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The Power of Place: The Impact of Real Estate on Work Success When Working From Home

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Abstract

Work success of knowledge workers is of utmost importance for organizational performance. Nowadays, knowledge work is widely performed from outside the corporate office and remote work practices are increasingly becoming a new standard among knowledge workers. Researchers and practitioners are interested in the factors that influence productivity in the workplace at home when working from there. This study applies the job demands-resources model to investigate the effect of real estate parameters on productivity when working from home. Furthermore, the study holistically analyzes the relative importance of physical, organizational, and socio-psychological parameters on employees' work success. For that purpose, data from n = 502 knowledge workers from Germany and the United States are examined with partial least squares structural equation modelling (PLS-SEM). The results show a significant positive relationship between real estate parameters and knowledge workers' satisfaction and between satisfaction and productivity when working at home. Specifically, the housing conditions, the workplace environment, and the indoor environmental quality factors play a significant role. Furthermore, the results show that organizational resources have hardly any effect on satisfaction apart from skill variety. In contrast, socio-psychological demands have a strong positive effect on burnout. Surprisingly, burnout itself has a significantly positive effect on productivity. In conclusion, this study empirically shows the decisive effect of real estate parameters on the work success of knowledge workers working from home.

Keywords: Work from home, work success, productivity, job demands-resources model

1. Introduction

The organization of work, especially the spatial distribution of work, is subject to dynamic changes. The introduction of Information and Communication

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Technologies (ICTs) causes a high degree of flexibility in terms of where and when to work. Even before the COVID-19 pandemic, the increase in the proportion of employees working from home was evident. However, due to the COVID-19 pandemic, work from everywhere and especially work from home has been established for millions of employees worldwide. For example, empirical studies estimate that 25 – 30 % of private-sector employees in Germany can work from home (Kagerl and Starzetz 2023), whereas 37 – 41 % of jobs in the United States can be done from home (Dingel and Neiman 2020). Thus, practitioners and researchers commonly agree that work from home will very much be part of the post-pandemic economy.

The relevant literature provides evidence that work from home may have an impact on individual, organizational, and social levels although the boundaries between these different levels are often blurred. On an individual level, an increase of general satisfaction and productivity is associated with benefits of working from home (Kagerl and Starzetz 2023). However, working from home has seen a significant increase in mental health problems ranging from stress to burnout, which is understood to be a long-term consequence (Bakker et al. 2014; Fan and Moen 2023). Various research disciplines separately investigate factors influencing work success at home. Studies broadly examine the impact of socio-psychological and organizational parameters on work success from home (Nakrošienė et al. 2019). Work success can be described as the interaction of employee attitudes and work outcomes (Yalabik et al. 2013). Employee attitudes are reflected through several sources, e. g., satisfaction or burnout (Judge et al. 2001). Additionally, productivity is one of the most common work outcome factors and describes the ratio of output and the resources used to achieve it (Aronoff and Kaplan 1995).

Krupper (2015) investigates the relationship between real estate, organizational, and socio-psychological parameters and the productivity of employees in the office. Furthermore, several studies show that the same parameters have an impact on work behavior in the home workplace (e. g., Weber et al. 2022). An experiment by Bloom et al. (2015) was the first to compare the two work locations. They observed employees working at the office and employees working from home, and revealed that working from home can lead to higher levels of performance and improved work satisfaction compared to working at the office. As the only difference between these two groups is the location of work, it must be assumed that real estate parameters at home, among other factors, play a decisive role in explaining higher degrees of work performance.

With regard to work from home, very few studies holistically investigate the impact of different parameters on employees' individual conditions and on organizational outcomes (Weber et al. 2022). Especially, the role of physical parameters at home, such as real estate conditions in relation to work success in the home office is still rarely investigated. Also, organizations are keen to know

how personal requirements of working environments at home can support work success and whether all employees are equally suited to work from home.

Therefore, this study aims to make two contributions. First, the significance of physical resources on work success of employees working from home is examined. In this study, physical resources are exclusively reflected by real estate parameters. Work success is reflected through productivity, satisfaction, and burnout, and influenced by the personal requirements of employees working at home. Second, the study analyzes the relative importance of personal requirements on employees' productivity when working from home. The personal requirements investigated in this study are physical, organizational, and socio-psychological parameters. For that purpose, the job demands-resources model (JD-R) (Bakker and Demerouti 2007) is applied. Based on a quantitative survey conducted among knowledge workers in Germany and the United States of America, partial least squares structural equation modelling (PLS-SEM) is used for the analysis.

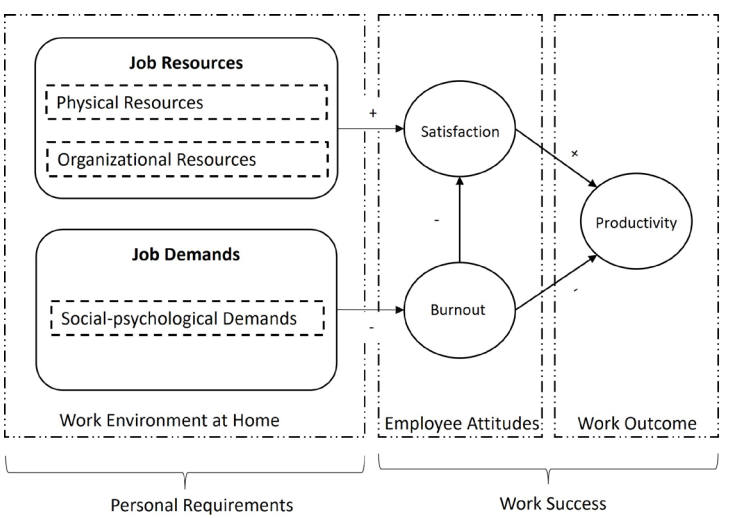
2. Theoretical Background and Derivation of Hypotheses

The job demands-resources model is highly suitable for the analysis of work from home. Psychological, social, physical, and organizational parameters have an impact on the conditions of employees and the organizational outcomes (Bakker and Demerouti 2007). However, these parameters and their impact depend on the specific workplace. The lack of robust empirical research and evidence makes it necessary to holistically investigate the impact of physical, organizational, and socio-psychological parameters on work success at home. Therefore, this study applies the JD-R model to measure the influence on two important employee attitudes, satisfaction and burnout, and the work outcome productivity when working from home.

The JD-R model combines the two independent research traditions of stress and motivation for describing the interaction of work-related resources (e. g., criteria of humane work design) and demands (e. g., environmental stressors). Initially, it was designed to understand burnout and was later supplemented to also understand the process of motivation (Bakker and Demerouti 2007). The JD-R model considers the main implications of the Conservation of Resources theory (Hobfoll et al. 2018) and responds to the criticisms of many other work organization models, such as the Demand-Control model or the Effort-Reward Imbalance model, by a broader conceptualization. With a comprehensive empirical base and conformations of the JD-R model, its applicability to a variety of different occupational groups is demonstrated (e. g., Xanthopoulou et al. 2007). The JD-R model states several propositions. The core of the model is that all occupations share common factors. These factors affect human well-being, work behavior, and success, and can be distinguished into two general categories: job

demands and job resources (Bakker and Demerouti 2007). A high level of job demands leads to burnout, which in turn can decrease productivity (Lesener et al. 2019). On the contrary, a high number of job resources leads to an increase in satisfaction and, thus, to a rise of productivity (Lesener et al. 2019). In addition, an interaction between job demands and job resources is postulated (Bakker and Demerouti 2017). This means that job resources buffer the impact of job demands. Even though every occupation has its own risk factors, these two universal categories serve as rationale for the transferability (also called "flexibility") of the model because all demands and resources of various occupational settings can be clustered into either one of the two categories (Bakker and Demerouti 2007).

Job demands and job resources have in common that they relate to physical, psychological, social and/or organizational aspects of the job. Krupper (2015) uses similar aspects of the job and shows their impact on productivity when working at the office. Regarding work from home, several studies postulate an impact of physical, socio-psychological, and organizational parameters on work behavior (Voll et al. 2022; Weber et al. 2022; Voll and Pfnür 2024). Based on the definitional delineation of job demands and job resources and the previously mentioned studies, the JD-R model provides a valid basis for addressing the contributions of this study. Figure 1 illustrates the resources and demands included in this study.



Note: The figure shows the interplay of physical, organizational and socio-psychological parameters, and their influence on employee attitudes and work outcomes in the home office.

Figure 1: Influence of personal requirements on work success

Source: Own illustration (2024)

Physical and organizational resources as well as socio-psychological demands are based on independent literature from different research disciplines, and are merged into a holistic model in the following remarks, which thereafter will be analyzed empirically. The development of this framework and the hypothesis will be discussed in detail in the following paragraphs. A conscious selection of resources and demands for the applied research model is necessary and results in a combination of 12 characteristics. In total, they holistically investigate the impact of the home office workplace on individual conditions of employees and organizational outcomes. All characteristics are categorized as either demands or resources (according to proposition one of the JD-R model). The order of the hypothesis developed is performed from left to right according to the direction of effect in the research model. Figure 2 illustrates the research model with all the hypotheses.

In this study, all five social–psychological aspects – isolation, family-work interference, boredom as well as age and household size – are classified as job demands, because they all represent aspects that require mental effort and carry psychological costs. The resources include physical and organizational aspects. Indoor environmental quality (IEQ), housing conditions, workplace environment, decision-making and work scheduling autonomy as well as task and skill variety were chosen. The reason is, they are either aspects of the workplace environment associated with an enhanced ability to reach higher levels of work engagement or an aspect of the job that is functional in achieving work goals or stimulating personal growth and development.

2.1 Physical Job Resources and Their Impact on Satisfaction When Working From Home

The first research objective is to examine the significance of physical resources on the work success of home office workers. In this study, physical resources are represented by three main characteristics of the workplace at home: IEQ, which is considered influential in offices and is therefore also tested for the home workplace; housing conditions which provide a wider frame; and the workplace environment which offers a more specific focus on the home environment. These three physical resources represent the core real estate-related aspects of home workplaces.

IEQ is measured through thermal comfort (Maarleveld et al. 2009), air, and light (Krupper 2015). Al-Omari and Okasheh (2017) show a relationship between temperature, noise, as well as alight and employee satisfaction. Satisfaction and productivity can be increased by good lighting conditions (Zuhaib et al. 2018). Improving IEQ embraces the possibility to enhance satisfaction and productivity (Al-Omari and Okasheh 2017). When working from home, there is

the possibility to configure thermal conditions individually to make an air exchange according to one's own preference and to adapt the lighting conditions specifically to the work (Xiao et al. 2021). Hence, when working from home, employees are hardly dependent on the needs of other employees. This makes it easier for them to adapt the IEQ conditions to their desired circumstances. This situation leads to the first hypothesis:

H1a: *The more suitable indoor environmental qualities are at home, the higher the satisfaction when working from home.*

Møller-Jensen et al. (2008) show that certain aspects of a residential property (e. g., the location) influence the propensity to telework. In principle, this suggests a connection between the so-called *housing conditions* and productivity when working from home. This assumption is emphasized by the fact that a comfortable housing situation and preferred location can lead to a higher acceptance of working from home (Ahlers et al. 2021). Housing conditions are further categorized as characteristics of the property, neighborhood, and the occupants of the property themselves. A different and more detailed categorization subdivides the impacts on housing conditions into subjective-physical, objective-physical, subjective-social, and objective-social perceptions (Amérigo and Aragonés 1990). In this study, housing conditions describe the subjective-physical perception of the property as a whole, the location, the planning concept, the quality of the construction, and the economy of the housing situation (Amérigo and Aragonés 1990, 1997; Haynes 2007; Maarleveld et al. 2009). A good location means that the residents appreciate the location of the property where they work from. This can be due to the surrounding conditions, amenities or beautiful nature. In terms of working from home, a suitable layout of the property can be reflected in the form of a dedicated room for working. High economic efficiency in the living situation means that residents perceive their rent and utilities as reasonable in relation to the quality of housing they receive. Accordingly, housing conditions not only serve as an important prerequisite for the acceptance of working from home but also contribute to overall satisfaction. It is thus postulated that:

H1b: *The more suitable the housing conditions at home, the higher the satisfaction when working from home.*

The *workplace environment* describes everything that exists around the employee's workplace and has an impact on their performance (Al-Omari and Okasheh 2017). In this study, the workplace environment refers to the workstation set-up at home and to the subjective perception of it (Xiao et al. 2021). In more detail, the workplace environment at home includes the support of equipment or furniture for work in general (Haynes 2007; Maarleveld et al. 2009). Regardless of the specific workplace, it is documented that an inappropriate workplace environment has a negative impact on employees (Bailey and Kur-

land 2002). Empirical studies with regard to the workplace at home show a positive relationship between the workplace environment and satisfaction (Nakrošienė et al. 2019). Thus, it is postulated that:

H1c: *The more suitable the workplace environment at home, the higher the satisfaction when working from home.*

2.2 Organizational Job Resources and Their Impact on Satisfaction When Working From Home

For the second research objective, an analysis of the relative importance of physical, organizational, and socio-psychological parameters on work success of employees working at home is carried out. At the individual level, the most important type of organizational resource is human-related. Therefore, two essential resources, autonomy and variety, are included in the model. They both influence humans in the home office. In addition to the autonomy to make decisions and to schedule the completion of tasks independently, it is also assumed that the presence of task and skill variety contributes to an individual working successfully at home. This study analyzes the determinants of work success when working from home and therefore highlights organizational job resources, including decision-making autonomy, work scheduling autonomy, task variety and skill variety.

Work autonomy has probably received the most attention out of all organizational job resources. Hackman and Oldham (1975, p. 161) define autonomy as "the degree to which the job provides substantial freedom, independence and discretion to the employee in scheduling the work and in determining the procedures to be used in carrying it out." According to this definition, autonomy can be classified into *work scheduling autonomy* and *decision-making autonomy*. In this study, work scheduling autonomy refers to the allocation of an employee's working time while decision-making autonomy refers to the determination of how their work is done. In general, there is empirical evidence that both types of autonomy are positively related to satisfaction (Loher et al. 1985). In more detail and with regard to work from home, work scheduling autonomy and decision-making autonomy can lead to a higher level of satisfaction for the individual employee and, thus, enhance their productivity (Hackman and Oldham 1980; Nakrošienė et al. 2019). Therefore, a positive relationship between work scheduling autonomy and decision-making autonomy and satisfaction is suggested. At this point, the impact of autonomy is deliberately considered at the level of the individual employee and not a possible loss of leadership by managers. It is thus postulated that:

H2a: *The more pronounced the decision-making autonomy, the higher the satisfaction when working from home.*

H2b: *The more pronounced the work scheduling autonomy, the higher the satisfaction when working from home.*

Task Variety describes the multitude of tasks associated with a certain job. At the same time, it is closely linked to job complexity. Job complexity is one of the core job resources with an impact on satisfaction and productivity (Oldham and Cummings 1996). If jobs are complex and require a lot of different tasks, then employees are more likely to focus all their attention and effort on their jobs. Simpler and more routinized jobs do not lead to a higher degree of employee satisfaction. A positive relationship between task variety and satisfaction is documented (Hackman and Oldham 1975). This connection should also be checked when working at home:

H2c: *The more pronounced task variety, the higher satisfaction when working from home.*

Skill variety describes the number of skills a person needs to be able to do a job (Hackman 1980). The lack of spontaneous help from colleagues or missing work equipment complicates work from home (Kellner et al. 2020). In addition, with all the distractions in one's own premises it might be more difficult to complete monotonous tasks satisfactorily (Xiao et al. 2021). Nevertheless, a meta-analysis by Humphrey et al. (2007) shows that skill variety is positively related to satisfaction. In order to cope with the lack of spontaneous help from colleagues and missing work equipment, employees need special skills to work from home. Skill variety can counteract these challenges. Thus, when working from home, skill variety is increased due to greater interactive complexity. This could prevent distractions, leading to greater satisfaction. It is thus postulated that:

H2d: *The more pronounced skill variety, the higher the satisfaction when working from home.*

2.3 Socio-Psychological Job Demands and Their Impact on Burnout When Working From Home

In addition to the workplace characteristics assumed to be resources of the home office, the workplace at home also has several demands. This study's research model takes into account the special socio-psychological circumstances that a workplace at home, in particular, entails. Thus, in addition to isolation and family-work interference, boredom as well as age and household size are included.

Isolation is one of the main reasons for low rates of working from home before the COVID-19 pandemic (Nakrošienė et al. 2019). Thereby, isolation can be subdivided into physical, professional, and/or social isolation. Physical isolation

describes that employees carry out their work activities in a work environment that is separated from the work environment of their colleagues (Bartel et al. 2012). Professional isolation, on the other hand, depicts reduced career opportunities due to reduced networking, learning, and informal mentoring (Cooper and Kurland 2002). Social isolation refers to an individual's feeling of lack of inclusion or connectedness within their work environment (Bentley et al. 2016) and is often cited as a drawback of telework or, more specifically, of working from home (Bailey and Kurland 2002; Mann and Holdsworth 2003; Nakrošienė et al. 2019). In this study, isolation depicts the subjective feeling of loneliness when working from home. Studies identify that isolation leads to loneliness when working from home (Wang et al. 2021) and that loneliness and the lack of social interaction are the most common reasons why employees want to work at the office (Bloom et al. 2015). While some studies show a mediating role of isolation on burnout (Stephenson and Bauer 2010), other studies emphasize a link between loneliness (and therefore isolation) and burnout, and suggest that greater human connection at work is a solution to solve burnout problems (Seppala and King 2017). Furthermore, a direct impact between isolation and burnout is shown (Bauer and Silver 2018). It is thus postulated that:

H3a: *The more pronounced the isolation, the higher the perception of burnout when working from home.*

Family-work interference is understood as a form of inter-role conflict based on role stress theory (Grzywacz and Demerouti 2013). Role conflict is identified as a predictor of burnout (Alarcon 2011). When working from home, the boundaries between work location and private life can be blurred (Wang et al. 2021). Greenhaus and Beutell (1985) describe the three types of family-work conflicts as time-based, strain-based, and behavior-based. All three could be experienced by employees working from home. While some people who go to work in the office and then spend their free time in their private spaces, other employees work from home and suddenly find themselves in the environment in which they normally fulfill their role as a family member, partner or parent. Time-based, strain-based, and behavior-based conflicts mean that a clear separation of roles becomes more difficult. Literature also states that frequent distractions and interruptions through cross-domain roles lead to greater experiences of exhaustion (Golden 2012) and that a relationship between stressful events in peoples' personal life and burnout exists (Hakanen and Bakker 2017). It is thus postulated that:

H3b: *The more pronounced the family-work interference, the higher the perception of burnout when working from home.*

Boredom at work is still largely unexplored although it has received some attention in recent years (Sousa and Neves 2021). Mikulas and Vodanovich (1993, p. 3) describe boredom at work as "a state of relatively low arousal and dissatis-

faction, which is attributed to an inadequately stimulating situation." Boredom at work can lead to higher levels of depressive complaints and anxiety (Lee and Zelman 2019) as well as lower job satisfaction and organizational commitment (Reijseger et al. 2013). Frustration, restlessness, and loneliness are often linked with boredom (Harasymchuk and Fehr 2010). Sousa and Neves (2021) illustrate the impact of boredom at work on burnout and emotional exhaustion. As the work environment at home tends to offer less variety and less interaction with colleagues, boredom in the home office could be particularly pronounced. It is thus postulated that:

H3c: *The more pronounced the boredom, the higher the perception of burnout when working from home.*

Numerous research studies identify *age* as a possible factor related to employee burnout. However, the study situation regarding the impact of age on burnout is not entirely clear. While some studies conclude no impact of age on burnout (Coetzee et al. 2019), within the frame of a meta-analysis, Brewer and Shapard (2004) show a small negative correlation between the age of an employee and emotional exhaustion in at least some fields of the United States. Ahola et al. (2008) argue that the impact of age on burnout differs in different age groups and among genders. This is emphasized by the fact that age and burnout follow a non-linear relationship (Marchand et al. 2018). With regard to working from home, a study by Hayes et al. (2021) emphasizes this non-linear relationship and indicates that age has a significant impact on stress and burnout as challenges like communication, collaboration, and time management with colleagues via technology arise. Moreover, older employees are more prone to techno-stressors even though aging is connected with the development of coping skills (Hauk et al. 2019). Thus, older employees are more likely to suffer from techno-stressors that can, in turn, lead to burnout. It is thus postulated that:

H3d: *The more pronounced a person's age is, the higher the perception of burnout when working from home.*

Previous studies have shown how frequent distractions and interruptions in the office negatively influence employees' well-being and especially exhaustion (Kellner et al. 2020). Hence, studies have examined the impact of different types of distractions and interruptions when working from home. Bergefurt et al. (2021) describe a major impact of workspace distractions on stress levels. The number of people in the work setting at home significantly enhances the distraction level, which in turn enhances stress (Bergefurt et al. 2021). Furthermore, the number of people/family members at home (*household size*) is negatively associated with the decision to work from a different place than the office. It is thus postulated that:

H3e: *The more pronounced the household size, the higher the perception of burnout when working from home.*

2.4 The Interaction Between Burnout, Satisfaction, and Productivity

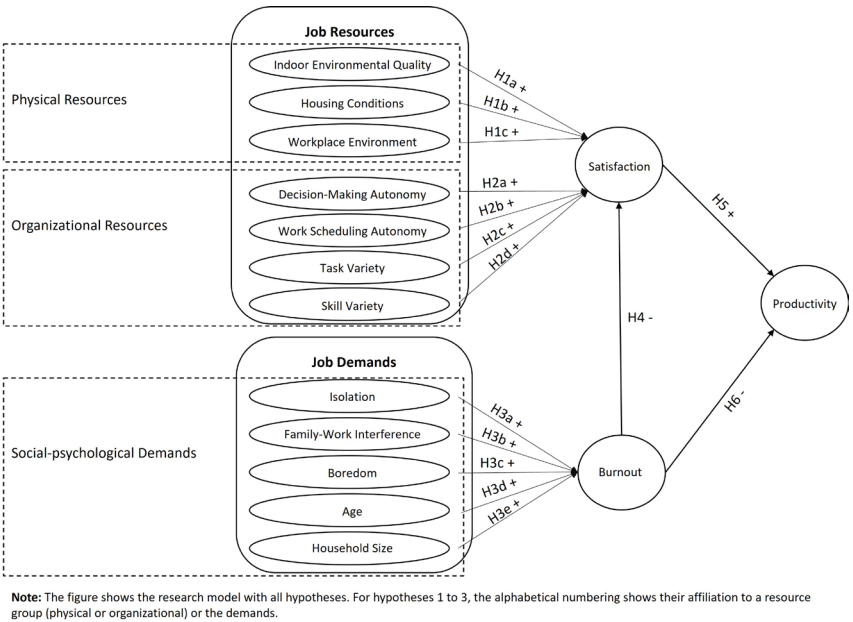
To measure work success according to the JD-R model, two parallel processes are modelled. As a health impairment process (Bakker and Demerouti 2007; Lesener et al. 2019), the influence of job demands on burnout is depicted. The motivation process, on the other hand, is represented by the impact of job resources on satisfaction. Thus, following the structure of the JD-R model (Bakker and Demerouti 2017), full mediation by the two mediator variables burnout and satisfaction is assumed and the influence of the workplace characteristics of the home office on the outcome variable productivity is analyzed.

Burnout can occur as a long-term consequence of stress. Such stress is caused by situational and individual factors (Bakker et al. 2014). This study builds on Hakanen et al. and relates the health impairment process to burnout (e. g., Hakanen et al. 2008; Crawford et al. 2010). Burnout is the most important predictor of low levels of job satisfaction (Lu and Gursoy 2016). In addition, a negative causal relationship between burnout and satisfaction is found (e. g., Ybema et al. 2010). With regard to work from home, Mann and Holdsworth (2003) argue that employees working from home experience significantly more mental health symptoms of stress than office workers.

Satisfaction includes aspects of job and work satisfaction with additional dimensions, like satisfaction with life overall, or an employee's financial situation (Siddiqui 2015). In contrast to this study, many studies only use one concept of satisfaction rather than combining multiple concepts. The use of the multi-faceted construct, subsumed under the generic term "satisfaction," is explained through the fact that in the home office, work and private life are intricately linked, and an isolated consideration of job satisfaction does not reflect the emotional status of employees that is of interest. Additionally, research about the correlation between satisfaction and productivity could be stronger if the operationalization of satisfaction were to include more than pure job satisfaction (Cropanzano and Wright 2001). In research on telecommuters, DuBrin (1991) shows a positive influence of satisfaction on productivity. Similar findings are the results of the "Happy-Productive Worker Thesis", revisited by Zelenski et al. (2008).

Productivity represents the ratio of the output achieved and the resources used to achieve it (Aronoff and Kaplan 1995). Productivity can be increased in several ways. In this study, productivity increase considers improved effectiveness, which is characterized by an increase in output with unchanged input. The respondents rate their perceived productivity. In contrast to satisfaction, the construct of productivity is specifically related to the home office situation, as this outcome variable characterizes the specific output under study. In conclusion, it is postulated that:

H4: *Burnout is negatively related to satisfaction when working from home.*
H5: *Satisfaction is positively related to productivity when working from home.*
H6: *Burnout is negatively related to productivity when working from home.*



Note: The figure shows the research model with all hypotheses. For hypotheses 1 to 3, the alphabetical numbering shows their affiliation to a resource group (physical or organizational) or the demands.

Figure 2: Research model

Source: Own illustration (2024)

3. Methodology

The analysis of this study is based on primary data collected through an online survey. The online survey is generated in LamaPoll and distributed via Clickworker in Germany and Mechanical Turk (MTurk) in the United States, two sampling platforms with increasing popularity in research. They generate fast and reliable responses with quality comparable to responses obtained from more traditional sampling methods (Follmer et al. 2017). In order to avoid common-method bias within a measurement occasion, it is recommended to incorporate time lags between the measurement of independent and dependent constructs (Polyhart and Vandenberg 2010). Following this, the items to measure job demands and job resources were gathered in June 2020, and the items to measure burnout, satisfaction, and productivity were gathered in August 2020. The respective participants were incentivized and identified across the different survey waves using an associated ID.

The survey addressed 2,000 office and knowledge workers who perform at least part of their activities from home[1] during the COVID-19 pandemic in Germany, Switzerland, Austria, and the United States. 565 respondents answered both surveys. The analysis focuses on the work from home situation. For this reason, it is relevant that the respondents have experience working from this location. However, they do not necessarily have to work there exclusively to be able to evaluate the effects of the various influences on their work success. Data cleaning took place in three steps using IBM SPSS Statistics. First, all surveys completed in less than seven minutes were excluded. In the second step, missing values and single outliers were sorted out. In addition, for the present study, survey responses were only included if the respondent's current country of residence was either Germany (N = 318) or the United States (N = 184) because the amount of data available for the other countries was not sufficient. The resulting sample size N = 502 exceeds two estimates of minimum sample size requirements ("ten times rule of thumb" by Hair et al. (2011) and statistical power tables documented in Hair et al. (2021)) and ensures a sufficient level of statistical power. This study uses PLS-SEM to analyze the relationships within the research model. In contrast to the more traditional CB-SEM, this research model focusses on prediction and theory development to understand the increasing complexity by exploring theoretical extensions (Hair et al. 2019) of the JD-R theory. The statistical power of PLS is always greater than or equal to that of CB-SEM, provided that the measurement model has sufficient quality and there are more than 100 observations to achieve acceptable statistical power (Sarstedt et al. 2017). In addition, research shows that PLS-SEM provides solutions when other methods do not converge nor obtain valid results. Given all of these considerations, the PLS-SEM approach is beneficial for this study. The analysis follows the guidelines of Hair et al. (2021) and Hair et al. (2019) and the SmartPLS 3 software is used. In chapter 4, all criteria evaluated refer to reflective measurement models, as this is the only type of construct measurement used in the research model. When using the bootstrapping procedure to derive p-values and bias-corrected and accelerated (BCa) confidence intervals, and examining the significance and relevance of coefficients, the settings are as follows, with full bootstrapping using 10,000 subsamples.

3.1 Operationalization and Data Sample

Items were combined from existing survey instruments as far as possible. A detailed list of items with associated sources can be found in Appendix A. A five/seven-point Likert scale was used for all items to measure perceived fit. Age

[1] Only participants with at least half a day of work from home per week were considered. On average, 4.5 days were worked at home.

and household size were scaled metrically. The Likert scales chosen in the survey provide metric data for the analysis. Table 1 reports the sample's employee characteristics.

Table 1

Sample Descriptive Statistics

Demographic Characteristics	*Frequency (N = 502)*	*Percentage (%)*
Gender		
Male	314	62.5
Female	187	37.3
Other	1	0.2
Age		
18 – 20	7	1.4
21 – 39	308	61.3
40 – 55	147	29.3
56 – 68	40	8
Relationship Status		
Divorced	15	3.0
Married	220	43.8
Relationship	140	27.9
Single	119	23.7
Widowed	2	0.4
N/A	6	1.2
Level of Education		
Lower secondary school (Hauptschule)	17	3.4
Secondary school (Realschule)	82	16.3
Higher school diploma (Abitur)	91	18.1
Master craftsmen	18	3.6
Bachelor	143	28.5
Master	141	28.1
Doctorate	10	2.0
Professional Status		
Employee	441	87.8
Self-employed	41	8.2
Civil servant	10	2.0
Freelancer	10	2.0

(continue next page)

(Table 1 continued)

Demographic Characteristics	*Frequency (N = 502)*	*Percentage (%)*
Position		
Entrepreneur/Freelancer	38	7.6
Managing director	8	1.6
Management	170	33.9
Project leader	46	9.2
Employee	219	43.6
Temporary staff	7	1.4
Apprentice	4	0.8
Intern	1	0.2
Other	9	1.8
Managerial Responsibility		
Yes	208	41.4
No	294	58.6

Note: This table shows the descriptive statistics of the sample in terms of frequency and percentage.

4. Results

4.1 Measurement Models

The PLS-SEM "algorithm first obtains the measurement model results, which are the relationships between the constructs and their indicator variables" (Hair et al. 2021, p. 120). A desirable value for the indicator loadings of a reflectively specified construct, also known as outer loadings, is 0.708. The exceeding values (see Table 2) indicate that the constructs explain more than 50 % of the indicator loading variance and demonstrates a satisfactory degree of reliability (Sarstedt et al. 2017). For the definition of the variables see Appendix A.

Table 2

Indicator Loadings, Mean Values, and Standard Deviations

	Outer Loadings	*Mean Values*	*Standard Deviation*
Physical Aspects			
Indoor Environmental Quality			
IEQ_1	0.699	5.691	1.313
IEQ_2	0.828	5.729	1.233
IEQ_3	0.755	4.998	1.485
IEQ_4	0.755	5.468	1.337
Housing Conditions			
HC_1	0.782	5.508	1.343
HC_2	0.883	5.518	1.350
HC_3	0.900	5.496	1.367
HC_4	0.774	5.582	1.312
HC_5	0.846	5.321	1.334
HC_6	0.798	5.195	1.450
HC_7	0.785	5.303	1.400
Workplace Environment			
WE_1	0.815	5.173	1.452
WE_2	0.862	4.757	1.486
WE_3	0.838	4.789	1.519
WE_4	0.876	4.865	1.452
Organizational Aspects			
Decision-making Autonomy			
DM_1	0.899	5.203	1.412
DM_2	0.927	5.197	1.419
DM_3	0.930	5.072	1.516
Work Scheduling Autonomy			
WS_1	0.888	5.102	1.564
WS_2	0.906	5.179	1.504
WS_3	0.915	5.149	1.496
Task Variety			
TV_1	0.861	5.074	1.382
TV_2	0.887	5.147	1.404
TV_3	0.867	5.311	1.322
TV_4	0.905	5.094	1.402

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(Table 2 continued)

	Outer Loadings	*Mean Values*	*Standard Deviation*
Skill Variety			
SV_1	0.885	5.333	1.279
SV_2	0.889	5.369	1.266
SV_3	0.860	5.183	1.405
SV_4	0.857	5.207	1.430
Social-psychological Aspects			
Isolation			
Iso_1	0.921	2.373	1.195
Iso_2	0.938	2.460	1.208
Iso_3	0.832	2.795	1.225
Family-Work Interference			
FWI_1	0.932	3.376	1.513
FWI_2	0.870	3.259	1.569
FWI_3	0.948	3.659	1.705
Boredom			
Bor_1	0.902	2.880	1.764
Bor_2	0.911	2.956	1.801
Bor_3	0.835	2.637	1.744
Bor_4	0.904	3.135	1.885
Age			
Age_1	1.000	37.863	10.785
Household Size			
HS_1	1.000	2.624	1.272
Full Mediators			
Satisfaction			
Satis_1	0.769	5.287	1.341
Satis_2	0.698	5.462	1.363
Satis_3	0.790	5.177	1.281
Satis_4	0.749	4.643	1.395
Burnout			
Burn_1	0.906	2.717	1.006
Burn_2	0.917	2.556	1.035
Burn_3	0.911	2.783	1.059

(continue next page)

(Table 2 continued)

	Outer Loadings	*Mean Values*	*Standard Deviation*
Target Variables			
Productivity			
Prod_1	0.889	5.034	1.498
Prod_2	0.924	4.980	1.512
Prod_3	0.932	5.012	1.524
Prod_4	0.777	4.882	1.597

Note: This table shows the indicator loadings, mean values, and standard deviations of all the items of the constructs. All items are measured on a seven-point Likert scale ranging from 1 = totally disagree to 7 = totally agree, except from burnout and isolation ranging from 1 = never to 5 = frequently, and age and household size are metric.

Internal consistency reliability is tested with Cronbach's α, composite reliability, and ρ_A. In general, higher values indicate higher reliability and vary between zero and one for all three measures (Hair et al. 2021). The results of the analysis (see Table 3) show values between 0.7 and 0.95 for all constructs, excluding the two single items. This is a recommended value range for satisfactory to good results, and the items are identified as valid measures of the constructs.

The convergent validity of each construct is measured with the average variance extracted (AVE). In the research model, all constructs – except for the two single items (see Table 3) – have an Average Variance Extracted (AVE) metric greater than 0.50. This means that each construct explains at least 50 % of the variance in its associated items (Hair et al. 2019).

The assessment of discriminant validity finalized the analysis of the reflective measured constructs. The analysis shows how strongly constructs differ empirically from one another. The heterotrait-monotrait (HTMT) ratio of the correlations is evaluated with a threshold value of 0.9 (Henseler et al. 2015). There is no indication of violation of assumptions (see Table 4). Values for the upper bound of the 95 % bias-corrected and the accelerated confidence interval should be equal to or lower than 0.850 to indicate significant results.

Table 3

Internal Consistency Reliability and Convergent Validity

	Internal Consistency			*Convergent Validity*
	Cronbach's α	ρ_A	*Composite Reliability*	*AVE*
Indoor Environmental Quality	0.758	0.765	0.846	0.579
Housing Conditions	0.921	0.923	0.937	0.681
Workplace Environment	0.870	0.872	0.911	0.719
Decision-making Autonomy	0.908	0.910	0.942	0.844
Work Scheduling Autonomy	0.887	0.897	0.930	0.815
Task Variety	0.903	0.905	0.932	0.775
Skill Variety	0.897	0.909	0.927	0.762
Isolation	0.880	0.896	0.926	0.807
Family-Work Interference	0.907	0.950	0.941	0.842
Boredom	0.911	0.915	0.937	0.789
Burnout	0.898	0.899	0.936	0.831
Satisfaction	0.747	0.759	0.839	0.566
Productivity	0.904	0.915	0.933	0.779

Note: This table shows internal consistency reliability measured by Cronbach's α, ρ_A and composite reliability as well as convergent validity measured with average variance extracted (AVE) for all constructs.

Table 4

HTMT Ratios

HTMT	*Age*	*Decision Making*	*Burnout*	*Family-Work Interference*	*Household Size*	*Indoor Environmental Quality*	*Isolation*	*Productivity*	*Skill Variety*	*Housing Conditions*	*Task Variety*	*Boredom*	*Workplace Environment*	*Satisfaction*
Age														
Decision Making	0.094 (0.186)													
Burnout	0.144 (0.230)	0.163 (0.259)												
Family-Work Interference	0.048 (0.129)	0.313 (0.408)	0.286 (0.385)											
Household Size	0.049 (0.135)	0.056 (0.124)	0.149 (0.236)	0.123 (0.205)										
Indoor Environmental Quality	0.248 (0.339)	0.365 (0.471)	0.279 (0.374)	0.308 (0.412)	0.042 (0.066)									
Isolation	0.123 (0.208)	0.091 (0.168)	0.447 (0.530)	0.040 (0.059)	0.051 (0.096)	0.274 (0.370)								
Productivity	0.084 (0.171)	0.241 (0.343)	0.111 (0.193)	0.301 (0.407)	0.112 (0.198)	0.363 (0.474)	0.233 (0.233)							
Skill Variety	0.123 (0.211)	0.570 (0.658)	0.149 (0.249)	0.269 (0.369)	0.039 (0.093)	0.430 (0.539)	0.082 (0.144)	0.267 (0.374)						

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(Table 4 continued)

HTMT	*Age*	*Decision Making*	*Burnout*	*Family-Work Interference*	*Household Size*	*Indoor Environmental Quality*	*Isolation*	*Productivity*	*Skill Variety*	*Housing Conditions*	*Task Variety*	*Boredom*	*Workplace Environment*	*Satisfaction*
Housing Conditions	0.112 (0.209)	0.314 (0.411)	0.277 (0.364)	0.325 (0.423)	0.084 (0.158)	0.686 (0.762)	0.269 (0.361)	0.342 (0.443)	0.333) (0.434)					
Task Variety	0.075 (0.161)	0.498 (0.589)	0.113 (0.215)	0.285 (0.383)	0.095 (0.183)	0.367 (0.468)	0.061 (0.085)	0.273 (0.374)	0.842 (0.896)	0.340 (0.436)				
Boredom	0.227 (0.304)	0.238 (0.324)	0.618 (0.689)	0.226 (0.315)	0.061 (0.139)	0.347 (0.450)	0.480 (0.560)	0.179 (0.269)	0.320 (0.409)	0.317 (0.410)	0.295 (0.385)			
Work Scheduling	0.060 (0.148)	0.804 (0.865)	0.173 (0.273)	0.274 (0.372)	0.057 (0.139)	0.338 (0.445)	0.078 (0.150)	0.261 (0.360)	0.475 (0.565)	0.283 (0.381)	0.382 (0.477)	0.209 (0.298)		
Workplace Environment	0.096 (0.191)	0.349 (0.437)	0.184 (0.289)	0.436 (0.528)	0.163 (0.250)	0.694 (0.759)	0.222 (0.318)	0.470 (0.557)	0.351 (0.443)	0.767 (0.820)	0.369 (0.456)	0.216 (0.313)	0.300 (0.396)	
Satisfaction	0.131 (0.199)	0.405 (0.503)	0.427 (0.521)	0.601 (0.680)	0.150 (0.242)	0.703 (0.783)	0.334 (0.437)	0.583 (0.668)	0.479 (0.580)	0.767 (0.831)	0.425 (0.522)	0.485 (0.573)	0.379 (0.477)	0.732 (0.797)

Note: This table shows heterotrait-monotrait (HTMT) ratios of the correlations. The figure in the parentheses represents the 95% bias-corrected and accelerated confidence interval.

4.2 Structural Model

The PLS-SEM evaluation process continues with the structural model since the quality of the measurement model evaluation results is satisfactory. To avoid undetected collinearity, which could bias the regression results, variance inflation factor (VIF) values are evaluated. The test of collinearity between the constructs (see Table 5) shows that the VIF values for the structural model are below 3.33. Thus, there is no indication for biased results because no undetected collinearity was found between the structural model coefficients (Diamantopoulos and Siguaw 2006).

Table 5

VIF Values

	Burnout	*Productivity*	*Satisfaction*
Indoor Environmental Quality			1.749
Housing Conditions			2.170
Workplace Environment			2.173
Decision-making Autonomy			2.412
Work Scheduling Autonomy			2.135
Task Variety			2.435
Skill Variety			2.690
Isolation	1.239		
Family-Work Interference	1.074		
Boredom	1.346		
Age	1.051		
Household Size	1.023		
Satisfaction		1.138	
Burnout		1.138	1.092
Productivity			

Note: This table shows the variance inflation factor (VIF) values.

The variance explained in each of the endogenous constructs, taking into consideration the coefficient of determination R^2, shows weak to moderate results for the model's in-sample explanatory and predictive power (see Table 6) (Henseler et al. 2009; Hair et al. 2011).

Table 6

R^2 Values

	R^2
Satisfaction	0.541
Burnout	0.338
Productivity	0.262

Note: This table shows the R^2 values of the three latent variables.

The statistical relevance and significance of the path coefficients is assessed with respect to the hypothesized relationships between the constructs (structural pathways), where the path coefficients have standardized values between minus one and plus one (Hair et al. 2019). The research model has 15 path coefficients, 10 of which have a positive and significant value and suggest a positive relationship (see Table 7). One path coefficient indicates a negative relationship. The results show significant coefficients on a 1 % level and 5 % level. Four coefficients are not significant and, thus, don't indicate a relationship at all. According to the path coefficients and their significance, H1a – H1c, H2d, H3a – H3c, H3e, H4, and H5 can be confirmed (see Figure 3). The path coefficient between burnout and productivity (H6) is significant but surprisingly positive, contrary to the hypothesis assumption. The values presented show that the model set up meets the quality criteria of the structural model. Thus, the results can be evaluated with valid content.

Table 7

Path Coefficients

Hypothesis	*Hypothesized Path*	*Path Coefficient*	*Confidence Intervals [2.5 %, 97.5 %]*
Satisfaction			
H1	Indoor Environmental Quality to Satisfaction	0.127***	[0.040; 0.209]
H2	Housing Conditions to Satisfaction	0.321***	[0.221; 0.419]
H3	Workplace Environment to Satisfaction	0.224***	[0.130; 0.138]
H4	Decision-making to Satisfaction	0.010	[–0.084; 0.110]
H5	Work Schedule to Satisfaction	0.044	[–0.054; 0.140]
H6	Task Variety to Satisfaction	–0.010	[–0.094; 0.070]
H7	Skill Variety to Satisfaction	0.138***	[0.054; 0.233]

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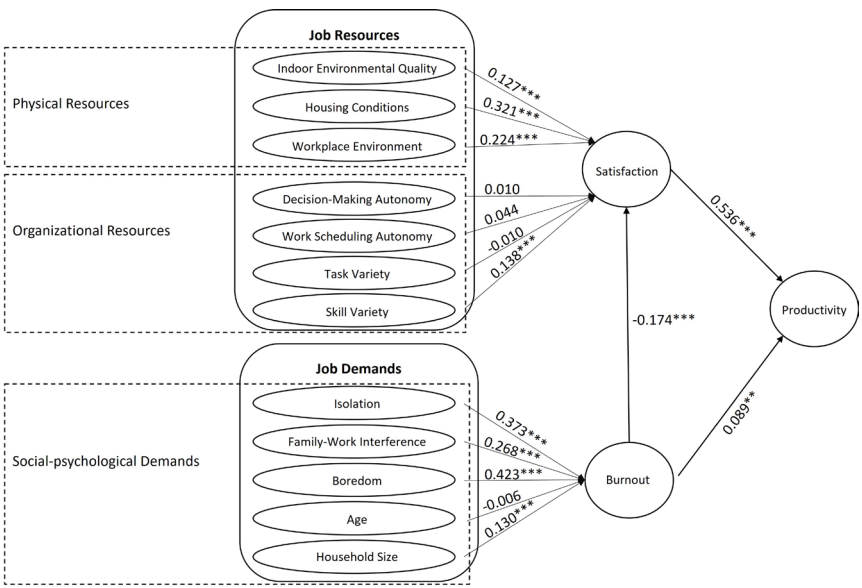
(Table 7 continued)

Hypothesis	*Hypothesized Path*	*Path Coefficient*	*Confidence Intervals [2.5 %, 97.5 %]*
H13	Burnout to Satisfaction	–0.174***	[–0.173; –0.102]
Burnout			
H8	Isolation to Burnout	0.207***	[0.126; 0.286]
H9	Family-Work Interference to Burnout	0.186***	[0.103; 0.271]
H10	Boredom to Burnout	0.423***	[0.333; 0.507]
H11	Age to Burnout	–0.006	[–0.082; 0.068]
H12	Household Size to Burnout	0.130***	[0.060; 0.196]
Productivity			
H14	Satisfaction to Productivity	0.536***	[0.457; 0.611]
H15	Burnout to Productivity	0.089**	[0.002; 0.179]

Note: This table shows the path coefficients for the hypnotized paths. *** shows significance at the 0.01 level (2-sided); **shows significance at the 0.05 level (2-sided) and *shows significance at the 0.1 level (2-sided). The confidence intervals are represented in the brackets [2.5 %, 97.5 %].



Note: The figure shows the research model with path coefficients and signifcances. *** shows significance at 0.01 level (2-sided); **shows significance at 0.05 level (2-sided) and *shows significance at 0.1 level (2-sided).

Figure 3: Research model and structural model results

Source: Own illustration (2024)

5. Discussion

5.1 Theoretical Implications

This study has two primary purposes: (1) to examine the relationship between physical resources and work success at home and (2) to investigate the relative importance of real estate, organizational, and socio-psychological parameters on productivity of employees working from home when considering satisfaction and burnout as full mediating effects.

This study provides first empirical evidence that physical resources at home enhance the satisfaction of employees working from home. All physical resources have a statistically significant positive relationship to satisfaction. Thus, H1a – H1c can be confirmed. This means, housing conditions (β = .32, p < .01) play a decisive role in explaining satisfaction as the path coefficient is the strongest positive coefficient of all physical resources. When considering the subjective-physical perception, it is likely that housing features like the location, the planning concept, or the construction quality enhance satisfaction when working from home. This positive influence can be due to several aspects. For example, an attractive residential location can increase satisfaction, as can a suitable layout with a separate room for working if required. Additionally, the workplace environment (β = .22, p < .01) at home and indoor environmental quality factors (β = .13, p < .01) have a significant positive effect on satisfaction when working from home. While Bailey and Kurland (2002) argue that an inappropriate workplace environment may have a negative impact on employees in general, Nakrošienė et al. (2019) document a positive relationship between the workplace environment at home and satisfaction. The latter is confirmed in this study. In this context, equipment and furniture are decisive for the workplace environment at home. Indoor environmental quality factors lead to higher satisfaction due to the individual configurability of noise, air, and light (Gauger et al. 2022). These individual configurations enable employees to work with an individualized indoor environment quality according to their well-being. Because the three selected physical resources in this study specifically represent the real estate-related aspects, the impact of real estate on the success of home-based work is clearly highlighted.

Second, the findings also allow us to draw conclusions about the relative importance of real estate, organizational, and socio-psychological parameters with respect to work success at home. Compared to real estate resources, organizational resources play a relatively minor role in explaining satisfaction. Only skill variety (β = .14, p < .01) has a significant positive effect on satisfaction. Thus, H2d can be confirmed while H2a – H2c must be denied. Considering satisfaction, real estate resources appear to significantly outweigh organizational resources when working from home. On the other hand, all socio-psychological

demands apart from age exhibit a statistically significant positive relationship to burnout. Thus, H3a – H3c and H3e can be confirmed, whereas H3c must be denied. Boredom (β = .42, p < .01) plays a specifically decisive role in explaining burnout as the path coefficient is the strongest positive coefficient out of all socio-psychological demands. Sousa and Neves (2021) already show a positive link between boredom at work and burnout. Boredom is often connected to feelings of frustration, restlessness, and loneliness (Harasymchuk and Fehr 2010), which, in turn, may enhance levels of depressive complaints and anxiety (Lee and Zelman 2019). Boredom can lead to a spiral, that may result in high degrees of burnout. When working from home, feelings of frustration and restlessness could be aggravated by the demands of this working situation and, therefore, increase the risk of experiencing boredom and consequently burnout. Furthermore, isolation (β = .37, p < .01) is positively related to burnout. The lack of social interaction is the most common reason why employees want to work in the office (Bloom et al. 2015; Nakrošienė et al. 2019). Hence, the postulated direct impact of isolation on burnout is confirmed (Bauer and Silver 2018). As social isolation is one of the most commonly cited drawbacks of working from home (Mann and Holdsworth 2003), a significant proportion of employees face the risk of developing burnout symptoms. In addition, family-work interference (β = .27, p < .01) and household size (= .13, p < .01) are positively related to burnout. These results contrast with isolation as not only the lack of social interaction but also the excess of social interaction affects burnout positively. This might result especially from the type of social interaction happening when working from home. It is particularly important to point out the additional responsibility many parents faced in caring for their children at home during the pandemic. Therefore, family-work interference is likely to be a negative type of social interaction regarding work, while social interaction with colleagues could be beneficial regarding isolation or boredom.

Work success can be explained by the interaction of employee attitudes and work outcome (Yalabik et al. 2013). While satisfaction and burnout are used to operationalize employee attitudes, productivity is used to measure the work outcome. The results indicate a strong positive effect of real estate resources on satisfaction and a strong positive effect of social-psychological demands on burnout. While burnout is negatively related to satisfaction (β = −.17, p < .01) and satisfaction is positively related to productivity (β = .54, p < .01), meaning that H4 and H5 can be confirmed, burnout is surprisingly significantly positively related to productivity (β = .09, p < .01) and, thus, H6 must be declined. This fact could be due to the time of data collection. The participants were surveyed in the first months after the emergence of the COVID-19 pandemic and when fear and uncertainty dominated. The experience level as well as the comparability with colleagues, which would be possible in the office, was not given at that point of time. Boundaries between work and life became blurred and employees

were more likely to supplement commuting time with working time. This may have led to the fact that employees who actually suffered from mental exhaustion work even more in order to keep up with other colleagues even though the evaluation of their own productivity was difficult at that time due to a lack of comparability. To summarize, satisfaction influences productivity when working from home and satisfaction largely depends on real estate resources. As such, real estate resources play a crucial role when working from home successfully.

5.2 Practical Implications

For organizations and practitioners, several implications can be derived from this study. First, working from home offers opportunities but also risks. Many scholars clarify that working from home will be very much part of a post-COVID future (Brynjolfsson et al. 2020). Therefore, it is necessary to evaluate work from home from different perspectives to maximize opportunities and minimize risks for employees and employers. A necessary first condition for successfully working from home is a suitable job. First investigations suggest that only slightly more than one-third of all jobs in Germany can be performed entirely from home (Dingel and Neimann 2020). Besides this necessary condition, there are other parameters that influence successful work from home. As this study shows, real estate resources are positively related to satisfaction and influence productivity. Real estate resources here specifically include the quality of the property in terms of room layout and the architectural concept and, specifically the design of the workplace at home. This also includes the lighting, room temperature, noise level, and air quality. To close the gap between scientific acknowledgements and practical implications, and to follow the principles of inclusive organizational behavior (e. g., Sabharwal 2014), real estate resources should be more recognized in future decision-making processes of organizations and employees regarding working from home. Employees should evaluate their housing conditions and IEQ factors whether these are suitable for working from home. Organizations in turn can improve satisfaction and thus productivity by providing the workplace at their employees' homes with equipment, furniture, and the necessary technical advice. In addition, organizations could include the equipment of their employees' workplaces at home in the company agreement. Hence, organizations should aim to support physical and functional comfort for their employees' workplaces at home. From a cost-benefit view, this suggests that relatively low costs on the part of the organization (i. e., equipment or furniture) might increase an employee's productivity. Joint exchanges between organizations and employees could create productivity potentials.

Moreover, to improve employees' productivity, social-psychological parameters should be taken into account. Isolation, family-work interference, boredom, and household size are demands that foster burnout and buffer the effects of re-

sources on satisfaction and productivity when working from home. In order to curtail this effect, it is necessary to think about strategies for multilocal work and to reconsider the office space that is currently available. Alternative work locations to the corporate office, such as coworking spaces, and work from home could substitute for unfavorable working conditions at home and at the corporate office by mitigating isolation, distractions and interruptions. In these locations, employees find co-workers or a community and can separate work and family more easily. Organizations should consider taking advantage of these professionalized work settings as employees might not want to travel to the corporate office every day and do not have ideal work settings at home. Management should continue to be able to address the social-psychological demands of working from home. To this end, appropriate measures such as coaching or mentoring should be offered to mitigate the negative effects of the socio-psychological demands. As part of a better separation of work and private life, "well-being managers" could be established in companies to support employees in achieving a good balance between private life and work life when working from home. In addition, the networking of employees, which no longer just happens alone in the corporate office, should be proactively addressed by organizations.

5.3 Limitations and Directions for Future Research

This study illustrates how real estate resources and in particular housing conditions, workplace environment, and IEQ enhance satisfaction and productivity with regard to working from home. To the best of the authors' knowledge, this is one of the first studies to examine the importance of real estate resources when working from home. Furthermore, the study demonstrates that for elaborating on burnout, satisfaction, and productivity, a multidimensional approach including physical, social-psychological, and organizational parameters is necessary. Thus, a more comprehensive understanding of work from home is achieved by integrating different strands of literature.

Additionally, by building on the JD-R model, this study contributes to a more inclusive framework by offering new approaches to extend the existing knowledge about resources and demands of the home workplace. Finally, this study offers implications for organizations and employees on how to handle the transformation of work organization in the future.

While providing a first step toward understanding the impact of real estate resources on work success in a holistic conceptualization for working from home, some limitations are observable and further research steps are necessary. Data were collected at an early stage of the COVID-19 pandemic. Besides the fact that the pandemic enables a broad investigation on work from home, this

pandemic is a worldwide shock and affects various aspects, especially the behavior of the sample. Particularly at the beginning of the pandemic, uncertainty and fear dominated. Forcing people to stay at home is a completely different situation than voluntarily working from home in a non-pandemic situation. Thus, it cannot be excluded that these behavioral changes lead to a bias in the responses of the survey participants. Furthermore, causal and endogenous concerns cannot be fully excluded. During the construction and evaluation of the questionnaire, it cannot be conclusively ruled out that potentially relevant variables may not have been recorded. Most statistical models are, therefore, subject to the risk of omitted variable bias (Walsh et al. 2021). Specific examples of possibly influential upstream variables include income and job quality, which are not included in the socio-psychological demands of this study. This could falsely suggest a direct correlation between housing conditions and satisfaction in the results, although it could be influenced by the omitted variable. Country and household specific circumstances, for instance the need for parents to homeschool their children simultaneously to working from home, while singles may have suffered more from isolation, are not specifically investigated. In addition, there are some reservations about collecting data via MTurk or Clickworker (Kennedy et al. 2020). Attention checks were incorporated into the survey to address these reservations but the study relays on a rather young and high educated sample. Nevertheless, other data collection methods should be used in the future to verify the results. Furthermore, the data set consists of respondents from countries with rather different work cultures: Germany and the United States.

To address these limitations, future research should verify the research model using longitudinal data (Ployhart and Vandenberg 2010; Ployhart and Ward 2011). This could be used, for example, to check whether the positive correlation between burnout and productivity remains or is reversed in the long term. In addition, possible differences between nations could be investigated. Furthermore, it would be meaningful to add further dependent variables into the research model. Optimizing the questionnaire design by measuring other possible upstream variables, such as income as a potential influencing variable, helps to rule out omitted variable bias. Examples for those additional dependent variables could be creativity or turnover intention while working from home. Moreover, it would be advisable to measure the influence of real estate factors on work success in the context of other work locations, such as offices or third places like coworking spaces, as well as during non-pandemic times, in order to demonstrate the high relevance of real estate. Furthermore, it would be interesting to compare the results to office environment resources to investigate whether real estate resources at the office outweigh organizational resources. Finally, future research should study the preferences for different conditions in order to adapt to future housing needs.

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Appendix

Appendix A: Operationalization

Item	*Constructs*	*Sources*
Physical Resources		
reflective	**Indoor Environmental Quality**	
IEQ_1	My workplace is bright.	(Brill and Weidemann 2001; Maarleveld et al. 2009; Krupper 2013)
IEQ_2	The lighting at my workplace is pleasant.	(Brill and Weidemann 2001; Maarleveld et al. 2009; Krupper 2013)
IEQ_3	My workplace is attractively designed.	(Brill and Weidemann 2001; Maarleveld et al. 2009; Krupper 2013)
IEQ_4	The indoor climate at my workplace is pleasant (e. g., temperature, humidity).	(Brill and Weidemann 2001; Maarleveld et al. 2009; Krupper 2013)
reflective	**Housing Conditions**	
HC_1	All in all, I am very satisfied with the spatial situation of my work at home.	(Own research following Amérigo and Aragonés 1990, 1997; Haynes 2007; Maarleveld et al. 2009)
HC_2	All in all, I am very happy with my living situation.	(Own research following Amérigo and Aragonés 1990, 1997; Haynes 2007; Maarleveld et al. 2009)
HC_3	All in all, I am very satisfied with my property.	(Own research following Amérigo and Aragonés 1990, 1997; Haynes 2007; Maarleveld et al. 2009)
HC_4	All in all, I am very satisfied with the location of my property.	(Own research following Amérigo and Aragonés 1990, 1997; Haynes 2007; Maarleveld et al. 2009)
HC_5	All in all, I am very satisfied with the planning concept of my property.	(Own research following Amérigo and Aragonés 1990, 1997; Haynes 2007; Maarleveld et al. 2009)
HC_6	All in all, I am very satisfied with the quality of the construction of my dwelling/construction.	(Own research following Amérigo and Aragonés 1990, 1997; Haynes 2007; Maarleveld et al. 2009)
HC_7	All in all, I am very satisfied with the economy of my housing situation.	(Own research following Amérigo and Aragonés 1990, 1997; Haynes 2007; Maarleveld et al. 2009)

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(Appendix A continued)

Item	*Constructs*	*Sources*
reflective	**Workplace Environment**	
WE_1	The available rooms (equipment, furniture) support the work optimally.	(Own research following Amérigo and Aragonés 1990, 1997; Haynes 2007; Maarleveld et al. 2009)
WE_2	Creativity is fostered by the working environment.	(Own research following Amérigo and Aragonés 1990, 1997; Haynes 2007; Maarleveld et al. 2009)
WE_3	The room acoustics are conducive to work.	(Own research following Amérigo and Aragonés 1990, 1997; Haynes 2007; Maarleveld et al. 2009)
WE_4	Productivity at work is promoted by the spatial environment.	(Own research following Amérigo and Aragonés, 1990, 1997; Haynes 2007; Maarleveld et al. 2009)
Organizational Resources		
reflective	**Decision-making Autonomy**	
DM_1	The job gives me a chance to use my personal initiative or judgement in carrying out the work.	(Hackman and Oldham 1980; Stegmann et al. 2010)
DM_2	The job allows me to make a lot of decisions on my own.	(Hackman and Oldham 1980; Stegmann et al. 2010)
DM_3	The job provides me with significant autonomy in making decisions.	(Hackman and Oldham 1980; Stegmann et al. 2010)
reflective	**Work Scheduling Autonomy**	
WS_1	The job allows me to make my own decisions about how to schedule my work.	(Hackman and Oldham 1980; Stegmann et al. 2010)
WS_2	The job allows me to decide on the order in which things are done on the job.	(Hackman and Oldham 1980; Stegmann et al. 2010)
WS_3	The job allows me to plan how I do my work.	(Hackman and Oldham 1980; Stegmann et al. 2010)
reflective	**Task Variety**	
TV_1	The job involves a great deal of task variety.	(Hackman and Oldham 1980; Stegmann et al. 2010)
TV_2	The job involves doing a number of different things.	(Hackman and Oldham 1980; Stegmann et al. 2010)
TV_3	The job requires the performance of a wide range of tasks.	(Hackman and Oldham 1980; Stegmann et al. 2010)
TV_4	The job involves performing a variety of tasks.	(Hackman and Oldham 1980; Stegmann et al. 2010)

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(Appendix A continued)

Item	*Constructs*	*Sources*
reflective	**Skill Variety**	
SV_1	The job requires a variety of skills.	(Hackman and Oldham 1980; Stegmann et al. 2010)
SV_2	The job requires me to utilize a variety of different skills in order to complete the work.	(Hackman and Oldham 1980; Stegmann et al. 2010)
SV_3	The job requires me to use a number of complex or high-level sills.	(Hackman and Oldham 1980; Stegmann et al. 2010)
SV_4	The job requires the use of a number of skills.	(Hackman and Oldham 1980; Stegmann et al. 2010)
Social-psychological Demands		
reflective	**Isolation**	
Iso_1	I feel lonely at my workplace at home.	(Bloom et al. 2015)
Iso_2	I feel isolated at my workplace at home.	(Bloom et al. 2015)
Iso_3	At my workplace at home, I lack opportunities to socialize at and after work.	(Bloom et al. 2015)
reflective	**Family-Work Interference (inverted)**	
FWI_1	In most ways, my work-life balance is close to my ideal.	(Diener et al. 1985)
FWI_2	So far, I have gotten the important things regarding my work-life balance.	(Diener et al. 1985; Grawitch et al. 2013)
FWI_3	If I could live my life over, I would change almost nothing about my work-life balance.	(Diener et al. 1985; Grawitch et al. 2013)
reflective	**Boredom**	
Bor_1	I feel bored in my job.	(Reijseger et al. 2013; van Wyk et al. 2016)
Bor_2	I am frustrated in my job.	(Reijseger et al. 2013; van Wyk et al. 2016)
Bor_3	I am not able to concentrate.	(Reijseger et al. 2013; van Wyk et al. 2016)
Bor_4	I am not fascinated by my tasks.	(Reijseger et al. 2013; van Wyk et al. 2016)
reflective	**Age**	
reflective	**Household Size**	

(continue next page)

(Appendix A continued)

Item	*Constructs*	*Sources*
Full Mediators		
reflective	**Satisfaction**	
Satis_1	All in all, I am satisfied with my job.	(Cammann et al. 1979; Cammann et al. 1983; Bowling and Hammond 2008; Allen 2001)
Satis_2	I am satisfied with my home office.	Amérigo and Aragonés 1990; Gauger et al. 2020)
Satis_3	Your satisfaction with your life overall.	(Diener et al. 1985; Bowling and Hammond 2008)
Satis_4	Your satisfaction with your financial situation.	(Van Praag et al. 2003; Newman et al. 2008; Gray 2014)
reflective	*Burnout*	
Burn_1	I feel emotionally drained from my work.	(Maslach and Jackson 1986; Moen et al. 2016)
Burn_2	I feel burned out by my work.	(Maslach and Jackson 1986; Moen et al. 2016)
Burn_3	I feel drained at the end of the workday.	(Maslach and Jackson 1986; Moen et al. 2016)
Target Variable		
reflective	**Productivity**	
Prod_1	Working in my home office makes it easier for me to do my work.	(Own research following Krupper 2013)
Prod_2	Working in my home office increases my effectiveness at work.	(Own research following Krupper 2013)
Prod_3	Working in my home office improves my productivity.	(Own research following Krupper 2013)
Prod_4	I have the feeling that working at home is more productive than working at my professional office workstation.	(Own research following Krupper 2013)

Note: Appendix A presents the definition of the variables and their sources. The name of the items is derived from an abbreviation of the variable name. For example, Prod_1-4 stands for the items one to four of the construct Productivity.

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