboration, concentration, time, workload, work life balance and motivation. Employees who are stressed and anxious regarding their working position, they cannot feel as a part of a team, they cannot concentrate on their work and they cannot handle the workload.

In addition, concentration is connected positively with connection, trust, collaboration, workload, time, motivation and productivity. Employees who are able to concentrate more at home, they get their work done in less time and they feel undoubtedly motivated and productive. Workload is related to connection, communication, independence, collaboration, time, work life balance motivation and productivity. Without doubt, when employees can proceed their work independently, they can handle their workload better and adapt it to their preferences. However, employees, who can proceed their tasks dependent on the others, good collaboration and communication with the other team members are needed. The variable time is positive correlated with connection, trust, caring, collaboration, concentration, workload, motivation and productivity. However, it is negative correlated with isolation, delegation, social relationships and stress. Independency of the tasks is related to action, workload and work life balance. The more independent employees are, the better work life balance they have. Work life balance is positive associated with trust, collaboration, independency, motivation and productivity. Finally, the two most important variables for this study are motivation and productivity. Motivation is positive correlated with connection, trust, support, transfer, communication, collaboration, workload, time, completeness and work life balance. Productivity is positive correlated with connection, collaboration, concentration, workload, time and work life balance. Both of variables are negative correlated with isolation, lack of social relationships and stress.

Following are the tables regarding the reliability results from the sample. A Cronbach's Alpha Test was executed to assess the reliability or internal consistency of Likert scale. As observed the Cronbach's Alpha is 0.815, which is very good result, it means that the answers are reliable.

**Case Processing Summary**

		N	%
Cases	Valid	89	100.0
	Excluded <sup>a</sup>	0	.0
	Total	89	100.0

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

Table 1: Case Processing Summary

**Reliability Statistics**

Cronbach's Alpha	N of Items
.815	32

Table 2: Reliability Statistics

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Equipment	70.2584	136.830	.266	.812
Action	70.4382	135.840	.352	.809
Connection	71.1685	127.619	.607	.798
Trust	70.9213	137.664	.242	.812
Support	70.2135	138.783	.188	.814
Feedback	70.7416	133.080	.391	.807
Caring	70.5506	133.500	.364	.808
Delegation	71.6629	142.181	.024	.820
Transfer	70.8652	132.595	.408	.806
Communication	70.7416	131.217	.572	.801
Collaboration	70.2584	133.012	.542	.803
Concentration	70.6854	126.900	.567	.799
Workload	70.0787	136.073	.378	.808
Less Time	71.0449	129.975	.514	.802
Increase Working Hours	71.1124	143.055	-.028	.825
Independance	70.6854	137.264	.258	.812
Completion	72.0674	156.745	-.589	.840
Work life balance	70.1910	137.565	.294	.811
Motivation	71.0562	129.599	.503	.802
Productiveness	70.9213	130.664	.483	.803
Cohabitants	71.9663	134.510	.317	.810
Children	72.8202	137.740	.285	.811
Experience	72.1124	138.624	.177	.815
WFH Days	72.0000	133.523	.629	.802
Gender	72.7978	141.618	.155	.814
Age	71.9888	136.920	.338	.809
Degree	71.6854	144.104	-.052	.820
Monitor2	69.5281	140.638	.095	.818
Isolation2	70.5056	131.366	.428	.805
MissSocialRel2	71.0000	129.750	.490	.802
MoreStress2	69.8315	131.074	.418	.806
Completion2	69.4607	131.910	.506	.803

Table 3: Item Total Statistics

A Cronbach's Alpha Test was executed on the variables motivation and productivity using the correlation from the validity results. This investigation will examine, if the answers are reliable and if they were answered honestly. According to the results, the alpha coefficient of motivation is equal to 0.766, indicating a good internal consistency and a little better than productiveness. Regarding the alpha coefficient of productiveness is equal to 0.760, indicating a good internal consistency too.

**Case Processing Summary**

		N	%
Cases	Valid	89	100.0
	Excluded <sup>a</sup>	0	.0
	Total	89	100.0

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

Table 4: Case Processing Summary of motivation

**Reliability Statistics**

Cronbach's Alpha	N of Items
.766	11

Table 5: Reliability Statistics of motivation



### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Action	25.57	33.179	.355	.755
Support	25.35	34.139	.233	.768
Concentration	25.82	30.058	.453	.743
Less Time	26.18	30.558	.487	.739
Work life balance	25.33	34.904	.206	.769
Connection	26.30	29.850	.544	.731
Communication	25.88	31.246	.546	.734
Feedback	25.88	30.973	.460	.742
Caring	25.69	30.582	.483	.739
Transfer	26.00	32.250	.341	.757
Productiveness	26.06	31.099	.435	.745

Table 6: Item Total Statistics of motivation

### Case Processing Summary

		N	%
Cases	Valid	89	100.0
	Excluded <sup>a</sup>	0	.0
	Total	89	100.0

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

Table 6: Case Processing Summary of productiveness

### Reliability Statistics

Cronbach's Alpha	N of Items
.760	11

Table 7: Reliability Statistics of productiveness

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Action	25.44	32.976	.343	.749
Support	25.21	34.079	.207	.764
Concentration	25.69	29.786	.450	.736
Less Time	26.04	30.430	.470	.733
Work life balance	25.19	34.384	.227	.760
Connection	26.17	29.505	.547	.723
Communication	25.74	30.694	.572	.724
Feedback	25.74	30.648	.461	.735
Caring	25.55	30.659	.448	.737
Transfer	25.87	31.618	.369	.747
Motivation	26.06	31.099	.383	.745

Table 6: Item Total Statistics of productivity

## 4.2 Descriptive Statistics

The sample was analysed with descriptive statistics in SPSS and the following table presents the results, which include summarized minimum, maximum, mean and standard deviation for each variable. In addition, graphs were created in Excel for a more understandable depiction of the rates. First of all, it is necessary to converse the five-point Likert scale to an interval scale in order to make the interpretation of the results easier. From 1 to 1.8 means strongly disagree. From 1.8 to 2.6 means disagree. From 2.6 to 3.4 means neutral and from 3.4 to 4.2 means agree. Finally, from 4.2 to 5 belongs to strongly agree.

### Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Equipment	89	1	5	4.00	.953
Action	89	2	5	3.82	.886
Connection	89	1	5	3.09	1.083
Trust	89	1	5	3.34	.891
Support	89	1	5	4.04	.903
Feedback	89	1	5	3.52	1.046
Caring	89	1	5	3.71	1.068
Monitor	89	1	5	2.25	.969
Delegation	89	1	5	2.58	.963
Isolation	89	1	5	3.24	1.128
Transfer	89	1	5	3.39	1.073
Communication	89	1	5	3.52	.893
Collaboration	89	1	5	4.00	.798
Miss Social Relationship	89	1	5	3.71	1.130
More Stress	89	1	5	2.56	1.177
Concentration	89	1	5	3.57	1.196
Workload	89	2	5	4.18	.791
Less Time	89	1	5	3.21	1.071
Increase Working Hours	89	1	5	3.15	1.221
Independance	89	2	5	3.56	.929
Completion	89	1	5	2.19	.940
Work life balance	89	2	5	4.07	.795
Motivation	89	1	5	3.20	1.130
Productiveness	89	1	5	3.34	1.076
Cohabitants	89	0	3	1.30	1.091
Children	89	0	3	.45	.798
Experience	89	1	4	2.15	.972
WFH Days	89	1	3	2.26	.666
Gender	89	1	2	1.46	.501
Age	89	1	5	2.27	.780
Degree	89	1	4	2.57	.705
Valid N (listwise)	89				

Table 7: Descriptive Statistics

To begin with the first statement “The company provided me the necessary equipment in order to work remotely”, the mean is 4, which is one of the higher means and it means that the majority of participants agree with the statement, as can be seen from the graph. The bar graph is very encouraging because only 3.37% strongly disagree and 5.62% disagree. Under the term equipment was included headphones, screen, docking station, pen, notebook or even chairs.

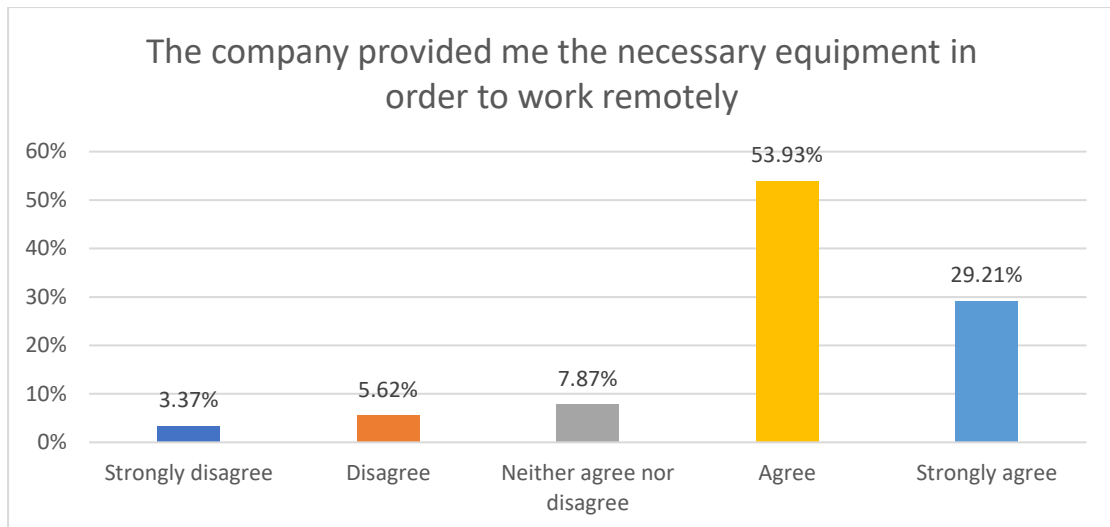


Figure 2: Respondents' percentages about equipment.

The mean of the second statement is 3.82, which means that the most of respondents agree with the statement "My company has taken enough action to stay further connected to employees". 21.35% strongly agree with that, however there is a 19.10%, who are neutral and it is a sign that some employees are not sure and they may believe, that the company could take more actions to keep its employees connected. Another explanation for neutral answer may be that the actions are the same as before pandemic and the company has not organized some extra actions to keep the employees connected.

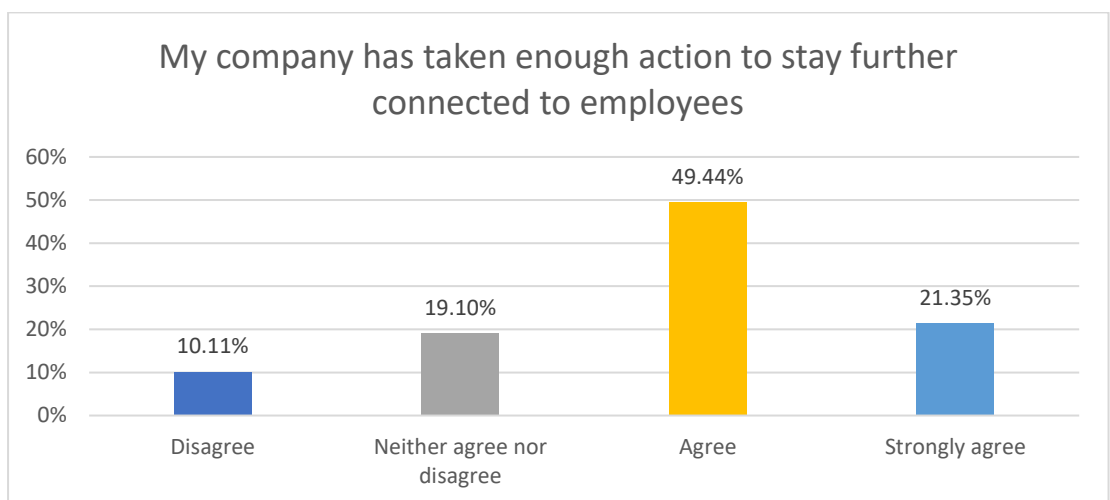


Figure 3: Respondents' percentages about actions of the company.

According to the statement "I feel as connected with the company when I work remotely, as I would when onsite.", almost 30% of the respondents have answered equal agree and neither agree nor disagree. The mean of this statement is 3.09 and belongs to the

neutral interval. It is significant result, that a high percentage of employees may not realize, if they feel the same connected with the company, when they work remotely or at the office. It is very common by engineering companies to lend out its personal and the employees work at the offices of the external company, so for them makes no difference if they work from their home or if they work at another company, because they do not have a workplace at their company.

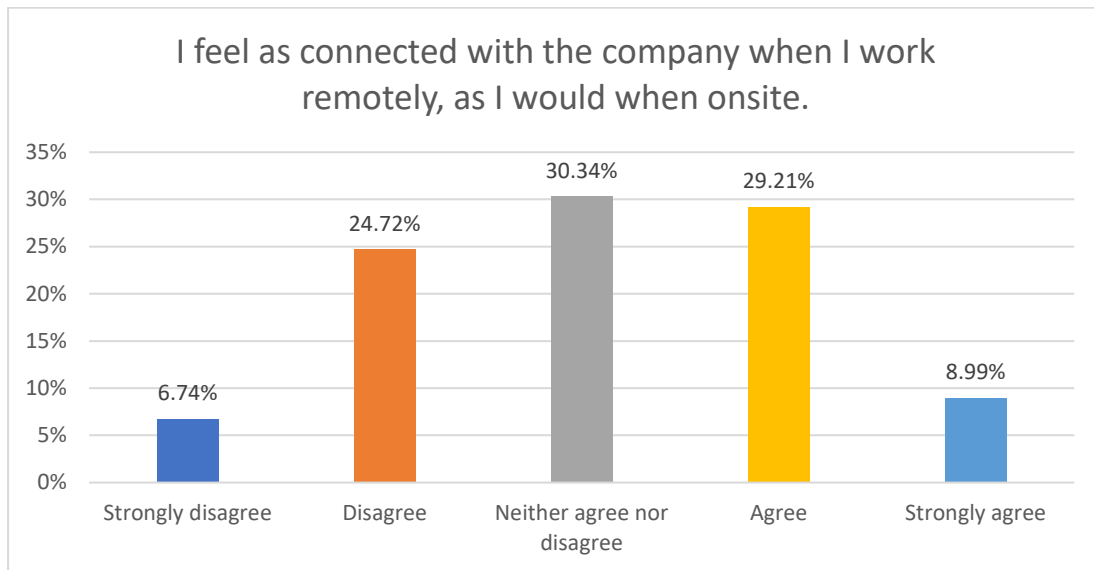


Figure 4: Respondents' percentages about connection with company.

The mean of the statement "I feel more trustworthy by my company, when I work from home, in comparison to working at the office" is equal to 3.34 and can be explained because half of the respondents answer neither agree nor disagree. As mentioned before, trustworthiness is generally positive correlated with motivation. The attendants have not observed any change, that their company trust them more than before. They did not perceive telework as advantage, because they knew that it came from government and the company itself had not any other choice to keep steadily its operation. In other circumstances, employees receive the right of home office as a reward for a very good performance and feel more trustworthy.

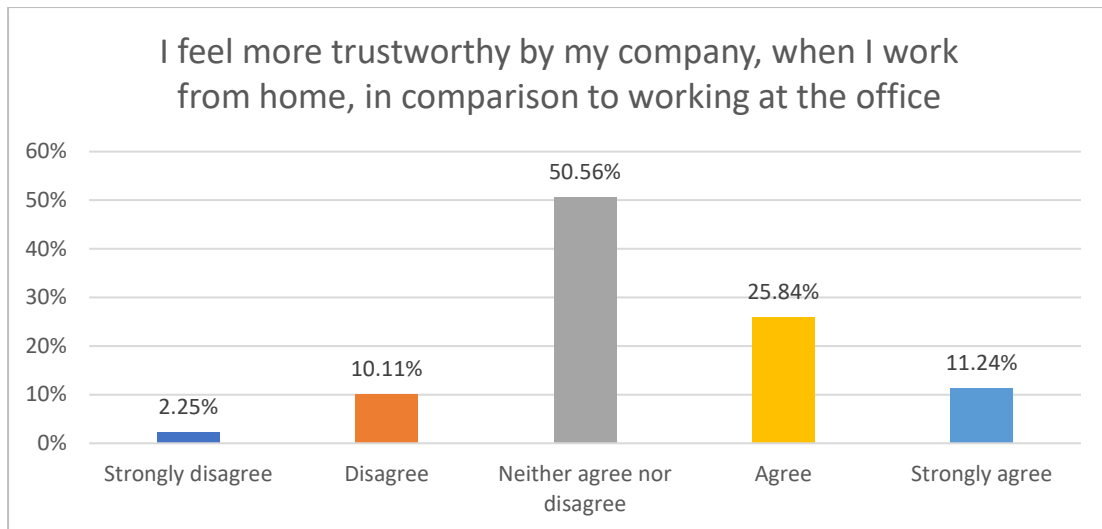


Figure 5: Respondents' percentages about trustworthiness.

On the other hand, one of the highest means is 4.04, which shows that most of employees receive support from the managers when they ask for guidance. In the survey conducted with teleworkers, we observed that few (5.62%) disagreed and very few (1.12%) strongly disagree that they receive support from their leadership when they request directions to perform their remote tasks. Remote support and advice are main elements of the e-leadership.

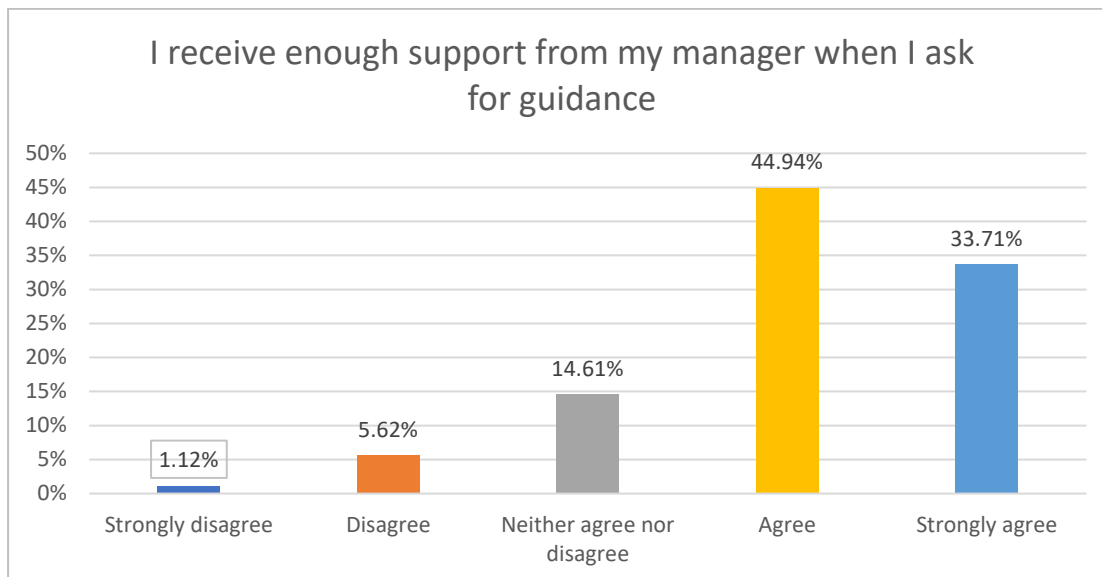


Figure 6: Respondents' percentages about support from manager.

The survey results showed that most participants (40.45%) receive constructive feedback regarding their performance, when they work remotely and 15.73% strongly agree with the statement. However, there is a total 14.61%, who admit, they do not receive constructive feedback in the telework period, which is a sign for improvement.

Many times, employees have noted that managers are not interested and they are not available for them. 29.21% have difficulty in giving their opinion about receiving constructive feedback from leaders about their performance in remote activities or they receive feedback as always.

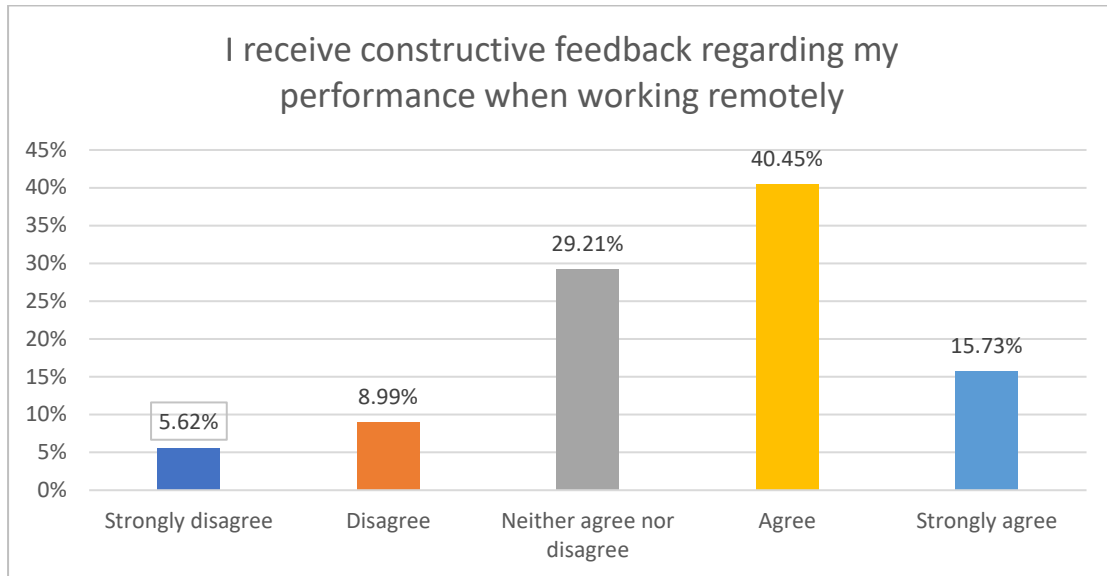


Figure 7: Respondents' percentages about constructive feedback from manager.

24.72% of teleworkers strongly agree and 39.33% agree with the statement "My manager demonstrates that s/he cares about my health and well-being". However, it is discouraged, that amid the COVID-19 pandemic one in three employees did not realize that their leaders showed concern for taking care of the health and well-being of their team members.

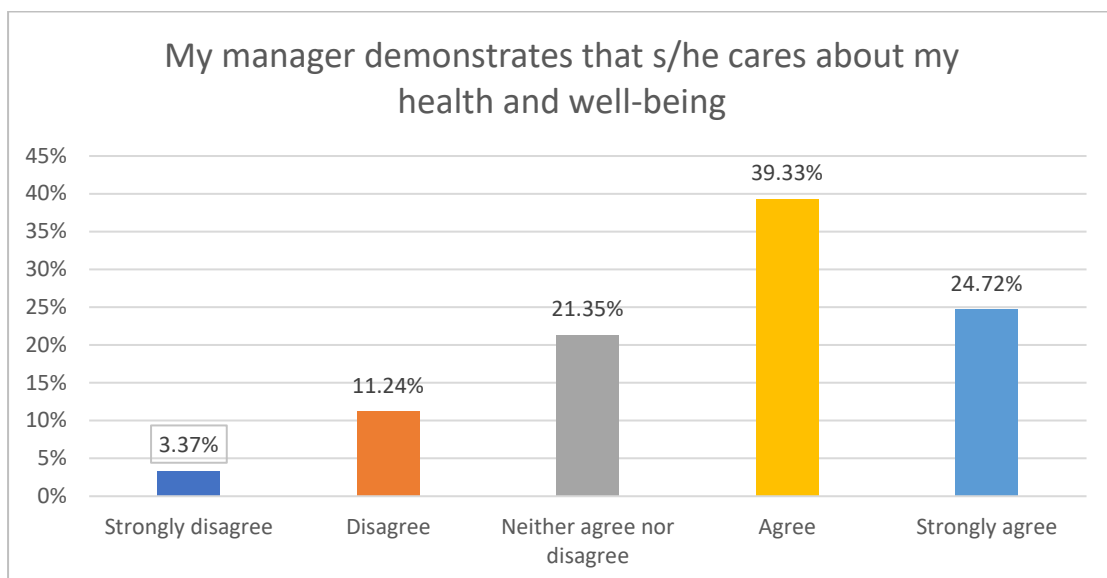


Figure 8: Respondents' percentages about health and well-being.

The majority of respondents (64.05%) disagree with the statement that their managers monitor them more, when they are working from home. Only few respondents 11.23% answered that they have observed an increase in monitoring. This percentage may need a further observation because excessive guidance and monitoring by managers cause psychological insecurity. 24.72% are neutral and they may have not observed any change at their managers' behavior.

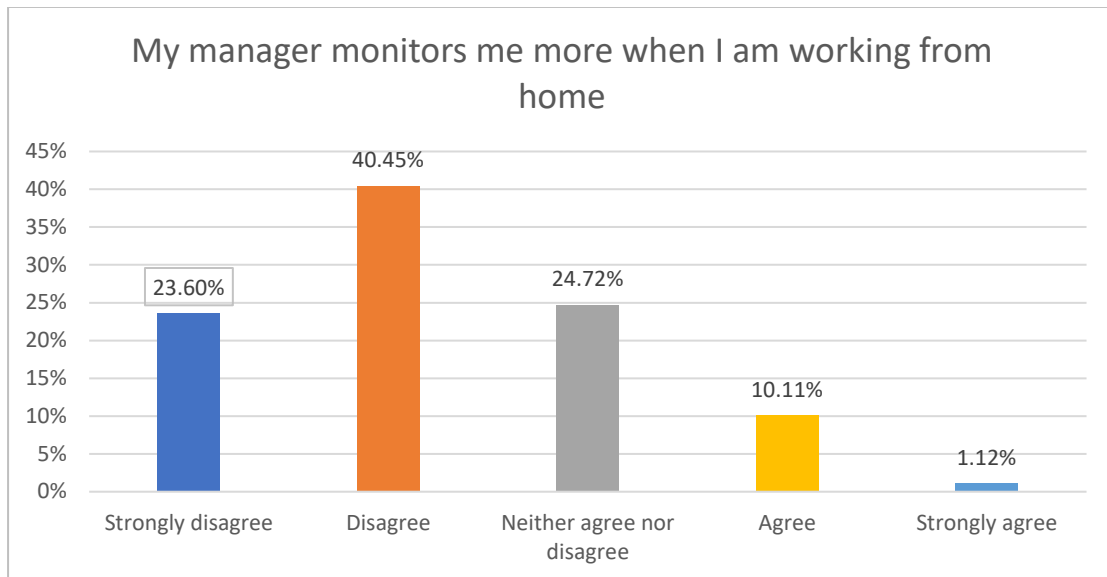


Figure 9: Respondents' percentages about monitoring.

The following bar graph verify the correlation between delegation and time. It is observed that only the 11.24% agree with the statement "My manager delegates more tasks and responsibilities than before COVID-19". 41.57% claim that their manager did not delegate more than before COVID-19. 44.94% are neutral and may not have realized any change at manager's behavior delegation.



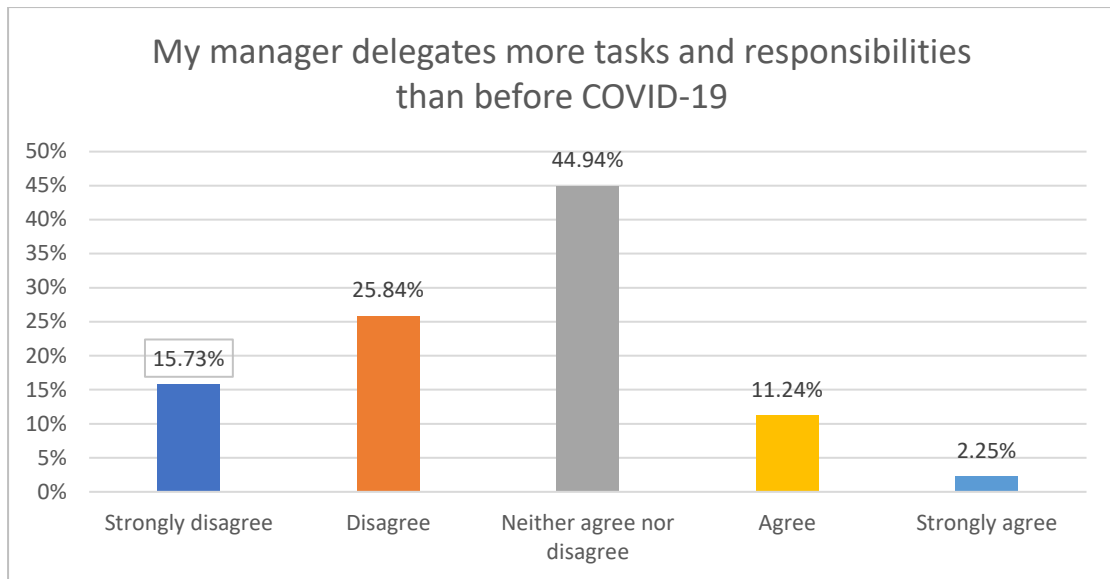


Figure 10: Respondents' percentages about delegating of tasks.

It was expected that the majority of teleworkers will agree with the statement "Working from home makes me feel isolated from my colleagues", however the mean 3.24 belongs to the neutral interval. 43.82% of the respondents agree with the aforementioned statement and 26.96% disagree with the statement.

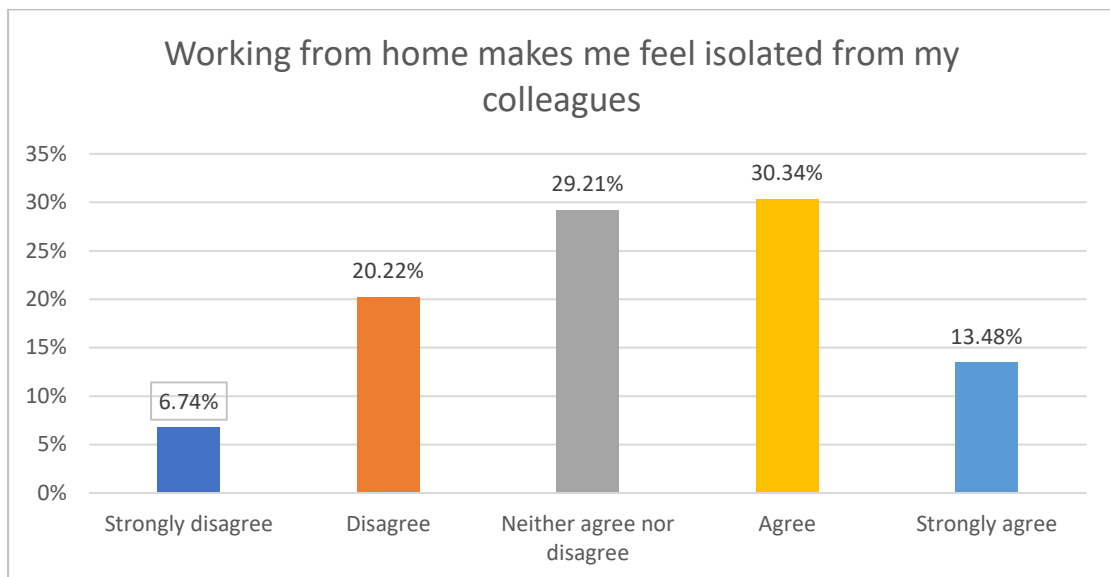


Figure 11: Respondents' percentages about feeling of isolation.

The mean of the following statement "The transfer of information works without problems among my colleagues, as if we were at the office" is equal to 3.39 and it means that the majority of the teleworkers agree with the statement, as can be recognized at the bar graph. On the other hand, there is 21.35%, who disagree with this statement and imply that there are potential problems between

the team members. Another 21.35% declare that they cannot express an opinion, maybe they work independently or they do not feel any difference.

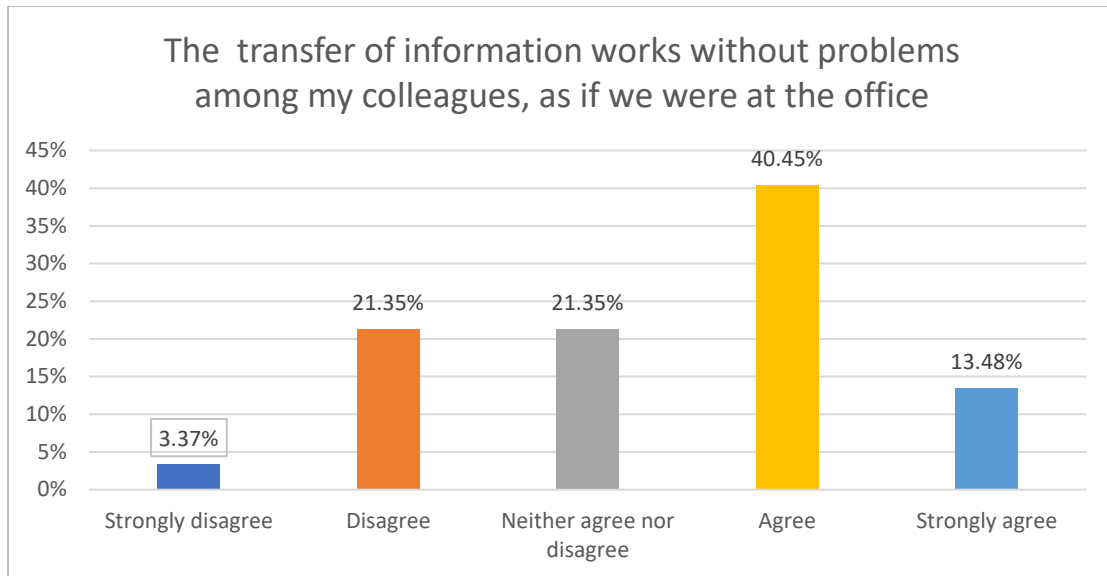


Figure 12: Respondents' percentages about transfer of information among colleagues.

The mean of the effective communication is 3.52 which is positive and it means that the majority of respondents (40.45%) agree with the statement "There is effective communication among my colleagues (without misunderstandings)". Few of the sample 12.4% disagree with the aforementioned statement coping with some potential misunderstanding with other team members. Again, it is observed a high percent of neutral answers closely 34%, which represent employees, who did not realize, if the communication between team members works properly.

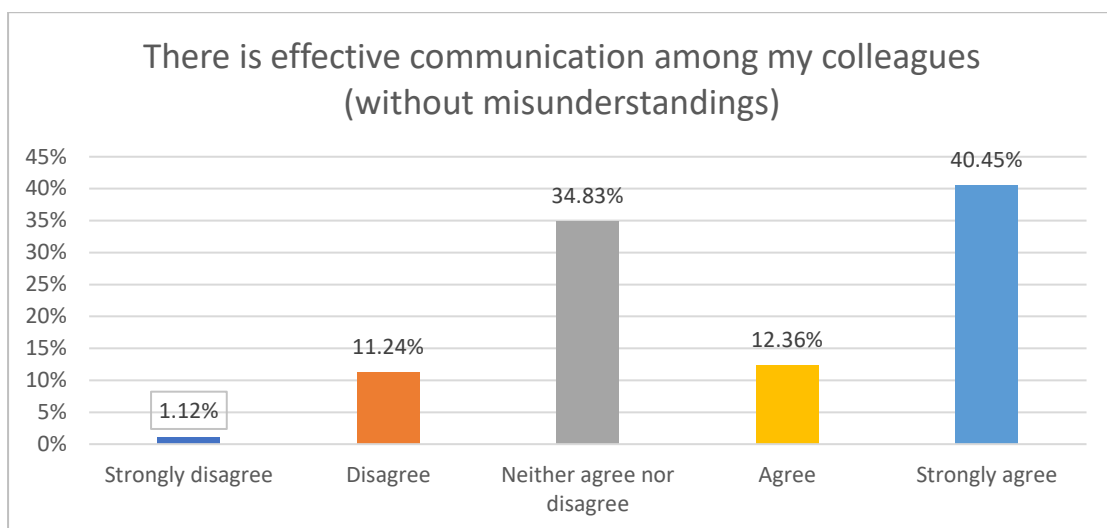


Figure 13: Respondents' percentages about effective communication among colleagues.

A very encouraging result is the mean 4.00 of collaboration, because it shows that the teleworkers can collaborate good with their colleagues, even if they are not at the same location. The neutral respondents are decreased to 11.24% in comparison to the previous results, which indicates that respondents work in a good team spirit. Only 5.61% did not have a good collaboration at home, and probably same employees did not have a good communication with their colleagues.

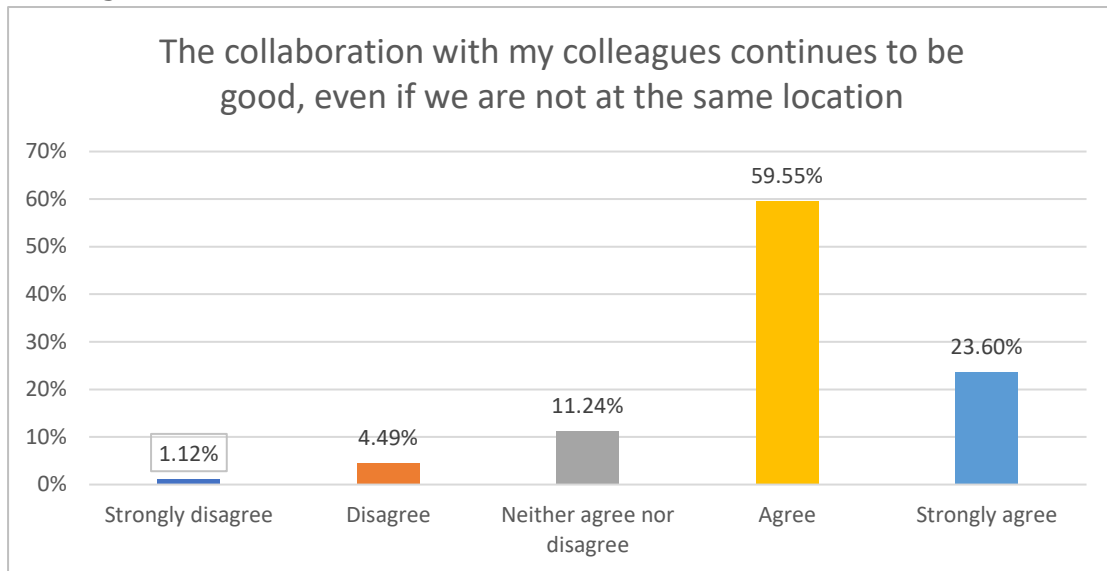


Figure 14: Respondents' percentages about collaboration among colleagues.

Total 65.17% support, that they miss social relationships, when they work from home. Another 17.98% are neutral and few 16.85% did not miss social relationships. People, who did not miss social relationships, prefer to work 4-5 days from home.

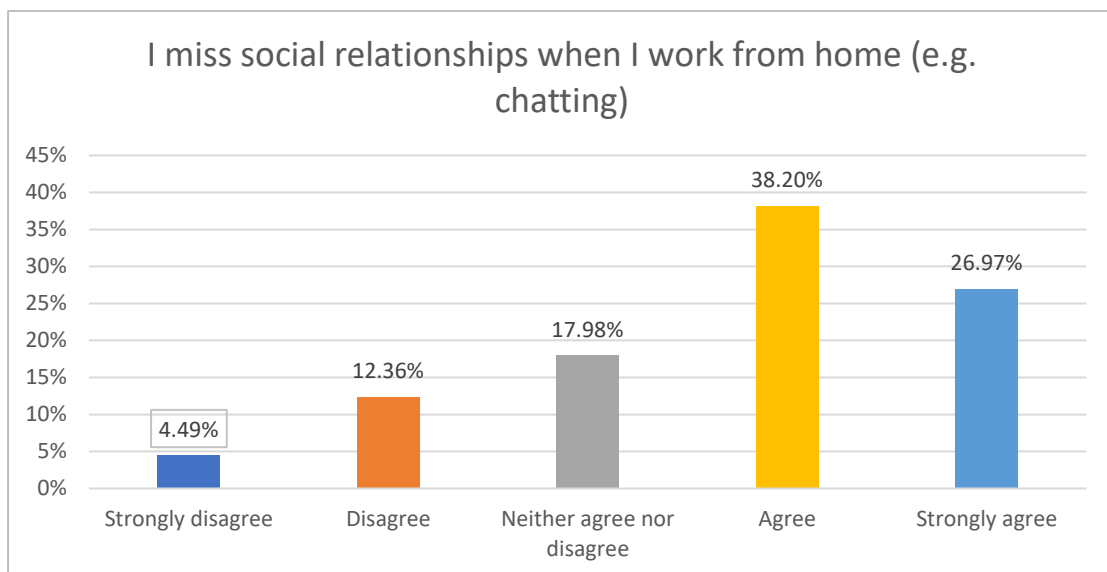


Figure 15: Respondents' percentages about social relationships.

More than half of the teleworkers (55.06%) support that they are not stressed and anxious regarding their working position due to the COVID-19. 21.35% are neutral and 23.6% are insecure about their working position. According to the answers, the participants with little experience are more anxious about their working position.

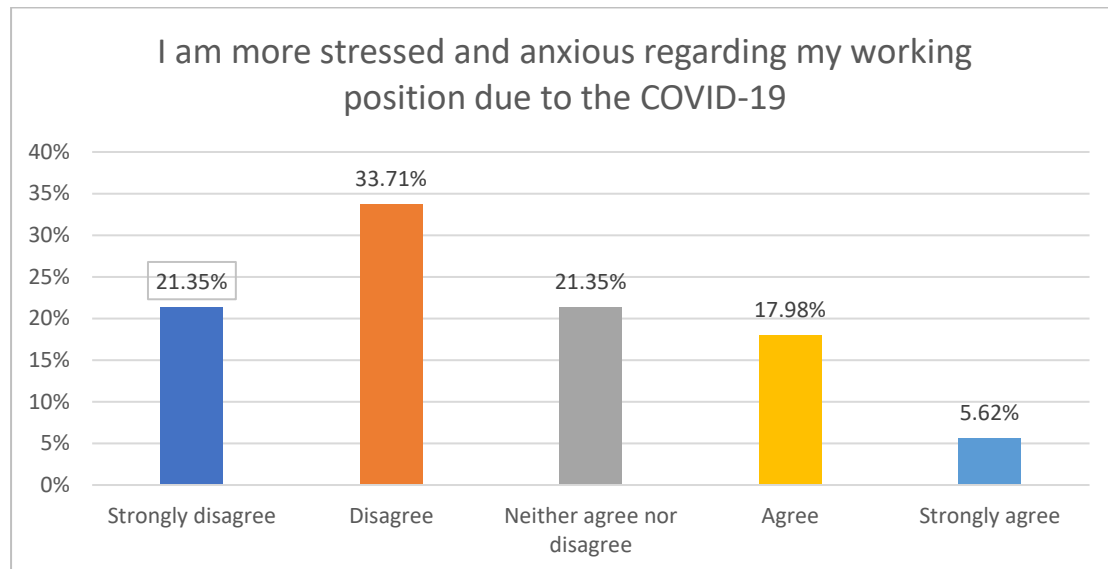


Figure 16: Respondents' percentages about working position.

More than the half of the teleworkers (56.18%) believe that they are able to concentrate better, while they are working from home than at their workplace, because they feel more comfortable at home. As a result, almost all of them prefer to work more than 2 days from home. 26.97% are neutral, an explanation may be that it makes no difference, if they work from home or not. In contrast, 16.86% believe, that they cannot concentrate better at the workplace and a reason may be other cohabitants, who may live at home. These teleworkers prefer from 0 to 3 days to work from home.

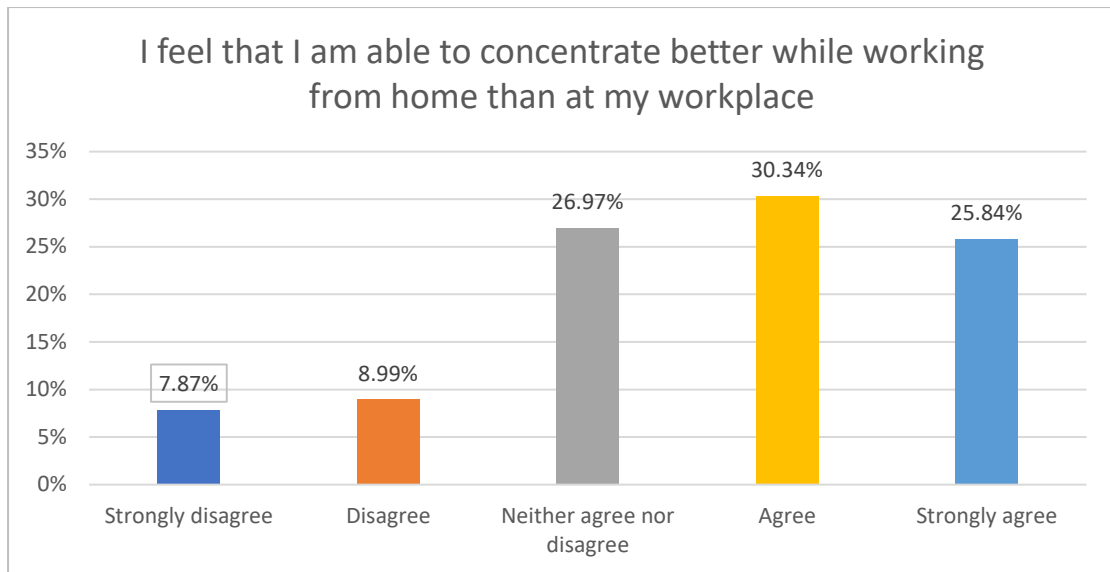


Figure 17: Respondents' percentages about concentration at home.

An expecting result was that most of the teleworkers can handle their workload, when they working from home. Most of the tasks and responsibilities are not place-oriented and because of that are easy handleable for the employees. There are few employees 6.74%, who are neutral and 5.62% who disagree with the statement. Their answers may depend on their little experience, from 0 to 3 years. The workload should be handleable, otherwise lurks the risk of burnout.

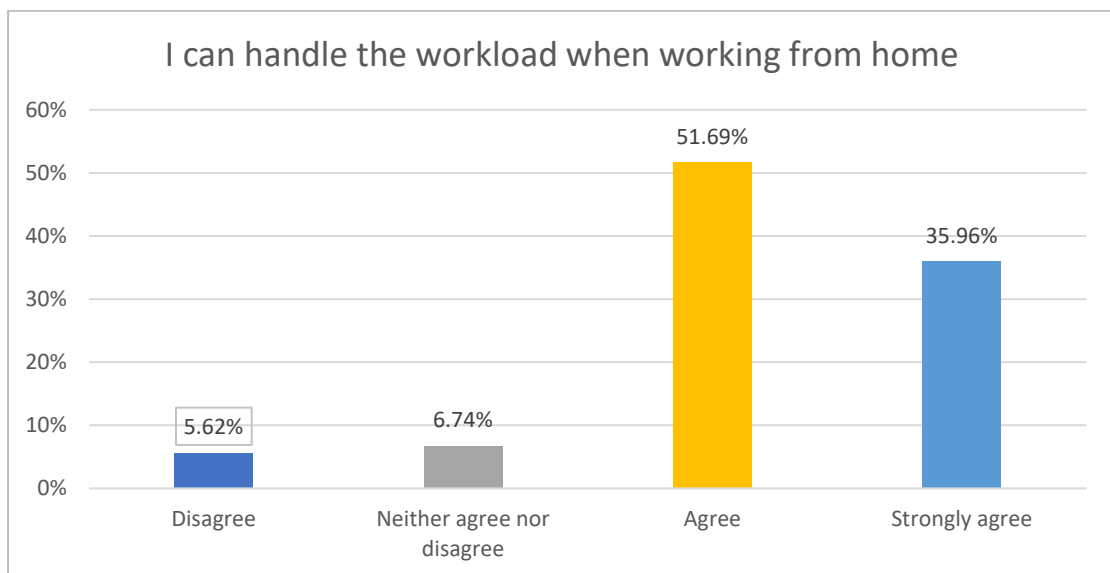


Figure 18: Respondents' percentages about workload.

The majority of the respondents belong to the neutral group and they did not support the statement, that they get their work done in less time, while working from home. This high percentage can be explained because the duration of the tasks may be the same at home

or at the office. Another explanation may be that the respondents have not observed any change. 37% believe that at home they need less time for their tasks and they prefer to work from 2 to 5 days at home. The majority of them have answered, that they are able to concentrate better at home. This observation can be explained because they did not have interruptions at home. On the other hand, 23.6% teleworkers need more time at home. This could be explained by the lack of communication between colleagues who can serve as an information source. The correlation between time and concentration shows that employees, who need more time for their tasks, cannot concentrate at home and according to the answers. they are employees with less than 3-year experience. Almost all employees with less than 1-year experience, they need more time for their tasks at home than at the office. It can be explained, because when they need support, they should wait until to solve it by themselves or to discuss with a colleague. At the office the solving of problems and questions is easier and quicker than at home.

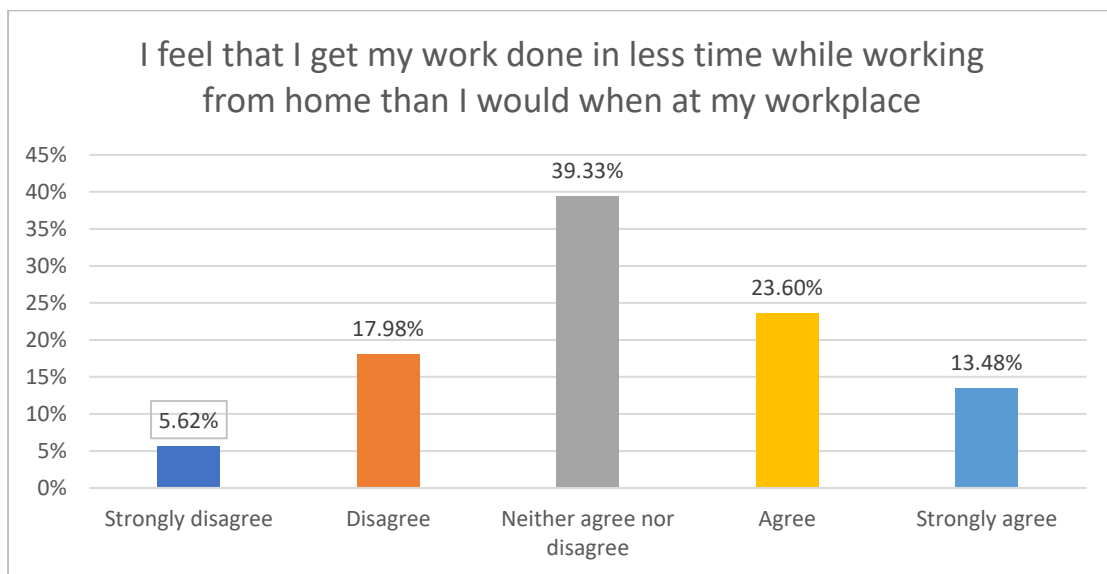


Figure 19: Respondents' percentages about duration of workload.

Again, one in three participants (31.46%) is neutral regarding the statement, that the working hours are increased, when they work from home. It is a surprising result, because teleworkers did not have observed, if they work more at home or not. Approximately 40% believe that they work longer at home than at the office. It was expecting more than 40% because due to COVID-19 restrictions, employees continued to work as they could not go out or to meet friends. Less than one third of the respondents believe that the

working hours are not increased, they keep their working hours as before.

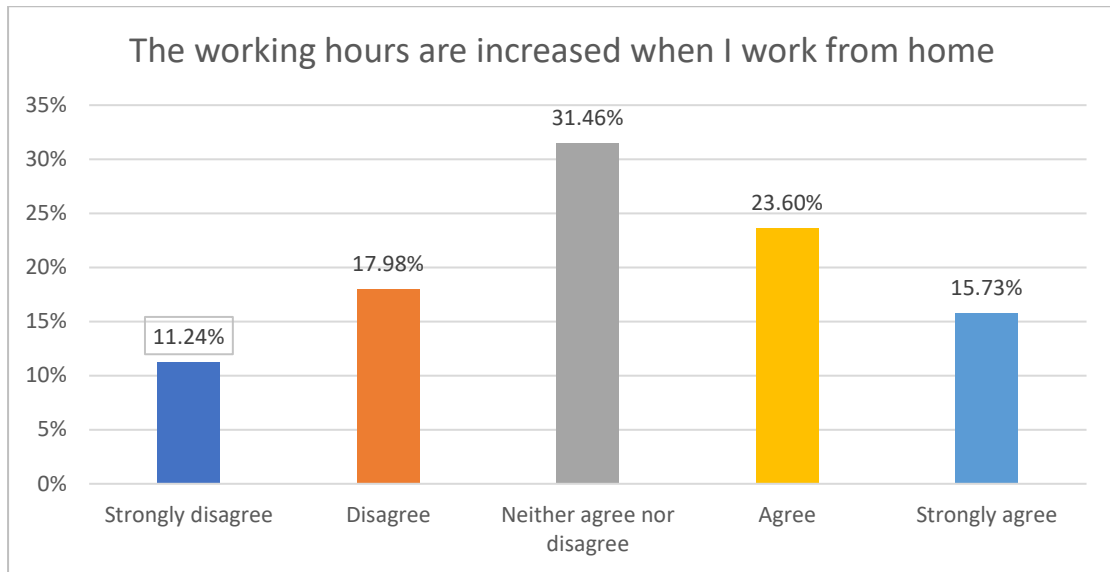


Figure 20: Respondents' percentages about working hours at home.

More than half of the teleworkers can complete their tasks independently from others. 30% of their tasks may be or not dependent from colleagues and roundly 15% are dependent on others.

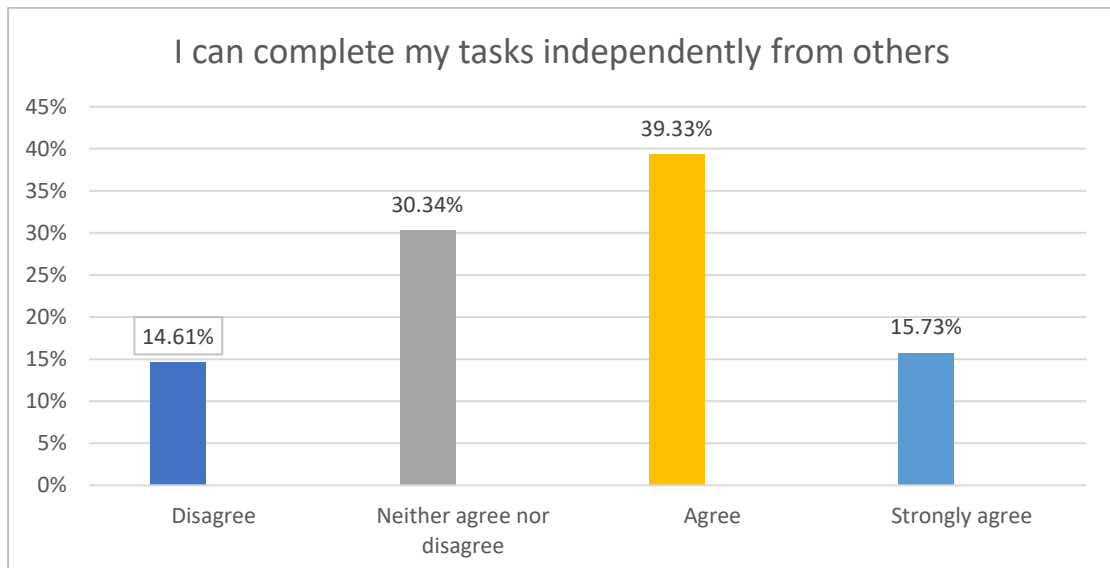


Figure 21: Respondents' percentages about independency of tasks.

More than the half believe, that they can complete their tasks as they did before the pandemic. There is a small percentage of 4.5%, who cannot complete their tasks as before and they have common characteristic, that they miss social relationships. Another 34.83% did not realize any difference before and after pandemic.

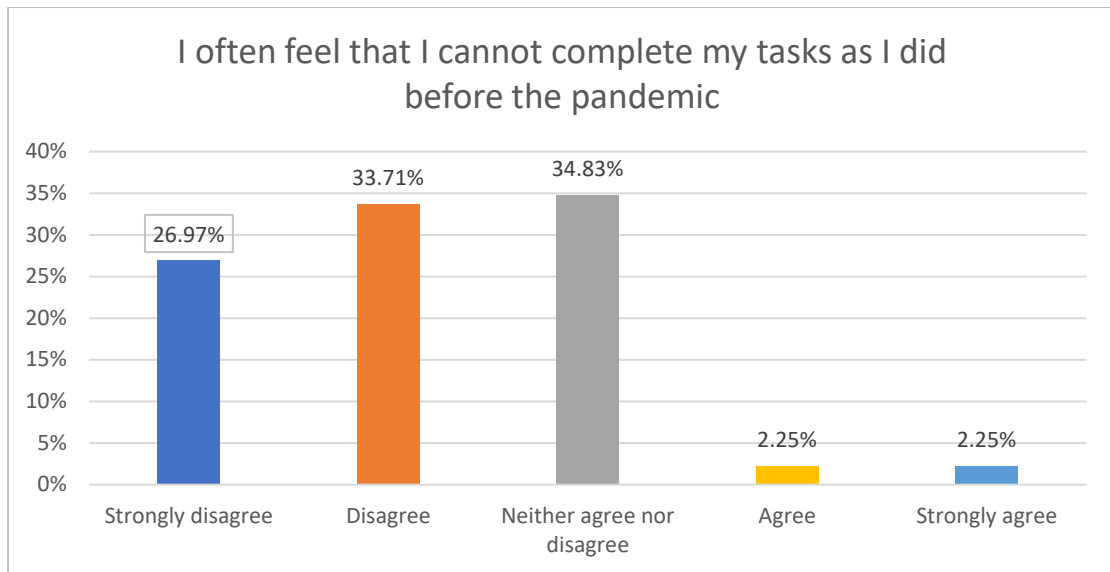


Figure 22: Respondents' percentages about completion of tasks.

One in four respondents are neutral to the statement that work-life balance helps them to be more productive. On the contrary, only two persons disagree with the statement. Undoubtedly, two in three respondents believe that work life balance makes them more productive. This can be explained that people can work at their leisure time in order to get work done, especially employees with familiar duties.

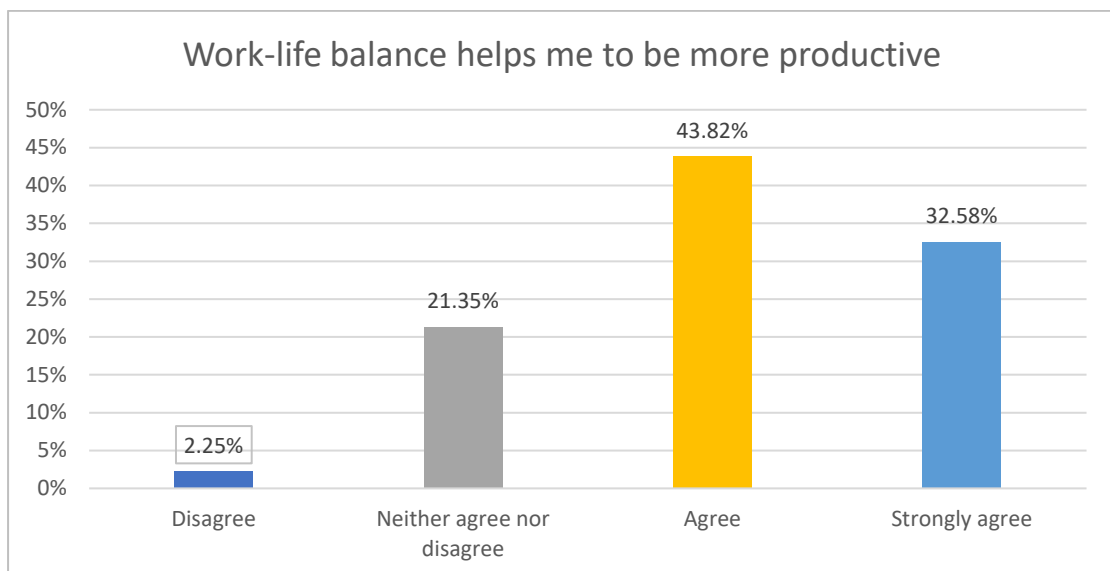


Figure 23: Respondents' percentages about work-life balance.

28.09% believe, that are not more motivated, when they work at home. This group of people have experience from 0 to 3 years and prefer to work from home 0 to 3 days. 33.71% are neutral and may have not observed any difference at their motivation, when they work



from home or at the office. In conclusion, most of teleworkers (38.2%) believe that they are more motivated, when they work at home and because of that they prefer from 2-5 days to work from home.

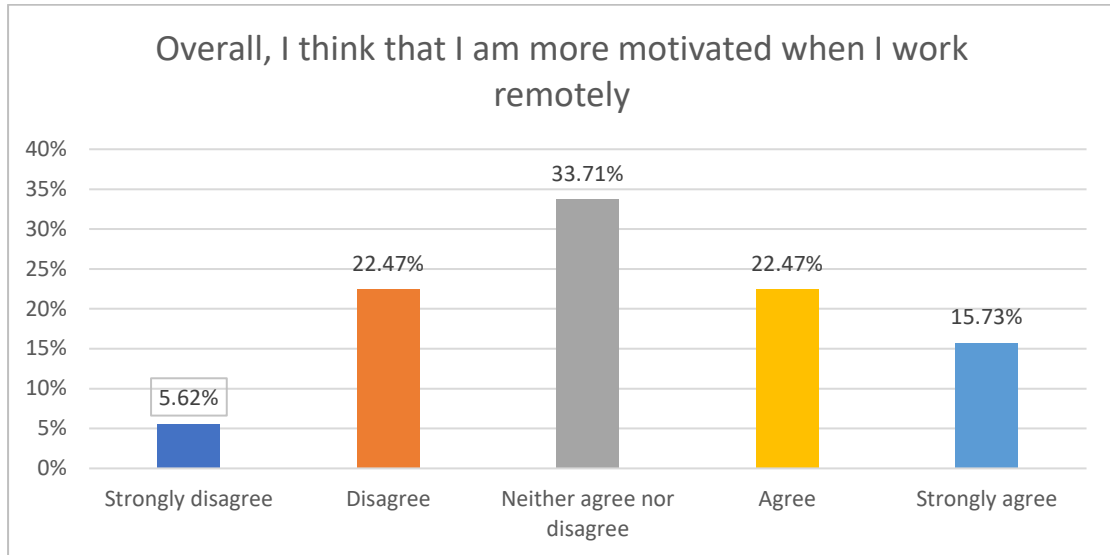


Figure 24: Respondents' percentages about motivation.

Most of participants (44.95%) believe that they are more productive amid the pandemic when they work from home than at the office. A high percentage 34.83%, as before, did not realize any difference and there is a 20.23%, who disagree with the statement.

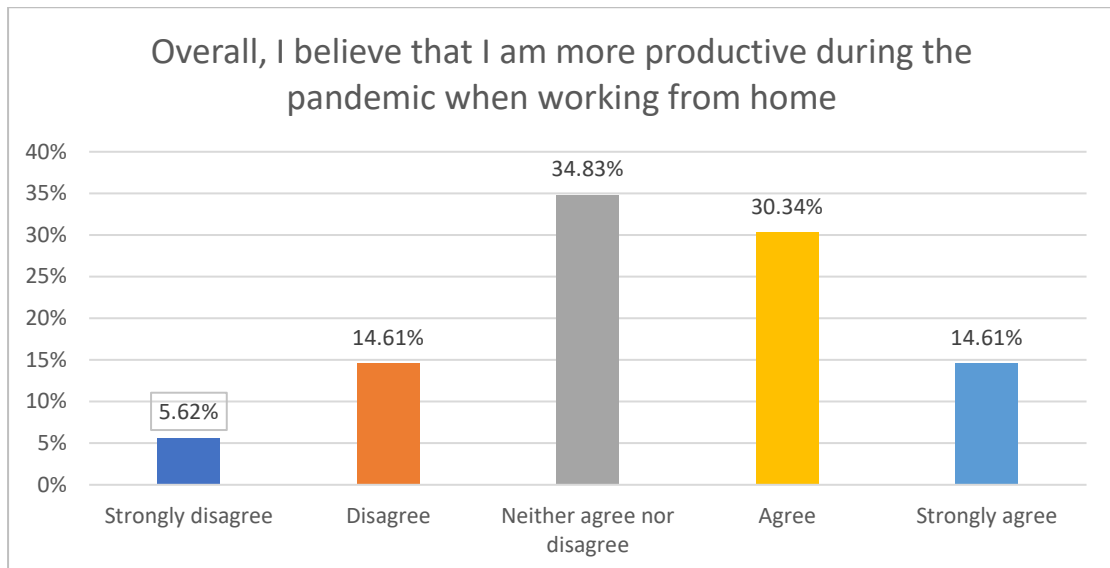


Figure 25: Respondents' percentages about production.

26.97% live alone, 37.08 live with another person, 14.61% live with another 2 persons and 21.35% live with 3 persons and more.

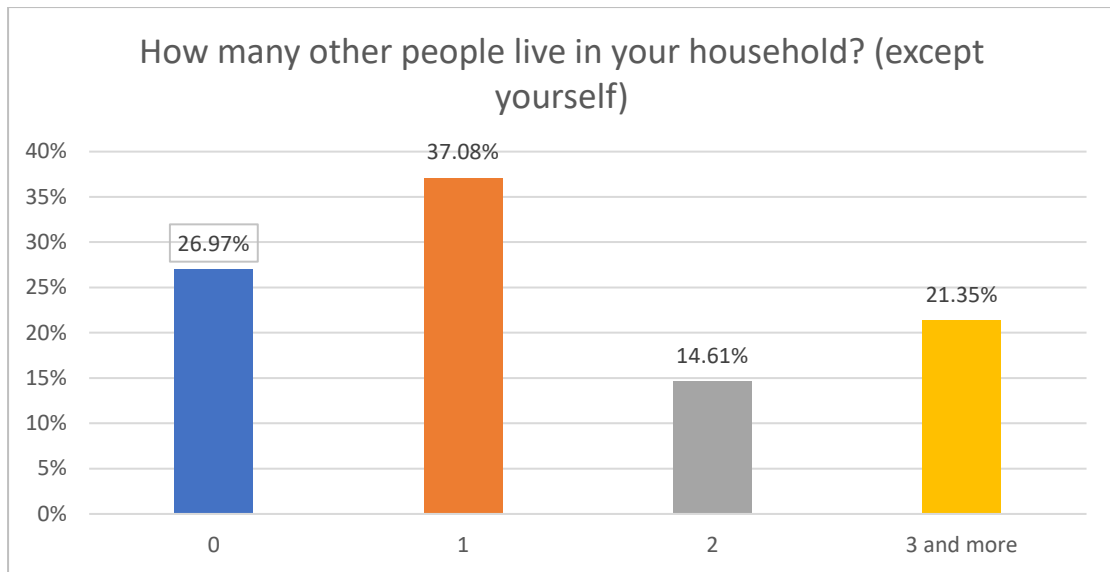


Figure 26: Respondents' percentages about the cohabitants.

The majority of respondents do not have children at the time of survey and the other 26.96% have more than 1 child. Although, 73.03% do not have children, most of them, they do not live alone, because in Germany the majority of unmarried people live with other persons as the costs for rent are quite high.

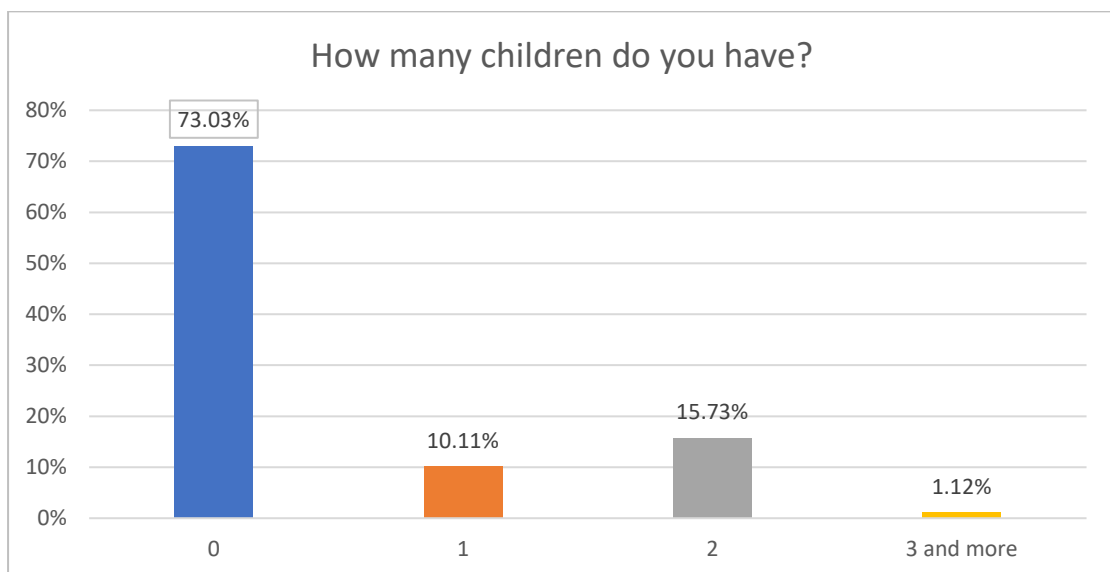


Figure 27: Respondents' percentages about children.

The highest percentage is 44.94%, who work from 1 to 3 years on the current project. 26.97% is less than one year and 4-6 years have the same percentage (14.61%) as 7 and more. It is very common for German to stay at one project up to three years and after that to change their position and responsibilities. Most of the people who have more than 7-year experience belong to 35-44 age group.

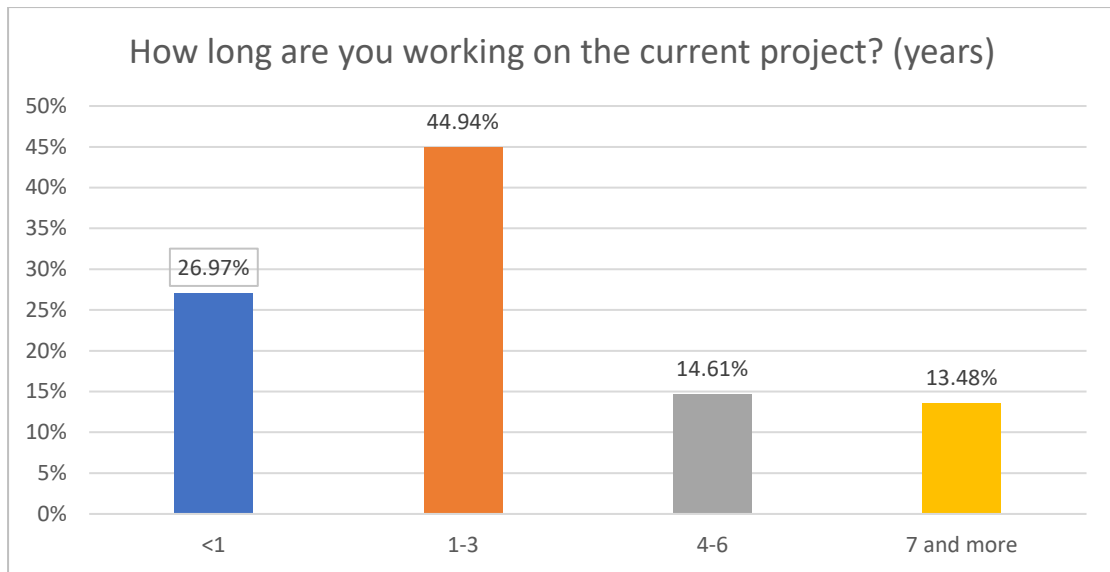


Figure 28: Respondents' percentages about experience.

According to the following bar graph, half of the respondents (49.44%) prefer to work 2-3 times in a week. 38.20% prefer 4-5 days pro week and a small percentage 12.36% prefer from 0 to 1 time a week.

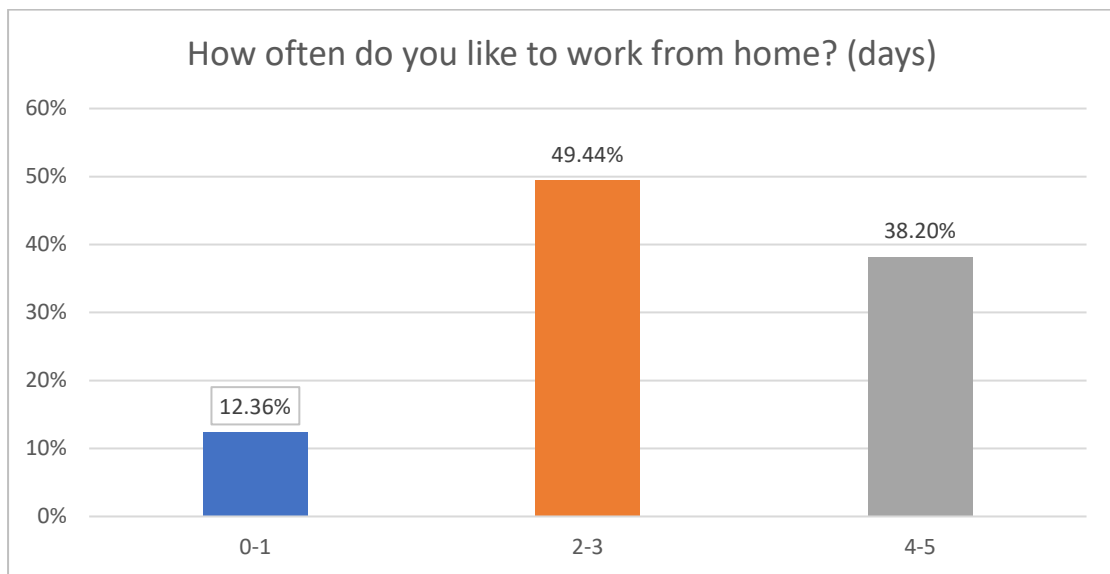


Figure 29: Respondents' percentages about days of home-office.

More than half (53.93%) of the respondents are male and 46.07% are female. In engineering departments, the majority of employees are male, although at the last years companies try to increase the female-quota.

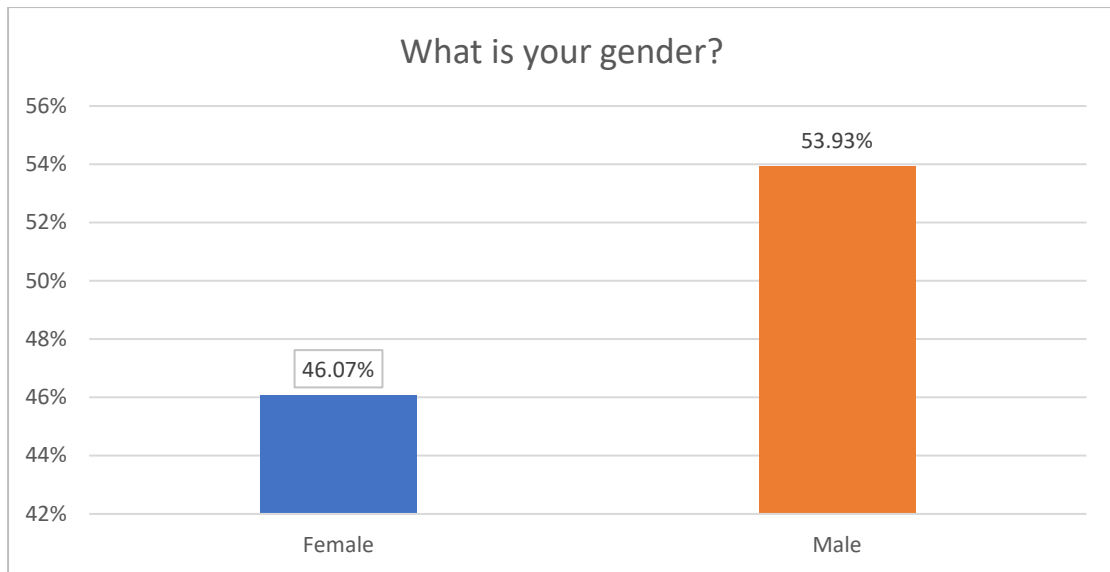


Figure 30: Respondents' percentages about gender.

Most of the respondents (47.19%) belong to the 25-34 age group, 34.83% are between 35-44, 14.61% are 18-24 years old and 3.37% are older than 45 years old.

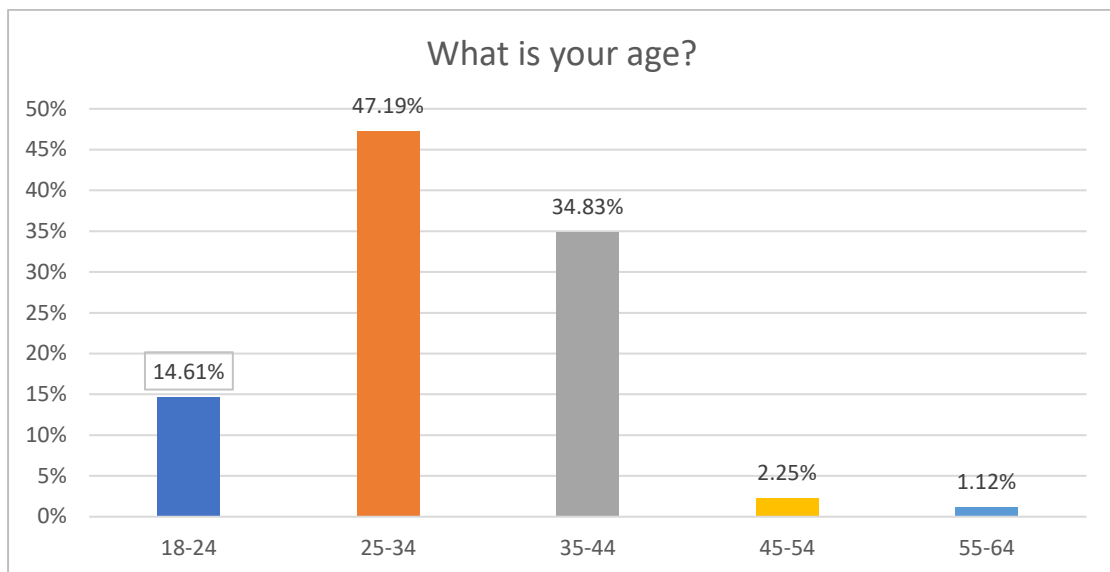


Figure 31: Respondents' percentages about age.

As far as education is concerned, 10.11% hold high school degree, 24.72% a bachelor's degree, 62.92% a master's degree and only 2.25% a doctoral degree.

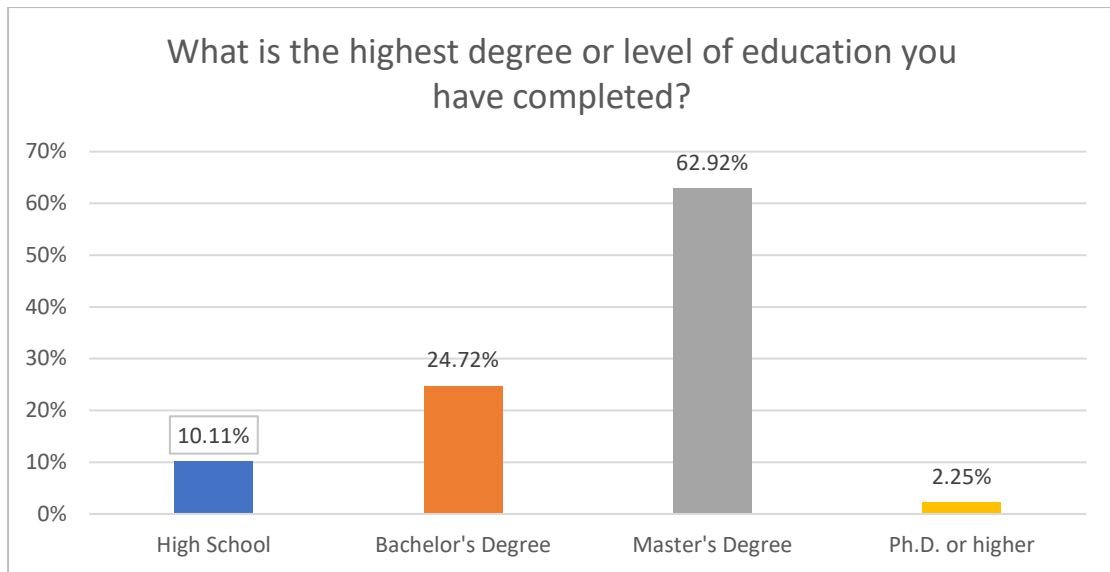


Figure 32: Respondents' percentages about education level.

### 4.3 Regression Analysis

First of all, an exploratory factor analysis (EFA) was executed in order to find out, which variables are closely correlated as a result of one or more underlying factors. EFA searches the unexplained factors that influence the co-variation among multiple observations. In this study, EFA used to discover the various factors which may influence the employee performance and motivation. The used sample size has 89 answers, which may be characterized as poor, because of the general rule of thumb. The Kaiser-Meyer-Olkin measure of sampling adequacy is 0.7, greater than 0.5, which means that there is not a sample issue. Also, Bartlett's test of sphericity was significant, it means that it exists at least one significant correlation.

### Pattern Matrix<sup>a</sup>

	Component			
	1	2	3	4
Less Time	.901			
Concentration	.880			
Productiveness	.763			
Motivation	.529			
Caring		.840		
Feedback		.810		
Support		.706		
Action		.633		
More Stress		-.443		
Miss Social Relationship			.836	
Isolation			.785	
Connection			-.652	
Work life balance				.774
Collaboration				.552
Communication				.463

Extraction Method: Principal Component Analysis.  
 Rotation Method: Oblimin with Kaiser Normalization.

Figure 33: Exploratory Factor Analysis

As observed from the table above, there are four different factors. The first latent variable is the employee performance and includes productivity, motivation, concentration and the time. The better concentrated an employee, the less time they need to complete their tasks. As a consequence, they feel more motivated and productive. Second latent variable refers to E-leadership regarding the manager's behavior and company's actions. If the managers are caring about the well-being and health of their employees or if they give constructive feedback and are supportive with their employees, it can affect the employee performance. The third latent variable refers to social relationships as a result include the isolation and connection. There is a negative relationship between connection and isolation. When the employees feel isolated and miss social relationships, they may do not feel enough connected with the company and with other employees. Last but not least, the fourth latent variable includes the work relationships such as collaboration and communication. The good collaboration and communication with other employees give more freedom and flexibility to the employees and they can create a better work- life balance.

The first scenario, which will be examined, is to find out which variables affect directly the productiveness of employees. According to EFA, concentration, time and motivation are strongly related to productiveness. The data fit very good with the model because it is significant. According to the results, 52% change in dependent variable is explained through the independent variables.

		Parameter Estimates					95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[Productiveness = 1]	3.249	1.626	3.991	1	.046	.062	6.437
	[Productiveness = 2]	5.371	1.644	10.672	1	.001	2.149	8.594
	[Productiveness = 3]	7.862	1.746	20.275	1	<.001	4.440	11.284
	[Productiveness = 4]	10.307	1.891	29.703	1	<.001	6.600	14.014
Location	Concentration	.828	.296	7.820	1	.005	.248	1.408
	LessTime	.810	.312	6.730	1	.009	.198	1.422
	Worklifebalance	.620	.272	5.194	1	.023	.087	1.153
	MissSocialRelationship	-.142	.195	.532	1	.466	-.524	.240

Link function: Logit.

Figure 34: Ordinal regression analysis with dependent variable the productivity

Positive coefficient is interpreted as following, for every one unit increase on an independent variable, there is a predicted increase in the log odd of falling at a higher level on the dependent variable. Generally, it indicates that there is an increased probability of falling at a greater level on the dependent variable as values rise on an independent variable. On the other hand, negative coefficient is interpreted, for every one unit increase on independent variable, there is a predicted decrease of a certain amount in the log odds of being in a higher level on the dependent variable. According to the figure 33, concertation has a significant positive predictor of employee productivity. For every one unit increase in concentration, there is a predicted increase of 0.828 in the log odds of being at a higher level on employee productivity, holding the remaining independent variables constant. So, concentration has the bigger positive coefficient estimate to employee performance, time and work life balance are following. For every one unit increase in time and in work life balance, there is a predicted increase of 0.81 and 0.62 respectively in the log odds of being at a higher level on employee performance, ceteris paribus. The coefficient of missing social relationship is not significant; however, it shows that for every one unit increase in missing social relationships, there is a predicted decrease of 0.142 in the log odds of being on a higher level on employee performance, remaining the other variables constant. It shows a negative correlation between the feeling of missing social

relationship and employee productivity, the lower the loss of social relationships the greater the productivity of employees may be.

In order to test, if motivation has positive effect to employee productivity, the same model was tested and the motivation variable was added. The data fit very good with the model, as it is significant too. According to the results, 67% change in dependent variable is explained through the independent variables. When the motivation variable was included an increase of 15% was succeeded through the addition of motivation. As a result, the motivation is the main factor which affects the employee's productivity. According to the following figure the coefficient of motivation is 1.592 which is almost double in comparison to the other coefficients. Motivation is statistically significant and has a positive affect to employee's performance. For every one unit increase in motivation, there is a predicted increase of 1.592 in the log odds of being at a higher level on employee productivity, holding the remaining independent variables constant. When the motivation is added, only the time remains statistically significant in contrast to work life balance and concentration. This is very significant observation, because managers, HR and company's strategy should focus on keeping the employees motivated.

		Parameter Estimates					95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[Productiveness = 1]	4.846	1.792	7.311	1	.007	1.333	8.359
	[Productiveness = 2]	7.551	1.866	16.374	1	<.001	3.893	11.208
	[Productiveness = 3]	10.570	2.000	27.938	1	<.001	6.651	14.489
	[Productiveness = 4]	13.591	2.227	37.235	1	<.001	9.226	17.957
Location	Concentration	.464	.309	2.258	1	.133	-.141	1.069
	LessTime	.736	.324	5.155	1	.023	.101	1.372
	Worklifebalance	.095	.295	.105	1	.746	-.483	.674
	MissSocialRelationship	.179	.221	.660	1	.417	-.253	.612
	Motivation	1.592	.312	26.000	1	<.001	.980	2.205

Link function: Logit.

Figure 35: Ordinal regression analysis with dependent variable the productivity according to motivation

The second scenario, which will be examined, is to find out which variables affect directly the motivation of employees. One variable was chosen from every latent variable. Concentration from employee performance, support from E-leadership, connection from social relationships and work life balance from work relationships. The data fit very good with the model because it is significant. According to the results, almost 50% change in dependent variable is explained through the independent variables.



**Parameter Estimates**

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[Motivation = 1]	1.278	1.541	.688	1	.407	-1.742	4.298
	[Motivation = 2]	3.942	1.586	6.176	1	.013	.833	7.052
	[Motivation = 3]	6.109	1.664	13.478	1	<.001	2.848	9.371
	[Motivation = 4]	7.856	1.726	20.725	1	<.001	4.474	11.239
Location	Support	-.632	.259	5.947	1	.015	-1.140	-.124
	Worklifebalance	.786	.272	8.378	1	.004	.254	1.319
	Connection	.552	.222	6.201	1	.013	.117	.986
	Concentration	.850	.221	14.762	1	<.001	.417	1.284

Link function: Logit.

Figure 36: Ordinal regression analysis with dependent variable the motivation

All independent variables are statistically significant and are predictors of motivation. Concentration has still a high coefficient as before with productivity. Work life balance coefficient is a little bit more than before in productivity model. Regarding to this model, when the company take actions to connect the employees with the firm, there is a positively correlation with motivation. For every one unit increase in connection, there is a predicted increase of 0.552 in the log odds of being at a higher level on employee motivation, ceteris paribus. The outcome from the support is remarkable, because it is negatively significant with motivation. The more a manager supports their employees, the less motivated the employee.

As before in order to test, if productivity has positive effect to employee motivation, the same model was tested and the productivity variable was added, as an independent variable. According to the results, 67% change in dependent variable is explained through the independent variables. When the productivity variable was included an increase of 17% was succeeded. It was expected, that the productivity would be correlated with motivation. As soon as productivity was added the connection and concentration were not statistically significant as before. As before there is a negative correlation between support and motivation. It shows that for every one unit increase in support, there is a predicted decrease of 0.723 in the log odds of being on a higher level on employee motivation, remaining the other variables constant.

		Parameter Estimates					95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[Motivation = 1]	2.830	1.693	2.796	1	.095	-.487	6.148
	[Motivation = 2]	6.125	1.782	11.815	1	<.001	2.632	9.617
	[Motivation = 3]	8.797	1.909	21.240	1	<.001	5.056	12.538
	[Motivation = 4]	11.158	2.040	29.910	1	<.001	7.159	15.157
Location	Support	-.723	.282	6.577	1	.010	-1.276	-.170
	Worklifebalance	.749	.289	6.727	1	.009	.183	1.314
	Connection	.451	.235	3.693	1	.055	-.009	.912
	Concentration	.295	.251	1.379	1	.240	-.197	.787
	Productiveness	1.611	.314	26.310	1	<.001	.995	2.226

Link function: Logit.

Figure 37: Ordinal regression analysis with dependent variable the motivation according to productivity

Finally, the last step through this study is to investigate how each latent variable affect (positively or negatively or no affect) the employee performance.

## Hypotheses

H<sub>1</sub>: E-leadership->Employee Performance

H<sub>2</sub>: Work Relationships ->Employee Performance

H<sub>3</sub>: Social Relationships ->Employee Performance

Employee performance was calculated taking the mean from the four variables of the first factor, which are productivity, motivation, concentration and time. The latent variable E-leadership was calculated as the mean from the variables caring, feedback, support, action and stress. The second variable work relationship calculated by the mean of collaboration, communication and work-life balance. Last but not least, the variable social relationship is the mean of isolation, connection and miss social relationship. Ordinal regression shown an almost 30% change in dependent variable, that was explained through the independent latent variables.

**Parameter Estimates**

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[EmployeePerformance = 1.00]	-1.800	2.059	.764	1	.382	-5.836	2.236
	[EmployeePerformance = 1.25]	-1.503	2.042	.542	1	.462	-5.505	2.498
	[EmployeePerformance = 1.50]	-1.264	2.031	.388	1	.534	-5.246	2.717
	[EmployeePerformance = 1.75]	-.879	2.020	.189	1	.664	-4.838	3.081
	[EmployeePerformance = 2.00]	-.433	2.014	.046	1	.830	-4.380	3.515
	[EmployeePerformance = 2.25]	-.196	2.012	.009	1	.923	-4.140	3.748
	[EmployeePerformance = 2.50]	.263	2.012	.017	1	.896	-3.681	4.206
	[EmployeePerformance = 2.75]	.637	2.013	.100	1	.752	-3.310	4.583
	[EmployeePerformance = 3.00]	1.580	2.021	.611	1	.434	-2.381	5.540
	[EmployeePerformance = 3.25]	2.218	2.027	1.198	1	.274	-1.754	6.190
	[EmployeePerformance = 3.50]	2.570	2.030	1.602	1	.206	-1.409	6.548
	[EmployeePerformance = 3.75]	3.135	2.036	2.370	1	.124	-.856	7.125
	[EmployeePerformance = 4.00]	3.843	2.045	3.531	1	.060	-.166	7.851
	[EmployeePerformance = 4.25]	4.138	2.050	4.076	1	.044	.121	8.155
	[EmployeePerformance = 4.50]	4.587	2.058	4.968	1	.026	.554	8.621
[EmployeePerformance = 4.75]	5.984	2.116	7.997	1	.005	1.836	10.131	
Location	ELeadership	-.700	.347	4.083	1	.043	-1.380	-.021
	WorkRelationships	1.554	.349	19.819	1	<.001	.870	2.237
	SocialRelationships	-.428	.352	1.472	1	.225	-1.118	.263

Link function: Logit.

Figure 38: Ordinal regression analysis with dependent variable the productivity according to three factor variables

E-leadership is statistically significant and has negative effect on employee performance. For every one unit increase in E-leadership, there is a predicted decrease of 0.7 in the log odds of being on a higher level on employee performance, remaining the other variables constant. The negative relation means e-leadership have a negative influence on employees, when they work from home. This may be explained because giving constantly feedback is not the most effective and employees become disengaged. Nowadays, companies promote the “always on” approach in which managers spend very much time coaching and giving continuous feedback. Work relationship factor is also statistically significant and has a positive influence on employee performance. For every one unit increase in work relationship, there is a predicted increase of 1.554 in the log odds of being on a higher level on employee performance, ceteris paribus. Work relationship is the most important factor regarding the

employee performance and managers should base on it in order to succeed better performance. In conclusion, the third factor social relationship is not statistically significant and has no effect on employee performance. Socializing does not influence directly the employee performance. It is recommended, because through socializing are built good employee relationships and in coffee breaks many ideas and useful information are conveyed. In reality, socializing may be an asset and enhance a good performance but it doesn't belong to the main factors. Managers and organizations have as a policy to promote this strategy and to bring team members together but it is more a human need than a requirement for a good performance.

Hypotheses	Result
H <sub>1</sub> : E-Leadership->Employee Performance	Supported
H <sub>2</sub> : Work Relationships ->Employee Performance	Supported
H <sub>3</sub> : Social Relationships ->Employee Performance	Not Supported

Figure 39: Hypotheses Results

## 5. Discussions

In the last two years due to the pandemic new employees' behaviors were observed and traditional theories were examined. Amid the pandemic, employees, companies and managers must handle the new reality and balance the new challenges. The study showed that the majority of respondents (45%) believe that they are more productive, when they are working from home. This outcome is aligned with other surveys such as by (Sectigo, 2020) and (Nasscom, 2021). The working hours increased and are spent at home in comparison to being at the office as some employees invested the travel time in to their working time. Under normal circumstances they spent their time in the car or on public transport. For other employees it was a contributing factor to work longer hours, as due to the pandemic restrictions meant that they had nowhere to go after hours and so preferred to work longer, which increased the feeling of never-

ending continuous work. As a result, being constantly available creates higher stress levels and employees cannot detach from work, harming their well-being.

It was interesting to investigate if the workload at home is equally as manageable as at the office, because when it is too high, it hampers the performance, motivation and the private life. Just a few answers stated that they cannot handle their workload and they had little experience or many children. So, the lack of experience makes the work more difficult at home. According to the study by (Shani Pindek, 2019) workload is significantly correlated with performance, but not with motivation. In contrast, this study supports that workload is significantly correlated with performance and motivation. Moreover, 16% of the answers supported, that they need more time in order to complete their tasks in comparison to before. In fact, these respondents answered that they do not feel productive nor motivated. They belong to the age group 24-35 and most of them did not have long experience on the project. A potential reason may be that they do not have enough guidance and they need more time as they would need at the office.

Another effect of feeling more stress and fear of losing their position during the pandemic, is that of creating strong negative emotions and in combination with work stress will demotivate the employees. This circumstance could be perceived as a threat to employee's job security. 20% feel insecure about their position, but it may be due to the general social and economic crisis caused by the pandemic and not specifically their companies. On the other hand, 8% supported that they feel insecure about their position, that they feel also demotivated. The feeling of insecurity stems from the lack of actions by company. They supported that they did not receive enough equipment, the company had not taken enough actions during the pandemic and they did not feel connected enough with their companies. It may be not enough to make teleworkers demotivated and unproductive, but it may be a good reason to drive them to unloyalty and to search for another job. Generally, more than 50% of the participants answered positively, that they receive the necessary equipment from their company. The percentage is very high and it reveals that the companies quickly found ways to support their employees during this unexpected global crisis.

Managerial support was rated highly and the outcome was very encouraging as it can increase the employee's motivation. When teleworkers receive enough support, they feel secure. Only 56% receive constructive feedback and 29% do not realize if their managers give them constructive feedback, that indicates opportunities for improvement. In comparison with the research from (Luciana Mourão, 2021), the above results regarding constructive feedback are a little bit lower than expected. The managers' ability to provide advice and support to subordinates is a main element of e-leadership. Regarding leadership behavior, only 10 respondents have admitted that they have observed a change in the exercise of control and delegation during the pandemic. This study confirms in some way the outcome of the study by (Stoker, Garretsen, & Lammers, 2021) that it is very difficult to change leadership behaviors amid the pandemic due to the manager's fear of losing control in the context of WFH. In alignment with this study was the outcome of regression analysis, that the perceived change in control or in delegation is not significantly correlated with productivity.

According to the results of this study, teleworkers are under the pressure of overworking, "work more in less time", which in combination with the social isolation may lead them to burnout. In addition, compared to traditional working conditions, working remotely under lockdown causes physical inactivity stress and work-related disorders. In such situations, professional support or treatment is highly recommended. The majority of participants admitted that they felt isolated from their colleagues. As mentioned before, the combination of interpersonal contact, isolation and high chance of misunderstanding may reduce motivation, it is therefore recommended to use video conferences. On the other hand, sharing information and maintaining effective communication are quite vital for good operation of the team. Effective communication between employees and listening to each other's opinions even though virtually, will be able to increase employee motivation and improve emotional relationships (Wiradendi et. al., 2020). Teleworkers answered with the highest percent of agree and strongly agree questions regarding transfer of information, effective communication and collaboration. As observed by the results, a good work spirit motivates the teleworkers.

From the outcome of the regression analysis, it was observed that motivation and productivity are highly related and interconnected.

When employees are motivated, the performance is also positively affected. The study showed that the performance is affected mostly by security, communication, collaboration, isolation, work life balance and concentration. The observations showed that the E-leadership from the manager and from company is reversely correlated with performance. In other words, many respondents have answered, that they receive support and feedback from their managers and their companies take actions in order to keep them connected. However, despite this they do not feel productive and motivated. This observation is aligned with the result of the research by (Vina Da'watul Aropah, 2021), who supported that organizational support has a negative relationship with employee performance. Although questions regarding the company and manager are highly rated with "agree" and "strongly agree", the percentage regarding productivity and motivation was not as highly rated, as expected.

A large percentage of employees (34%) could not understand if they were more motivated at home and it should be examined further, what could be the factors and the root cause. It may be the fact that there are employees, who do not feel motivated at home, because they do not have contact with their colleagues and miss social relationships. If someone is generally social, when he/she stays at home with casual clothes, they may not be motivated and feel bored about the tasks. My experience has shown, that working from home is depending not only on the manager and the organization, but also on personal mood. If someone isn't used to working from home alone and suddenly also loses any private social events, a feeling of depression and demotivation will overcome them. This fact confirms that 20% of employees are not motivated when they cannot be as productive as they would be at the office, because their work may be dependent on other people and they feel more comfortable to work in the same place with other colleagues. These employees have little experience in the project and as a result they may feel excluded from their colleagues.

Most of the respondents who said that they cannot be productive at home answered that they cannot stay concentrated at home, despite the fact that they do not have children. Their home is also a place of relaxation and fun which is now combined with a place of work. They cannot work at home because there are other things, that can distract their attention and they may be less productive. The manager ought

to observe the behavior of their employees and take the appropriate actions according to employees' needs.

On the other hand, there were almost a quarter of respondents who supported that they are more productive at home, despite the fact that they neither had appropriate equipment nor required support from their manager. There are occasions in which the manager was not available for a long time. Due to home office, the possibility to meet the manager or the boss coincidentally at the office and to have a small talk with him/her was negligible. However, teleworkers may feel motivated and productive because they receive enough support from their team and they can succeed their tasks. The management role is very important, but even without support and feedback, there are employees who believe that they are productive. Of course, this is the opinion of the employee and may do not correspond to the reality. The next level of this study would be to make a survey with the managers of the employees and to compare the answers from both aspects, regarding motivation and productivity. It would give the whole picture of what the employees believe about themselves and what manager perceive about them.

It is recommended in future studies to enlarge the sample size and expand the study geographically. Undoubtedly, employees are affected by the general situation and conditions during the pandemic and employees could not go out. As a result, they are focused on their tasks, work more than before and there are no work limits of the availability. So, employees feel that they are more productive and have the feeling that they succeed more, because they may do not ask for help immediately and have the joy of accomplishment. In addition, at home some independent tasks may take less time, as they do not need to wear the mask when they are seated or to sanitize their hands or desk.



## 6. Limitations

This study is a cross-sectional study and the data collected at a single measurement point. A study with quantitative and qualitative methods would be more complete. Another limitation may be the small sample size. In future, bigger sample of participants may give more persuasive data. The results refer to German employees from Munich, who are highly educated and young people in engineering companies. National culture and mentality may influence the individual expectations, behaviors and the way of thinking. In future, comparing research including other regions, countries or on a worldwide level could offer a better depiction of the general picture. The study was conducted through an online questionnaire and no personal information of the participants was collected. The participation was voluntary and there was an anonymity, therefore the assumption is that the responses were honest. One limitation which cannot be influenced is that people wanted to present themselves better than they really are in reality. The responses were based on self-perceptions, which may differ from leadership and management aspects. It cannot be foreseen or minimized, if the respondents answered more or less critically. This study was conducted amid the pandemic and participants coped with two main changes WFH and COVID-19. Future research should examine the productivity of employees, when they work from home beyond the pandemic.

## 7. Conclusions

Amid the health and economic crisis of COVID-19, companies paid attention to employees' safety and security, while trying to keep continuing the operations of the company. Executing this study, the goal was to examine the factors which affect the employee productivity. According to the results, the majority of the respondents supported, that they are more productive and motivated when they work from home and that they would like to work from home 2-3 times per week beyond the pandemic. A hybrid work model is emerging and settling a sustainable new normal. This pandemic was an opportunity to modernize the work environment and offer more flexibility and work life balance. Without a doubt the future of work will be more virtual, automated and paced in changes than now. The

traditional work environment will be transferred to a digital workplace. The existing studies around employees, leadership and management amid the pandemic will be the foundations for new management frameworks. Employees need more autonomy, freedom of choice and responsibility. As shown by the results of regression analysis, work relationships are very important for employees and have a significant effect on employee performance. On the other hand, E-leadership has an inverse effect on employee performance. E-leadership and management are the pillars for building a good team spirit and keep the employees satisfied especially in times of crisis. Managers should build an employee – manager connection in which they will learn their employees in a deeper level and understand employees' motivations, goals and interests. Managers should build team connection, which will create a transparent environment, where team members will work more with peers than managers. Organization connection facilitates peer to peer coaching and team members develop one another. It goals to help employees through self-awareness to find right skill and expertise from others. In future, teleworking programs should be organized by companies in order to keep higher level of job satisfaction and loyalty. In addition, e-leadership programs for managers are also required in order to learn how they can coach their employees and foster good collaboration and communication in virtual environment.

## Questionnaire about Remote Work

The present research is carried out as part of the thesis of the Master in Business Administration at the Open University of Cyprus. The subject of the dissertation is the investigation into the impacts of working from home on employees' performance during the COVID-19 pandemic.

If you have worked during the COVID-19 pandemic remotely, I would sincerely appreciate, if you take time to complete the following questionnaire. It would take 10 minutes of your time. Your responses are voluntary, will remain confidential and will be solely used for academic purposes. If you have any questions or you want to share your thoughts, please do not hesitate to contact me at [dimitra.dimitriadi@st.ouc.ac.cy](mailto:dimitra.dimitriadi@st.ouc.ac.cy). Thank you in advance for your help.

---

\* Απαιτείται

1. A. During the pandemic I have worked / can work from home. \*

*Να επισημαίνεται μόνο μία έλλειψη.*

Yes

No

B. Questions

## 2. Please state the level of agreement/ disagreement with the following statements.

\*

*Επιλέξτε όλα όσα ισχύουν.*

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The company provided me the necessary equipment in order to work remotely (e.g. computer screen, office equipment).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My company has taken action to further connect to employees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel as connected with the company when I work remotely, as I would when onsite.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel more trusted by my company, when I work from home, in comparison to working at the office.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I receive enough support from my manager when I ask for guidance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I receive constructive feedback regarding my performance when working remotely.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My manager demonstrates that s/he cares about my health and well-being.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My manager monitors me more when I am working from home.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My manager delegates more tasks and responsibilities than before COVID-19.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Working from home makes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

me feel isolated from my colleagues.

---

The transfer of information works without problems among my colleagues, as if we were at the office.

---

There is effective communication among my colleagues (without misunderstandings).

---

The collaboration with my colleagues continues to be good, even if we are not at the same location.

---

I miss social relationships when I work from home (e.g. chatting).

---

I am more stressed and anxious regarding my working position due to the COVID-19 pandemic.

---

I feel that I am able to concentrate more while working from home than at my workplace.

---

I can handle the workload when working from home.

---

I feel that I get my work done in less time while working from home than I would when at my workplace.

---

The working hours are increased when I work from home.

---

I can complete my tasks independently from others.

---

I often feel that I cannot complete my tasks as I did before the pandemic.

---

Work-life balance helps me to be more productive.

---

Overall, I think that I am more motivated when I work remotely.

---

Overall, I believe that I am more productive during the pandemic when working from home than when working onsite.

---

3. How many persons live in your household? \*

*Να επισημαίνεται μόνο μία έλλειψη.*

- 0  
 1  
 2  
 3 and more

4. How many children do you have? \*

*Να επισημαίνεται μόνο μία έλλειψη.*

- 0  
 1  
 2  
 3 and more

5. How long are you working on the current project? (years) \*

*Να επισημαίνεται μόνο μία έλλειψη.*

- <1
- 1-3
- 4-6
- 7 and more

6. How often do you like to work from home? (days) \*

*Να επισημαίνεται μόνο μία έλλειψη.*

- 0-1
- 2-3
- 4-5

7. What is your gender? \*

*Να επισημαίνεται μόνο μία έλλειψη.*

- Male
- Female
- Prefer not to say

8. What is your age? \*

*Να επισημαίνεται μόνο μία έλλειψη.*

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64

9. What is the highest degree or level of education you have completed? \*

*Να επισημαίνεται μόνο μία έλλειψη.*

- High School
- Bachelor's Degree
- Master's Degree
- Ph.D. or higher

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Αυτό το περιεχόμενο δεν έχει δημιουργηθεί και δεν έχει εγκριθεί από την Google.

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