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## **MASTER'S THESIS**

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## **PREFACE**

This thesis is part of my master's degree in Industrial Economics at the University of Stavanger (UiS). The degree has been of great inspiration, and the combination between finance, computer science, leadership, and management has been excellent and motivational for further career challenges. With the new knowledge attained from the degree, I feel equipped to meet the complex and ever-changing work life.

This thesis provided new insight into conducting research, using scientific methods, and writing a research paper. My previous research experience was limited. Working with this master's thesis in the last months has provided hands-on experience on the challenges of conducting quantitative research. This insight enlightens the effort in modern research, an essential pillar of our society. Regarding autonomous teams and leadership, it has been rewarding to deep dive into research on this matter. This has been invaluable as part of my daily work as a Team Lead at my employer. Studying academic research and applying the theory into practice in my team has been challenging, instructive, and an experience I would not be without.

I have conducted this master's thesis on my own, but with support from many. As I have worked full-time at my current employer, I've had to prioritize and plan my time to the extreme. Therefore, I need to thank my girlfriend for all the support and for taking greater responsibility for our son while being pregnant with our second son. The effort and energy she has invested in my master's degree are invaluable, and I couldn't have done it without her. I would also need to thank family and friends for assisting us in our daily life. It is a team effort that I have completed this master's thesis.

Lastly, I also need to thank my supervisor Finn Sandberg for his contributions to this thesis and for providing experience and knowledge about conducting a research paper.

Haslum 15.06.2021

Tord Langedal Ness

## **ABSTRACT**

The outbreak of COVID-19 lead to economic and social disruption. Organizations worldwide have felt the consequences of the pandemic, and employees have been more or less forced to Work-From-Home (WFH). Remote work has been a popular research topic in recent years and became more relevant due to the outbreak. Although remote work has been researched previously, the forced nature of COVID-19 and the magnitude of distributed teams distinguish the current remote working environment from the previous environments.

Remote work introduces challenges and opportunities for teams in organizations. While it is easier to recruit resources to virtual teams and employees don't need to commute to work, the lack of face-to-face interaction challenges team coordination and communication. Previous research indicates that teams and employees experience more freedom and increased autonomy in virtual teams, while leaders lack awareness and overview of team progress and status. The latter suggests that leaders will need to gain more awareness and overview to ensure team productivity and performance, which can reduce autonomy in teams.

This thesis investigates if autonomy, control, and monitoring have changed while WFH during COVID-19 by conducting a quantitative study. Data was collected through questionnaires from four different sources, resulting in 533 valid respondents. The findings indicate that control and monitoring have been reduced during COVID-19 and WFH, while individual and team autonomy have increased. Although the study hypotheses originally were opposite, meaning the study proposed that control and monitoring would have increased and therefore individual and team autonomy would have decreased, the relationship between control and monitoring, as one construct, and autonomy, as a second construct, are slightly positive correlated. This low, positive correlated relationship is not as proposed by the study hypotheses, nor as indicated by previous research.

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

- COVID-19** Coronavirus Disease 2019
- EU** European Commission
- WFH** Work-From-Home
- WHO** World Health Organization



# 1. INTRODUCTION

## 1.1 Motivation and Background

On the 12th of March 2020, the Prime Minister of Norway announced the most intrusive measures and regulations in peacetime in Norway to mitigate and control the contagious Coronavirus Disease 2019 (COVID-19). One common action in Norway, European countries, and the rest of the world was the recommendation of remote work and the closure of workplaces. The new Work-From-Home (WFH) situation offers a set of challenges for businesses that is interesting to look further into.

Stable, agile, and autonomous teams have been increasingly popular over the last years and almost seem like a panacea in many organizations, research papers, and consulting recommendations. The concept of stable, agile, and autonomous teams, especially the autonomous part, has caught my interest and provoked a drive to explore the literature and theory of autonomous teams.

In addition to the new inspiration for autonomous teams, effective leadership and optimal team performance have been of great interest since my early days as a football player and later in the military and the professional workplace. How some leaders and teams seem to achieve success more often than others, or with a more sense of ease than others, are fascinating.

Also, witnessing outstanding and mediocre leadership in personal and professional life intrigues a curious mind about teams and leadership.

The combination of these factors sparked the motivation for this master's thesis. Will WFH have consequences for working conditions for individuals, teams, and organizations. How will this affect autonomous teams? How will leaders react to this new working condition? A recent observation at the workplace contributed to the research questions, as described in the upcoming sections.

## 1.2 Research question

A personal observation at the workplace initiated the research question for this thesis. The uncertainty with COVID-19 and the new WFH situation seemed to burden leaders and managers, who felt they lost control, insight, and overview of their team and team members. Some leaders even appeared frustrated over this new work environment.

The work rhythm and routines at the office provide informal meeting places where information is shared between colleagues, leaders, and team members. These informal meetings are common and can occur at the coffee machine, lunch breaks, walk-and-talks in the hallway, or at the office desk. The ease of getting *up-to-date* or get a status on a task is significant. A study from 1994 showed that 31% of the office activity consists of informal communication, and removing such interaction would decrease collaboration [1].

Modern leaders are constantly faced with contradictory demands and situations. Leaders cautiously need to choose their actions in the proper condition to accommodate the paradoxes faced. As leaders may feel less control, insight, and overview of their teams, one can imagine they would try to get back the control and overview. Rightfully so, perhaps, as teams working remotely rely on technology as communication mediums, which lacks the ability to reproduce the same richness as physical face-to-face communication. The reduced communication richness can increase conflicts and decrease collaboration [2], [3]. Furthermore, research also supports that monitoring team progress and processes can improve performance and is a vital task for managers [4], [5].

However, increased control and monitoring may have adverse effects on teams and team members. Sundaramurthy and Lewis [6] state that exaggeration of control could lead to mistrust and harm collaboration, but also that a lavish amount of collaboration may incorporate group thinking and have adverse effects on performances. Enzle and Anderson [7] found that increased control and monitoring will reduce motivation as it threatens individual autonomy. However, if the monitoring's intention is not felt as a controlling action, no decrease in motivations was found.

Manz and Stewart [8] state that autonomy is achieved by reducing hierarchical control and increasing collaboration. Furthermore, they also suggest that coordination is essential for autonomous teams, as without necessary coordination, autonomous teams can practice isolated with negative effects. Somewhat contradictory, monitoring is found to increase coordination and quality in teams [9], and Langfred stated that an increased level of individual autonomy required more monitoring and communication to avert coordination and process errors [10].

As for autonomous teams, autonomy is an essential element. Based on the personal observation that leaders feel less control over team progress and performance, which may increase control and monitoring in the new WFH environment, the following research question is formulated for this study:

*How has WFH affected control and monitoring and teams' autonomy?*

## 1.3 Structure

Section 2 of this study will cover relevant theory and background and set the research topic's context. It will also develop hypotheses based on said theory. The hypotheses will assist in answering the research question.

Section 3 will describe the methods used to answer the research question and how data is gathered.

Section 4 examines the data collected, presents the data and the data analysis.

Section 5 will discuss and elaborate the data in light of the theory, research question, and hypothesis.

Finally, section 6 provides a conclusion of the study. It also highlights the limitations encountered in the research and suggestions for further work.

## 1.4 The researchers' objectiveness

As the researcher in this study, I feel the need to underline my objectiveness. This master's thesis is part of my master's degree in industrial economics at the University of Stavanger. The master's degree and program have been done part-time while working full-time at my current employer. The employer has not contributed to this master's degree with funding or extra spare time. The employer has neither required any form of compensation nor demanded any specific outcomes from this thesis. This is 100% a personal initiative from me as a student and as a researcher.

However, the research topic and research question are strongly shaped by personal experience and observations done at my workplace. The observations consist of colleagues and managers close to me in the organization and some more distant in the organization. Parts of the data collected in this thesis sources from my employee, but it is important to highlight that the quantitative survey data used in this thesis is anonymous, and the respondents have no incentive to bias their feedback towards me as a colleague. Section 3 and 4 will provide more details on the research method and data collection.

## 2. Theory and background

This section will introduce and present relevant background and theory—first, some literature about groups and teams and their differences before moving on to autonomous teams. Secondly, a section will look at virtual teams before a new section reviews team leadership, focusing on control and monitoring. Lastly, background on the COVID-19 situation will be presented before hypotheses are developed to answer the research question.

### 2.1 Groups and Teams

Working in teams has become more or less the standard for organizations worldwide to meet increased competition, the pace of innovation, and complex workflows [11].

The literature uses the terms *groups* and *teams* interchangeably [12]. *Groups* can be formed quickly by individuals in an organizational structure with a common goal. *Teams* contain individuals who see themselves as one entity, socially interact, share common goals, perform interdependent tasks to achieve goals, and work in an organizational system [11]–[13]. Hjertø [4, p. 33] stated that teams are relatively autonomous workgroups with a high degree of interdependency which tries to achieve a common goal.

Katzenback and Smith [15] have highlighted some differences between groups and teams, as illustrated in Table 1.

While groups and teams might be indistinguishable and used interchangeably, the literature argues there is a difference. Although some researchers acknowledge a degree of difference between groups and teams, some still use the terms interchangeably as a convenience [13]. Consequently, much literature around teams and autonomous teams is represented by research on groups, workgroups, and teams. The study in hand recognizes the difference between groups and teams but will, nonetheless, use the term teams throughout the paper.

*Table 1: Differences between groups and teams according to Katzenback & Smith [15]*

<b>Group</b>	<b>Teams</b>
Strong, clearly focused leader	Shared leadership roles
Individual accountability	Individual and mutual accountability
The group's purpose is the same as the broader organizational mission	Specific team purpose that the team itself delivers
Individual work-product	Collective work-products
Runs efficient meetings	Encourage open-ended discussions and active problem-solving meetings
Measure its effectiveness indirectly by its influence on others (such as financial performance of the business)	Measures performance directly by assessing collective work products
Discusses, decides, and delegates	Discusses, decides, and does real work together

One is used to hear teams are superior to individuals, with phrases like “*talent wins games, but teamwork win championships*”, “*alone we can do so little, together we can do so much*”, “*none of us is as smart as all of us*” and “*the whole is greater than the sum of its parts*”. Unfortunately, it is not an easy task to create a team. Individuals organized in groups don't automatically increase productivity, which means something else is needed [14]–[17]. Bruce Tuckman proposed the *forming-storming-norming-performing* model, with four inevitable phases for teams [18], which indicates that teams start performing after a set of learning and growth phases. Teams first start as groups, merely a collection of individuals, and require dedicated activities and processes to develop the team into a coherent, collective entity with a high degree of interdependence [19]. Creating teams requires investment from the organization, leaders, and team members, but modification to the team design and composition will also require effort. New individuals will need to be trained, socialized, and conform with the team before becoming team members. Onboarding new members into a *performing* team will require effort and might give the team a setback while new team members *conform* [20]. This highlights that effective teams and teamwork require significant effort when launching a team *and* throughout the entire teams' lifespan.

As onboarding requires investment from organizations, one can ask what's the optimal headcount, or size, for teams? Although there is no exact answer regarding team size, research indicates that the need for coordination and communication increases with the number of team members. At some point, the team will not perform optimally due to the cost of these factors [14], [16]. This indicates that smaller teams will tend to be more effective than big teams. Some research backs this claim, as Rodríguez et al. [21] suggest that productivity decreases for teams with nine or more members, while Katzenbach & Smith [15] states most effective teams have fewer than ten members. However, Weiss & Hoegl [22] argues that headcount is not an appropriate measure for teams and suggest using *relative team size*, which considers the tasks and goals for the team.

## 2.2 Autonomous Teams

Autonomous teams, sometimes referred to as self-managed teams, empowered teams, or self-directed teams [23], have been around for several decades and were already researched in the 1950s [24]. Cohen, Ledford, & Spreitzer defined self-managing teams as “groups of interdependent individuals that can self-regulate on relatively whole tasks” and emphasizes the interdependence between the individuals and the freedom to choose work assignments, work methods, and work sequence [25].

Autonomous teams have distributed the responsibility and authority within the team and are distinguished from traditional teams by the decision-making process [26], [10].

Autonomous teams postulated to be more effective and increase satisfaction compared to traditional teams, mainly based on two characteristics: 1) Autonomous teams can self-regulate and adapt to changing situations, and 2) autonomous teams share power and rewards, which leads to higher motivation [8], [27]. Patanakul et al. found that autonomous teams perform better than regular teams in high novelty fields and with radical innovations [28].

However, studies on autonomous teams in the '80s and '90s showed conflicting results on the effects of autonomous teams on productivity, turnover, attitude, and morale [13]. Cohen and Ledford predicted that autonomous teams would increase effectiveness, but their quasi-experiment suggested the opposite [27]. They also argued that work and task design must be

formed for autonomous teams, and therefore that autonomous teams are not suitable in all conditions. Stewart found a moderately strong relationship between team autonomy and performance, which supports previous research on the positive effects of autonomous teams [29]. However, Stewart also highlighted the need to better understand the “environmental conditions” for autonomous teams [29].

Langfred acknowledged the importance of trust and autonomy to be essential in autonomous teams [10].

### **2.2.1 Autonomy**

Janz et al. defined autonomy as the “extent an individual or group of individuals has the freedom, independence, and discretion to determine what actions are required and how best to execute them” [23]. Their research also suggested that increased autonomy improved the satisfaction and motivation of individuals in teams. As autonomy improves internal motivations for teams, it also leads to better performance [27].

Stewart described autonomy as “how tasks are coordinated with other parts of the organization”, where more autonomy increases the discretion “to make decisions, to plan work activities, and to adapt to changing conditions” [29].

In the context of autonomous teams, autonomy can be categorized into two levels: 1) Individual autonomy and 2) team autonomy [30], which fits Janz et al. definition of autonomy, as it mentions both “*individual or group of individuals*”.

Langfred [30] suggested that autonomy is not an *either-or* state for teams but rather a continuum where the *degree of autonomy* varies from team to team. The concept of autonomy as a continuum is illustrated in Figure 1. Langfred also argued that teams could be categorized into four types based on the autonomy continuum. Type 0 refers to the traditional teams, while type 1 – 3 are related to autonomous teams in some form, while the design varies [30].

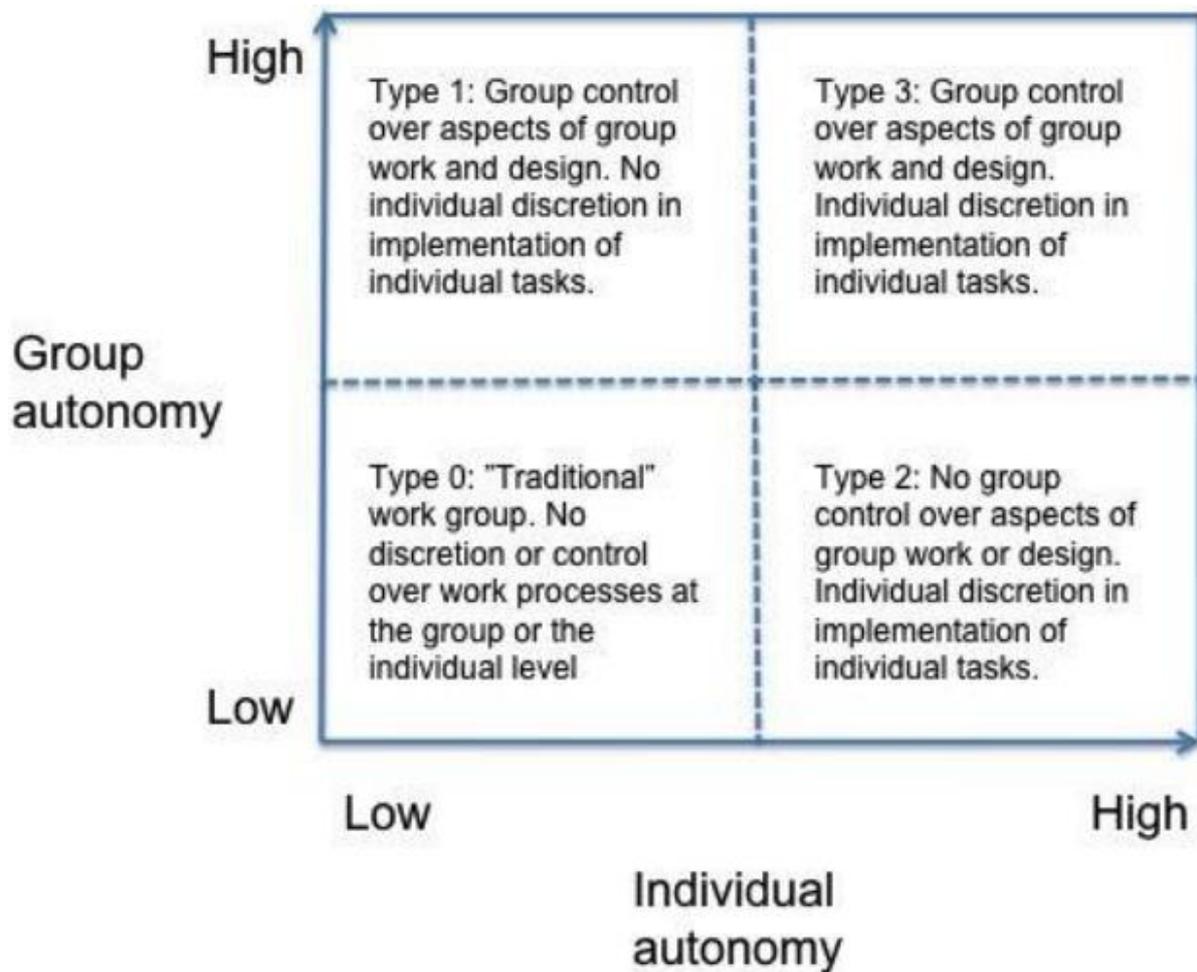


Figure 1: Types of autonomous teams designs (Langfred. 2000) [30]

The relationship between the two levels of autonomy in teams has been studied before, with a mixture of results. Some studies found that team autonomy enhances individual autonomy [31], [32], while Barker [33] argued that increased team autonomy would ramify individual autonomy.

Jønsson and Jeppesen found that individuals that experienced higher team autonomy also experience higher individual autonomy [34], supporting a positive relationship between team autonomy and individual autonomy. Van Mirelo et al. found that social support (i.e., the relationship between co-workers and managers) was a moderator for the relationship between individual and team autonomy [35]. The study from van Mirelo et al. suggested that high social support would increase team autonomy while suppressing individual autonomy. However,

Jønsson and Jeppesen could not conclude that social support moderates the relationship between individual and team autonomy [34].

Stewart and Barrick argued that “an increased dependence on others requires the sacrifices of individual autonomy”, and in general that low interdependence results in team members operating as individuals [36, p. 4]. On the other hand, greater interaction can develop cohesiveness in teams and decreasing individual autonomy. The same study also argues that team autonomy increases individual autonomy, as control is decentralized and team members can adjust their behavior according to team processes [36].

Langfred found a positive relationship between team autonomy and team cohesiveness, while individual autonomy and team cohesiveness was negatively related [30]. Team cohesiveness has been argued to enable teams to self-manage and become autonomous teams [5].

## 2.3 Virtual Teams

Bell and Kozlowski [5] defines virtual teams based on two characteristics: a) spatial distance and b) information, data, and personal communication. While conventional teams meet face-to-face regularly and are within a proximal, spatial distance, virtual teams are distributed and do not meet face-to-face regularly. Virtual teams use technology and information systems to share information and communicate to cope with the spatial distance.

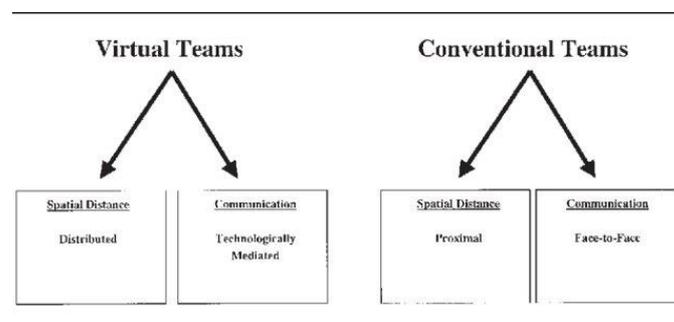


Figure 2: Virtual and conventional teams (Bell and Kozlowski, 2002) [5]

The nature of virtual teams makes it possible to attract the right competency and skillset as they are not limited to physical presence. This has made virtual teams popular over the last two decades and even more attractive due to COVID-19.

Hoegel and Muethel observed that virtual teams are “a different kind of work organization, requiring different roles for team leaders and members” [37, p. 10].

“In the context of the purely virtual team, researchers have often suggested these teams are autonomous or lack a formal leader (c.f. Balthazard et al. 2004)” [38].

Hoegel and Muethel highlight that leaders will lack awareness in virtual teams compared to conventional teams, both concerning task statuses and indicators of issues and troubles. This leads to a necessity to trust the team members and enable them to become more self-reliant.

## 2.4 Team Leadership

Team leadership is a critical factor in team effectiveness [5], [39], although team leadership should vary based on team conditions. New teams are more in need of a direct team leader than mature and experienced teams, and while teams become more mature, team leaders can go from a delegating role to an observing role and take actions if needed [14], [16]. In already mature and experienced teams, the role of the team leaders will be more of a facilitator to enable and empower the team to perform [14], [16], as Manz and Sims stated, the leaders' role “is to lead others to lead themselves” [40, p. 14].

Leaders still have an essential role in autonomous teams, even though the premises for leadership in traditional teams have changed with the increased autonomy and distributed authority. Stray et al. states that leaders in autonomous teams should focus on four aspects: 1) setting team direction, 2) enable the team to set self-established team norms, 3) help the team to *learn to learn*, and 4) coach the team and team members [41]. By not focusing on these four aspects, leaders start demanding detailed reports from the team, which is “detrimental to the teams' autonomy” [41, p. 3].

Several studies highlights *shared leadership* as a key component in autonomous teams [14], [16], [37], [42]–[44].

Barry defined in 1991 shared leadership in autonomous teams as “a collection of roles and behaviors that can be split apart, shared, rotated, and used sequentially or concomitantly” [45, p. 5].

In traditional teams, leadership functions are expected by one individual, often an external leader. Functions like shared mental models, establishing behavioral and performance expectations, monitor internal and external environments are expected to be executed by a team leader [46]. However, with shared leadership, these functions are not set to one individual but instead shared between team members. Moe et al. [43] stated that shared leadership is essential for team autonomy and argues that knowledge, skills, and abilities for the given task should determine the leader.

It is argued that shared leadership is effective based on two assumptions: 1) The natural selection will emerge the most qualified member to take the given leadership responsibility, and 2) the team itself is in the best position to determine who should be given the leadership responsibility [47]. Research has found a positive relationship between trust and shared leadership [48], [49], and that shared leadership would positively influence team creativity [42]. Shared leadership is also recognized to unlock the team's potential and improve innovative, financial, and competitive advantages [37]. However, shared leadership also requires more from the team members regarding skillset and competency, as leadership is rotated and distributed [43]. Some leaders are reluctant to enable shared leadership within teams, even though the team members feel ready for the leadership responsibility [37]. By restraining shared leadership in mature teams, team autonomy may be damaged and consequently also jeopardize team performance [37]. Leaders can enable shared leadership by becoming a servant-leader and act as a facilitator for the team [37].

Both autonomous and virtual teams may or may not have a designated leader [50]. The context of virtual teams, where team members and leaders are physically separated, requires team members to self-manage and are responsible for structuring work processes, coordinate interdependent tasks, and acknowledge individual differences in team members [50], [51].

Bell and Kozlowski state that the characteristics of virtual teams obstruct the team leaders' ability for performance management and team development [5]. They also argued to distribute the leaders' functions to the team and enable shared leadership, highlighting the importance of monitoring their own performance rather than the team leader. One of the crucial functions for team leaders of virtual teams is to provide a clear direction with individual goals, as the individual can with ease self-regulate. Therefore, it is expected that team leaders of virtual teams will design autonomous teams by empowering team members [5].

### **2.4.1 Control and monitoring**

Monitoring team behavior, team performance, and team progress are vital functions of the team leader [5], and managerial control to be essential to performance management [52]. Control can be defined as “the organization's attempt to increase the probability that employees will behave in ways that lead to the attainment of organizational goals” [52, p. 1]. From this point of view, control and monitoring seem to have a positive intention, both by the organization and the managers.

Research by Henderson and Lee [52] suggests that team leaders at effective teams should perform behavior control, rather than outcome control, and Piccoli and Ives [53] found that behavior control mechanisms such as reports and directly delegation of tasks were linked with a reduced trust between team members and the team leader. Trust is considered an essential component for team success. A comprehensive study at Google found that trust and psychological safety were crucial in the most effective and successful teams at Google [54]. Moe et al. [55] found that managerial control could obstruct autonomy, as the teams are supposed to have the discretion to control themselves.

Autonomous teams give the autonomy and discretion to control their behavior and establish their own control and monitoring systems to a significant degree. By empowering the teams to decide control mechanisms, the teams get empowered to achieve desired outcomes and increased performance [8].

High-performing autonomous virtual teams have a high degree of shared leadership and use this shared leadership to monitor their behavior [44].

## 2.5 COVID-19

In December 2019, the Wuhan Municipal Health Commission reported several cases of viral pneumonia in Wuhan, People's Republic of China, and the World Health Organization (WHO) was later informed [56]. In January 2020, it was confirmed that the pneumonia was caused by a novel coronavirus [57] and got the more common name *COVID-19*. WHO declared COVID-19 as a pandemic on the 11<sup>th</sup> of March 2020, and within days, offices around the world were closed for employees, and WFH was the new normal for the global workforce. One report assessed that “81% of the global workforce is affected by full or partial workplace closure” [58], and another report from the European Commission (EU) shows that 48% of the respondent of their e-survey worked to some degree from home [59]. In contrast, 34% worked exclusively from home [59]. The uses of WFH before COVID-19 varied a lot based on countries and industries, but now many conventional teams needed to shift to virtual teams in a rush.

WFH can be defined as employees working outside company offices and have four characteristics: (1) a person who is an employee of a company or a staff member of an organization; (2) actual work engagement with a company or an organization on specific tasks; (3) work being performed outside the company's physical premises; and (4) telecommunication with the employer [60, p. 19]. Previous literature has used *telecommuting* and *remote work*, and WFH can be considered a synonym for these terms. The association between WFH and virtual teams is also prominent.

## 2.6 Hypothesis Development

The starting hypothesis is based on the personal observation described in section 1.2 of this study; leaders and managers feel a lack of control, insight, and overview due to COVID-19 and the WFH situation. The dilemma is to increase control to get more insight and overview, but with a reduced level of coordination and trust with team members and within the team [6]. Virtual team leaders will lack awareness compared to conventional teams, both regarding task statuses and indicators of challenges [37]. Control and monitoring are traditionally viewed as

vital functions for leaders to ensure progress towards organizational goals. Therefore, the leading study hypothesis is:

**Hypothesis 1 (H1):** *The level of control from leaders and managers have increased during COVID-19 and WFH*

Furthermore, research argues an increased level of control, report, and monitoring will reduce coordination and autonomy in teams [7], [41], [55]. As previously mentioned, autonomy can be categorized as both individual autonomy and team autonomy. Based on H1, the following hypothesis are generated for autonomy:

**Hypothesis 2a (H2a):** *The level of individual autonomy has decreased during COVID-19 and WFH*

**Hypothesis 2b (H2b):** *The level of team autonomy has decreased during COVID-19 and WFH*

### 3. Methodology

This section will outline the methodologies used, the research design, how data was gathered, and its analysis.

#### 3.1 Research Design

The study's objective is to answer the research question with assistance from the hypothesis. A quantitative method was conducted to get a broad overview of the effects of WFH on autonomy, control, and monitoring. Quantitative research is suitable for exploratory studies, like testing if managerial control has increased during remote work and reduced autonomy. Also, questionnaires provide data from the present, which ensures pertinent data for analysis. By using Likert-scales, questionnaires are well fitted for graded answers and measuring personal, perceived opinions. These aspects work well to explore the research question “How has WFH affected control and monitoring and teams’ autonomy?”.

Inferential statistics are used to test the hypotheses based on the sample data. Mutually exclusive hypotheses are used for hypothesis testing. Null -and alternative hypotheses was derived from the study hypothesis, H1, H2a, H2b. An alpha value of 0.05 ( $\alpha = 0.05$ ) is common [61] in behavioral sciences and will be used as critical values in this study in order to reject the null hypothesis. However, the significant values should not be rigid when interpreting the data, and the probability values (p-values) calculated from observed sample data should be used as evidence against the null hypothesis [61]. Descriptive statistics will also be used to discuss and interpret the results. The quantitative analysis has been performed with Python and Jupyter, with libraries such as Numpy, Pandas, Matplotlib, Scipy, Statsmodels, and Seaborn.

The quantitative data gathered in this study is collected through questionnaires, as seen in the appendix, from different sources. The questionnaires were designed specifically for this thesis in Microsoft Forms and were active for 52 days, between 10.03.2021 – 01.05.2021.

The primary target population is individuals working in teams and who have been working from home during COVID-19. There is no specific sector, industry, or background for the

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target population, which effectively makes anyone working remotely in teams worldwide part of the target population. However, the data sources and the data sample in this study are biased towards some industries and countries, which must be considered when interpreting the data. Section 4.1 describes this in more detail.

The questionnaire contains logic to assist the data quality collected. As the target population is those working in teams and been affected by WFH after COVID-19, two questions with specific alternatives were introduced to filter out those not working in teams and those who have not been WFH:

- 1) *How long have you worked in your current team?*
- 2) *In general, after COVID-19, how many days in the week are you working from home?*

If the respondents answered either “*I don’t work in any team*” to question 1) or “0” to question 2), they would immediately be redirected to the end of the questionnaire without providing any more data. These respondents are also excluded from the analysis and categorized as *invalid respondents*.

Table 2 shows the number of valid respondents, which is the difference between the total respondents and the invalid respondents.

The questionnaire has three primary constructs linked to the research questions and hypothesis: 1) Individual autonomy, 2) team autonomy, and 3) control and report. Construct's intend to measure specific themes or categories in a questionnaire with a given subset of questions [62].

The study conducted a quantitative data collection by surveying three different companies and public forums, using convenience sampling. Convenience sampling is a non-probability sampling where members of the target population that meet specific criteria are included in the study [63]. The inclusion criteria for this thesis is described above, and aims to only have valid respondents in the sample data as part of the target population.

The variables *control and reporting*, *individual autonomy*, and *team autonomy* are the latent variables. The survey for gathering quantitative data contains Likert scales for each latent variable and is formulated in a disagree/agree manner (see the appendix).

## 4. Results and analysis

### 4.1 Data Sources

There are four different sources for data gathering in this study; *public*, *a financial company*, *an energy company (within the oil, gas, and offshore)*, and *a start-up/scale-up company*.

The table below highlights the data points gathered from the different sources.

*Table 2: Data Sources*

Source	Alias	Total Respondents	Valid Respondents (VR)	VR (%)
Public	Source A	62	54	87,1%
Financial Company	Source B	117	113	96,6%
Energy Company	Source C	396	356	89,9%
Start-up	Source D	11	10	90,1%
<i>Total</i>		<i>586</i>	<i>533</i>	<i>90,1%</i>

The sources are mainly Norwegian and mainly within IT or Financial. This makes the data gathered from the different sources biased and not a clear representation of the population.

#### 4.1.1 The Public Source

The public sources are respondents from either Reddit or LinkedIn. The questionnaire was distributed in different communities on Reddit, a social media platform with around 52 million active users and over 100.000 different communities. Most of the active users are from the US, with the UK, Canada, Australia, and Germany having a distinguished number of users [64].

By distributing the questionnaire on Reddit, the data gathered will reach a greater audience, which will assist with diversity in the sample data. Two communities where the questionnaire was published and worth mentioning are *r/remotework* and *r/agile*. The community *r/remotework* has over 11.000 users and “is a place for teams, companies, and individuals who

want to share about working remotely or in distributed teams”<sup>1</sup>. In comparison, *r/agile* has over 36.000 users engaging in agile development and methodologies<sup>2</sup>.

The questionnaire was also distributed on the social media platform LinkedIn. LinkedIn is a platform for professionals to connect and stay connected with their networks. It is used to share job status, professional relationships, experiences, and education. Users also actively share events, articles, and posts in a professional context<sup>3</sup>. By publishing the questionnaire on my LinkedIn profile, the data gathered will be biased towards my professional network.

### **4.1.2 The Financial Company**

The financial company, now referred to as source B, is a prominent Norwegian firm with more than 5000 employees. The company offers financial services all over Norway, as well as some places abroad.

The company is focusing on implementing an agile mindset and autonomous teams. As part of the company's size, there are several different sections and divisions in the organization that spans from pure technology and IT sections to pristine financial sections and cross-functional teams and department, which consists of a mixture of skills and functions.

### **4.1.3 The Energy Company**

The energy company, referred to as source C, is a significant engineering company from Norway. They provide services worldwide.

The energy company is primary organized in temporary project-based teams and working closely with their customers. The questionnaire was mainly distributed to the back-office employees and managers, excluding the field technicians, as they primarily have not been working from home due to their nature.

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<sup>1</sup> <https://www.reddit.com/r/remotework/>

<sup>2</sup> <https://www.reddit.com/r/agile/>

<sup>3</sup> <https://about.linkedin.com/>

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#### 4.1.4 The Start-Up Company

The start-up company, referred to as source D, is a successful start-up established in the mid-2010s. The company offers a Software-as-a-Service (SaaS) to their customers and is currently expanding as part of their success. They had around 30 employees when the survey was conducted but are expected to be approximately 40 employees after this report.

## 4.2 Quantitative Data

The questionnaire's objective was to get data on how autonomy and relationship to managers have been affected during COVID-19 and WFH. A total of 533 valid responses got collected, which alone is a decent sample size to represent the population. However, as the target population is anyone working in teams worldwide, the data is biased to Norwegian employees and within three different industries: 1) Banking and Finance, 2) Technical Services (The Energy Company), 3) Information, Technologies, and Software.

### 4.2.1 Independent and dependent variables

*Individual autonomy, team autonomy, and control and report* are the scores interesting in this study and thereby the dependent variables. To measure the perceived effects on individual autonomy, the following questions were asked:

*Compared with my work situation before COVID-19, I feel...*

1. *I've more control over my schedule*
2. *I've more control of the sequence of my activities*
3. *I've more freedom on how to get my work done*

And to measure the perceived effects on team autonomy, these questions were asked:

*Compared with my work situation before COVID-19, I feel...*

1. *My team have more control over the scheduling of teamwork*
2. *My team have more control on when to perform activities*
3. *My team have the freedom to decide how to go about getting the work done*

Similarly, the questions asked to measure the perceived effects on the level of control and reporting:

*Compared with my work situation before COVID-19, I feel...*

1. I'm being followed closer up by my leaders and managers
2. I'm attending more meetings with my leaders and managers
3. I'm reporting more to my leaders and managers

The alternatives are designed as a five-point Likert scale, with *Totally Agree*, *Slightly Agree*, *Neutral*, *Slightly Disagree*, *Don't Agree at all*, and *Don't Know* as the alternative for each question. These alternatives are converted to numerical numbers for statistical analyses. The conversion is illustrated in Table 3.

*Table 3: Likert Conversion Scale*

<i>Alternative</i>	<i>Numerical Score</i>
Don't know	0
Don't Agree at all	1
Slightly Disagree	2
Neutral	3
Slightly Agree	4
Totally Agree	5

*Cronbach's Alpha* is the dominant measure of reliability (the consistency of the measures) in psychology and social sciences, and is calculated by the following equation:

$$\alpha = \frac{n\bar{r}}{1+\bar{r}(n-1)},$$

where  $n$  is the number of items (questions), and  $\bar{r}$  is the average intercorrelation between the items.

Cronbach's Alpha indicates how consistent the group (respondents of the questionnaire) scores different questions within a category. Therefore, the alpha value is fit to describe reliability within other constructs (category) of questions, but not as an overall value for the questionnaire [65].

A Cronbach alpha score over 0.7 is commonly considered to be acceptable for the internal reliability of constructs. However, a very high alpha value doesn't necessarily express *excellent* reliability but might instead indicate "an inefficient level of redundancy" of questions [65][66].

It is also worth mentioning that, based on how Cronbach alpha is calculated, one can increase the alpha score by introducing more questions to each construct. This might, however, increase the inefficiency and unnecessary redundancy of questions in the questionnaire.

This study will follow the widespread practice where an alpha value over 0.7 is considered acceptable, although there is no absolute threshold for a sufficient alpha value. Table 4 presents the different Cronbach's Alpha for each relevant construct in this study.

*Table 4: Cronbach's Alpha score*

<i>Source</i>	<i>VR</i>	<i>Individual autonomy</i>	<i>Team autonomy</i>	<i>Control and report</i>
Source A	54	0.7358	0.7724	0.7542
Source B	113	0.8455	0.7854	0.7811
Source C	356	0.8649	0.8156	0.8506
Source D	10	0.4246	0.8644	0.8070
Total	553	0.8485	0.8087	0.8243

*Note: VR (Valid Respondents)*

As part of solving the research question, three study hypothesis was created:

**Hypothesis 1 (H1):** *The level of control from leaders and managers have increased during COVID-19 and WFH*

**Hypothesis 2a (H2a):** *The level of individual autonomy has increased during COVID-19 and WFH*

**Hypothesis 2b (H2b):** *The level of team autonomy has increased during COVID-19 and WFH*

Z-test will be used to test these hypotheses statistically, besides for source D, where the sample size is significantly less than the others ( $n_D = 10$ ). T-test will be used for the hypothesis testing on the data from source D. To be able to perform z-tests and t-tests, one needs to test two mutually exclusive statements; the study, or alternative, hypothesis (presented above) and the null hypothesis, which implies that there are no effects from COVID-19 and WFH.

To test these mutually exclusive statements statistically, one will consider the mean value from the sample size. The respectively null hypothesis and alternative hypothesis will be represented as:

$$\mathbf{H1_0} : \mu = 9$$

$$\mathbf{H1_A} : \mu > 9$$

$$\mathbf{H2a_0} : \mu = 9$$

$$\mathbf{H2a_A} : \mu < 9$$

$$\mathbf{H2b_0} : \mu = 9$$

$$\mathbf{H2b_A} : \mu < 9$$

The z-test and t-test will return a p-value used to interpret the data and indicate if there is enough evidence to reject the null hypothesis of a stationary level (no perceived change) within

the different constructs. Table 5 shows the p-values from the hypotheses testing. Table 6 shows the mean scores with the standard deviation in parenthesis for the different constructs. Figure 5, Figure 3 and Figure 4 illustrate the distribution for each construct with the mean and standard deviation. Table 7 shows the mean, standard deviation, Cronbach's alpha score, and Pearson's correlation coefficients between the constructs for the total sample data.

*Table 5: P-value from the z-test and t-test*

	Source A	Source B	Source C	Source D*	Total
Control & Report	0.852	0.783	0.965	0.349	0.984
Individual Autonomy	1.000	1.000	1.000	1.000	1.000
Team Autonomy	0.993	1.000	0.974	0.559	1.000

\* T-test performed due to small sample size ( $n_D = 10$ )

*Table 6: Mean and Standard Deviation (in parenthesis)*

	<i>Individual Autonomy</i>	<i>Team Autonomy</i>	<i>Control and Report</i>
<i>Source A</i>	11.04 (2.31)	10.07 (3.20)	8.57 (2.99)
<i>Source B</i>	11.33 (2.85)	10.40 (3.06)	8.77 (3.13)
<i>Source C</i>	10.65 (2.85)	9.29 (2.85)	8.71 (3.01)
<i>Source D</i>	11.80 (1.75)	9.20 (4.16)	9.30 (2.36)
<i>Total</i>	10.85 (2.79)	9.60 (2.99)	8.72 (3.02)

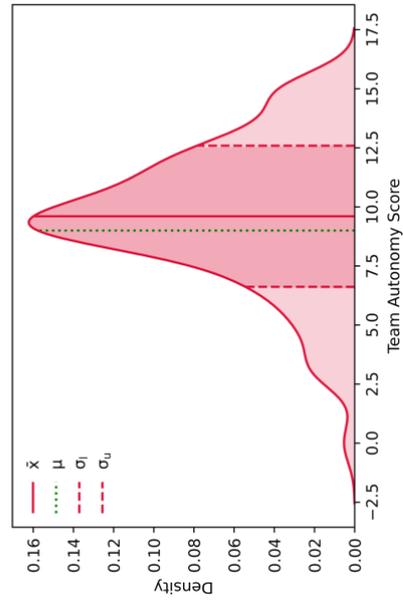


Figure 4: Team Autonomy Distribution (Total)

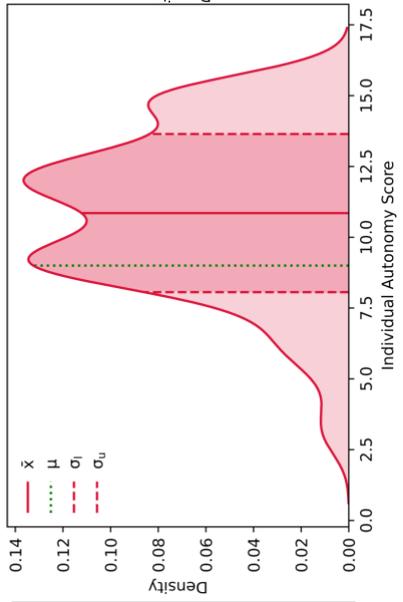


Figure 5: Individual Autonomy Distribution (Total)

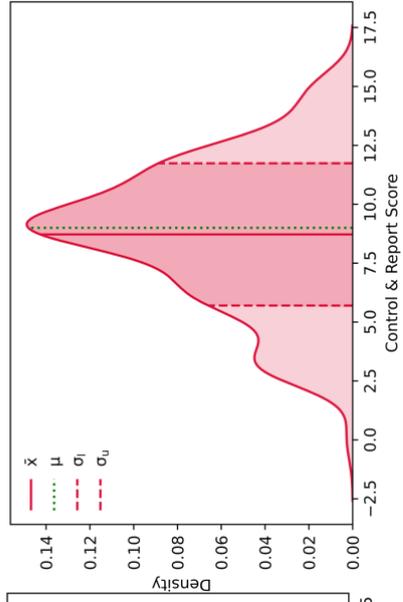


Figure 3: Control & Monitoring Distribution (Total)

*Table 7: Means, Standard Deviation and Correlation Matrix (Total)*

	Mean	Std	Alpha	1	2	3
1. Control and Report	8.72	3.02	0.82			
2. Individual Autonomy	10.85	2.79	0.85	0.30		
3. Team Autonomy	9.60	2.99	0.81	0.30	0.59	

*Note: Pearson's correlation coefficient is used*

## 5. Discussion

### 5.1 The sample and data gathered

The sample total sample size is 533 ( $n = 533$ ), from four different sources: A) A public forums ( $n_A = 54$ ), B) a financial company ( $n_B = 113$ ), C) an energy company ( $n_C = 356$ ), and D) a technology start-up ( $n_D = 10$ ).

Table 7 shows the means, standard deviation, and correlation matrix for the total data sample. As for the survey design, one would expect a mean value of 9.00 if the participants didn't experience any changes from the work environment before COVID-19 and the current WFH environment after COVID-19. The mean value of 9.00 will sometime be referred to as "the stationary value", as it indicates that the perceived effects have been stationary during COVID-19. Scores greater than 9 indicate an increased level for the given construct, while scores below 9 indicate a reduced level.

The control & report construct has a mean of 8.72, indicating that people feel less controlled and monitored, although it is close to the stationary score of 9. The perceived level of individual autonomy has increased significantly, with a mean score of 10.85. At the same time, team autonomy also has increased, but not to the same extent, with a mean score of 9.60.

By only assessing the mean scores from the total sample size, the relationship between control & monitoring and autonomy seems to align with the study hypotheses, as the reduced level of control enables greater autonomy. However, by assessing the correlation matrix, it is not that clear.

Both individual autonomy and team autonomy have a Pearson's correlation coefficient of 0.30 with the control & report construct. This indicates a low to moderate positive relationship. One would expect a negative relationship between the constructs based on the study hypotheses and previous research. It is worth noticing that there is a moderate to a high positive relationship between individual autonomy and team autonomy, with a correlation coefficient of 0.59.

Research on the relationship between individual and team autonomy has mixed outcomes. The results from this study suggest a strong, positive relationship, which supports the previous research done by Batt [31], Niemelä and Kalliola [32], and Jønsson and Jeppesen [34], while contradicts the research by Barker [33].

Some research found that control and monitoring function can reduce trust between team leaders and team members [6], [53], and Enzle and Anderson [7] suggested that increased control and monitoring threatened individual autonomy. Stray et al. [41] highlighted four aspects that were critical to avoid negative consequences for team autonomy, and several researches states that shared leadership is essential for team autonomy [37], [42]–[44]. While shared leadership and autonomy will grant more discretion in how to control and monitor themselves (teams and team members), the questionnaire and data in this study measured control and monitoring from managerial positions. One would assume that teams were managers that reduced the control and monitoring during WFH would increase autonomy and trust based on mentioned research. That managerial control and monitoring have a positive relation (although small) may be result of managers actually meeting team members need for monitoring. Monitoring functions that are not felt as controlling will not decrease individual motivation [7]. Also, as Stray et. al suggested four aspects to be critical for team autonomy, managers can have done a good job focusing on these aspects prior to WFH and therefore acting more like a coach than a manager. This may be some explanation for the unexpected positive relationship between control & monitoring and autonomy, although it was only a slight relationship.

Both z-test and t-test have been conducted to statistically determine whether the null hypothesis stands or can be disregarded with the study hypothesis.

Table 5 shows the p-values after hypothesis testing. As indicated from the descriptive statistics in Table 7, the proposed study hypothesis is incorrect. The p-values from the hypothesis testing clearly state this as well, as most of the p-values are above 0.78. Both the descriptive statistics and hypothesis testing indicated that the study hypothesis is inversed. As part of this observation, it would be interesting to see if this can be proven statistically. Therefore, the following hypotheses are formulated to accumulate for these observations.

**Hypothesis 3a (H3a):** *The level of control from leaders and managers have decreased during COVID-19 and WFH*

$$\mathbf{H3a_0} : \mu = 9$$

$$\mathbf{H3a_A} : \mu < 9$$

**Hypothesis 3b (H3b):** *The level of individual autonomy has increased during COVID-19 and WFH*

$$\mathbf{H3b_0} : \mu = 9$$

$$\mathbf{H3b_A} : \mu > 9$$

**Hypothesis 3c (H3c):** *The level of team autonomy has increased during COVID-19 and WFH*

$$\mathbf{H3c_0} : \mu = 9$$

$$\mathbf{H3c_A} : \mu > 9$$

The same one-sided z-tests and t-tests are performed to test these new hypotheses, and the p-values are presented in

Table 8.

*Table 8: P-values for the new hypothesis (H3a, H3b, and H3c)*

	Source A	Source B	Source C	Source D*	Total
Control & Report	0.148	0.217	0.035	0.652	0.016
Individual Autonomy	0.000	0.000	0.000	0.000	0.000
Team Autonomy	0.007	0.000	0.026	0.441	0.000

\* T-test performed due to small sample size ( $n_D = 10$ )

Table 8 shows, the p-values are significantly smaller, which indicates that the hypotheses H3a, H3b, and H3c are valid, and the respective null hypothesis can be rejected.

*Table 9: Results of hypothesis with alpha 0.05 and 0.01 for total sample size*

	P-value	$\alpha = 0.05$	$\alpha = 0.01$
H1	0.984	Not Supported	Not Supported
H2a	1.000	Not Supported	Not Supported
H2b	1.000	Not Supported	Not Supported
H3a	0.016	Supported	Not Supported
H3b	0.000	Supported	Supported
H3c	0.000	Supported	Supported

As Table 9 illustrate, the modified study hypotheses are all supported with a significant level equal to 0.05, while hypotheses H3b and H3c are even supported with a significant level equal to 0.01. This provides strong support for that individual autonomy and team autonomy have increased during COVID-19 and WFH. While the same results support that control and monitoring have decreased during COVID-19 (H3a), it is not nearly as clear as the results for increase autonomy (H3b and H3c). In fact, with 10-digit precision, the p-values for H3a, H3b, and H3c are respectively 0.0162367389, 0.0000000000, and 0.0000015067.

The results from the modified study hypotheses also corresponds with the interpretation of mean values from the sample data, where there observed mean value for control and monitoring were slightly below the stationary, null-hypotheses mean (9.00), while for both individual and team autonomy, the observed mean value was significantly above the null-hypothesis mean.

## 6. Conclusion

This study sheds light on how control and monitoring have changed after COVID-19 and how WFH has affected individual autonomy and team autonomy. By analyzing questionnaire data from three Norwegian companies and some public forums, it is clear that control and monitoring from management have decreased, and both individual and team autonomy have increased. Previous research has mixed results on these matters, and these findings were the opposite of the study hypotheses.

### 6.1 Limitations

The study uses a quantitative method by distributing a survey on different public forums and three Norwegian firms, and the aim to so measure changes in the three constructs *1) control and monitoring*, *2) individual autonomy*, and *3) team autonomy*.

When using a convenience sampling method, discussion and conclusion of the results need to cater for this. With convenience sampling, several variables may clutter the results and the latent variables/independent variables. The participants who are partaking in the questionnaires are volunteers, which means the sample is excluding individuals not willing to volunteer in the survey. Also, the results and sample data are biased towards the Norwegian market, as three of the sources in the sampled data are Norwegian companies, and the public sources will have a higher distribution of Norwegian participants than the rest of the world.

Convenience sampling will provide a sample mean biased towards the Norwegian workspace, even more against two specific firms in Norway. As such, the sample mean will not represent the population mean.

These limitations make it hard to generalize but instead give indications and suggestions for further work.

## 6.2 Suggestion to further work

As the analysis from the sample data in this study provides precise results, it must be considered against the limitation described in the Limitations section. Therefore, this study should be used as an indication that control and monitoring have been reduced with WHF and autonomy increased. To be able to generalize based on these indications, more comprehensive studies such be performed. Especially studies with more random sample sizes and over more prominent regions.

Suggestion to further work is to look closer into the direct relation between control and monitoring against individual and team autonomy. As this study shows that control and monitoring have been reduced, and at the same time autonomy has increased, it does not imply a direct relationship between control and monitoring and autonomy.

Also, one should use different data sources, not only questionnaires, in further work. As questionnaires are based on respondent's perceptions, it would be advisable to also explore the same topic with more reliable and concrete data. For example, control and monitoring can be measured by the number of meetings, reports, and follow-up meetings with managers.

To also get more details and knowledge about how the respondents have perceived the changes with WFM, a qualitative study or a mixed study should be performed. The result from previous qualitative studies, like this study, can form semi-structured interviews.

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# APPENDIX

Norsk bokmål (Norge) ▼

## Appendix A

This survey will look closer into the effect of COVID-19 and the work-from-home (WFH) situation on team members, teams, and autonomy. The survey consists of 16 questions and is estimated to take 6-9 min.

The survey will ask questions about your perception of the current WFH situation compared to prior COVID-19 and WFH. Try to answer as best honestly as possible.

The survey is anonymous. The data collected will only be used in an MSc thesis at the University of Stavanger. By proceeding, you accept that the answers will be used for academy research.

\* Obligatorisk

### Individual and team questions

To better understand this survey result, we will ask some questions regarding yourself and your team. If no answer fits you well, please answer the closest fit or the first thought to mind.

#### 1. Which industry/sector are you working in? \*

- Agriculture, Forestry, Fishing and Hunting
- Construction and Manufacturing
- Information, Technologies and Software
- Real Estate and Rental and Leasing
- Professional, Scientific, and Technical Services
- Educational Services
- Health Care and Social Assistance
- Banking and Finance
- Governmental
- Annet

#### 2. What is your job title? \*

Skriv inn svaret

3. Where do you sit in the organization with regard to management? \*

- Top Mangement
- Middle Management
- First-line Management
- Non-managerial

4. Which of the following best describes your tenure in your current role? \*

- Less than 1 year
- 1 - 2 years
- 3 - 4 years
- 5 - 8 years
- 9 or more years

5. How long have you worked in your current team? \*

- Less than 1 year
- 1 - 2 years
- 3 - 4 years
- 5 - 8 years
- 8 or more years
- I don't work in any team

6. In general, after COVID-19, how many days in the week are you working from home? \*

- 0

- 1
- 2
- 3
- 4
- 5 or more

7. How many team members are there in your team? (including yourself) \*

- 2 - 3
- 4 - 5
- 6 - 7
- 8 - 9
- 10 - 11
- 12 or more

8. How long has this team existed? \*

- Less than 1 year
- 1 - 2 years
- 3 - 4 years
- 5 - 7 years
- more than 8 years

9. How is your team organized? \*

- Permant
- Project-based
- Mixed
- Annet

## 10. How agile would you say your team is? \*

- Totally agile
- Very agile
- Some agile
- Not agile at all
- Don't know

[Neste](#)

Side 1 av 3

Utlever aldri passordet ditt. [Rapporter misbruk](#)

Dette innholdet opprettes av skjema-eieren. Data du sender inn blir sendt til skjema-eieren. Microsoft er ikke ansvarlig for personvernet eller sikkerhetspraksisene til kundene deres, inkludert de som eier dette skjemaet. Oppgi aldri passordet ditt.

Levert av Microsoft Forms |

Eieren av dette skjemaet har ikke angitt en personvernerklæring for hvordan de skal bruke svardataene. Ikke oppgi personlig eller sensitiv informasjon.

| [Brukervilkår](#)



leaders and managers

13. After COVID-19 and the WFH situation, I feel... \*

	Totally Agree	Slightly Agree	Neutral	Slightly Disagree	Don't agree at all	Don't know
I've more trust from my leaders and managers	<input type="radio"/>					
I'm more able to perform well at work	<input type="radio"/>					
I've become more productive at work	<input type="radio"/>					
my team has more trust from management	<input type="radio"/>					
my team has become more able to perform at work	<input type="radio"/>					
my team has become more productive at work	<input type="radio"/>					

14. In general, I feel the COVID-19 and WFH situation have... \*

	Totally Agree	Slightly Agree	Neutral	Slightly Disagree	Don't agree at all	Don't know
been positive for my work	<input type="radio"/>					
been positive for my teams work	<input type="radio"/>					

Tilbake

Neste

Side 2 av 3

Utlever aldri passordet ditt. [Rapporter misbruk](#)

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## Concluding questions

15. Would you like to add anything else to this survey? (not mandatory)

Skriv inn svaret

16. To better understand the result of this survey, we would like to interview some random respondents. If you are willing to be contacted for an interview, please provide contact details (mail address). If not, leave this field blank.

Thank you for your valuable time and feedback!

Skriv inn svaret

Tilbake

Send

Side 3 av 3

Utlever aldri passordet ditt. Rapportert misbruk

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