Is job performance conditioned by work-from-home demands and resources?

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ABSTRACT

Substantial research has been dedicated to describing remote work, yet the understanding of working from home since the Covid-19 pandemic remains rather limited. While recognising the necessity for exploring employees' perceptions and interaction with technology as the ultimate requirement for a functional work-from-home, this study observes the factors that would determine job performance. Thus, adhering to the Job Demands-Resources theory, we argue that employees' ICT (Information and Communication Technologies) anxiety and smartphone addiction can inhibit their work progress by provoking interruptions in the course and reducing the efficacy, further affecting performance. PLS-SEM (Partial Least Squares - Structural Equation Modelling) was employed to analyse the data collected by 363 employees working from home due to Covid-19 restrictive measures. The results reveal that employees' reluctance and apprehensiveness related to the use of ICT and their dependency on smartphone usage act as distractions that impact the efficient achievement of work goals. The ensued findings valuably contribute to the relevant body of knowledge, while the implications offer helpful strategies for improving work-from-home. Finally, companies must simplify the transition to the home office, providing employees with job management and tools to ensure uninterrupted and productive working processes.

1. Introduction

Recent research regarding the use of new technologies during the Covid-19 isolation has reported widespread popularity and intensified usage of different technologies and tools, given their potential to inform and provide support. For personal and professional purposes, the use of new technology has been continuously rising in the past decades yet has demonstrated remarkable growth during times of crisis as the means for individuals to stay connected [1,2]. Although their increasing application in everyday lives has been evident, new technologies have become especially vital since the Covid-19 pandemic. They have been assisting people searching for information regarding the spread, for communication with friends and family in isolation, and for a continued operation of companies whose employees are required to work from home. Given the escalated use of devices, apps and tools, the attention of the research has been focused on the benefits of integrating new technologies' instruments in the battle to overcome the cognitive and emotional challenges of isolation, which affected personal and professional life's

logistics [3]. However, the relationship that individuals have with those new technologies has not been appropriately addressed. How people perceive and interact with technology has become a disquieting component of Covid-19, particularly after acknowledging an increase in the addictive and apprehensive behaviour reported to the pandemic [4]. Therefore, recognising the urgency to go further than the mere coordination of work and family obligations, this study concentrates on the less explored individual relationship with technology, entailing job accomplishments.

In fact, one of the aspects that have been through a significant change is professional engagement, where companies and employees have been facing completely virtual working environments, distant communication and online task management, implementation of new methods for a seamless execution of activities and engagement directions that aim at employees' work-life balance [5]. It has been generally considered that working from home can be a fructiferous alternative to the office-established work in the sense of a successful organisation and operation, spotting Internet and smartphone services as indispensable in

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these critical moments [2]. However, experts describe it as rather demanding the transition and adaptation to this extended use of new technology's tools and apps, considering as a serious problem if the access to those was disrupted or invaded [1]. Apparently, adverse circumstances directly affect employees' efficiency and then affect companies' outcomes. Some of the most conditioned activities are mentioned to be the interaction resulting from the Covid-19 isolation, work activities planning, unlimited working time bringing lack of life-work balance, or the company's equipment and procedures necessary for working from home, which all finally impact business production and performance [6].

Keeping in mind the fluctuations in the working conditions during this shift to a home office and the mixed results among companies implementing it, here raises the need to identify the home office resources and demands that could determine the evolution of the operational activities and companies' outcomes. Grounding on the Job Demands-Resources theory (JD-R) [7], we identify Information and Communication Technology (ICT) anxiety and smartphone addiction as the critical conditions employees undergo, especially emphasised due to Covid-19 isolation. Further, we explore their influence on working activities interruption and efficacy, shaping employees' work performance.

2. Theoretical background

2.1. Work-from-home critical issues

The term explaining the use of new technologies for working purposes outside of the office or the usual company's location has been known under different designations, such as telework, telecommuting, remote work. All of those concepts describe activities understanding "the use of information and communications technologies (ICTs), such as smartphones, tablets, laptops, desktop computers, for work that is performed outside the employer's premises" [6]. However, what has been typical of the remote work since the beginning of the Covid-19 pandemic, is that job activities are exclusively carried out from employees' homes, described more precisely by the work-from-home or home office denomination.

Previous literature has identified the encouraged use of ICT, especially smartphones, to perform work activities remotely, underlining this as a beneficial approach for organising companies and employees' duties [8,9]. ICT and smartphones' usage in everyday job tasks has been confirmed to increase collaboration, communication, efficiency and production [6,10]. However, although these technologies have indicated benefits for jobs' processes and progress, people still report a lack of time and capacities for adaptation to this new way of action, provoking psychological side effects such as anxiety or addiction [11].

Actually, ICT elements introduced to employees with the aim to facilitate their working process and progress might have an adverse effect in reality and drive them to engage in production-deviant behaviours [12]. This issue is especially critical in integrating new technological tools and smartphones for work, which has turned into a standard practice for realising personal matters while working [13]. These deviant use, especially smartphones during work, with social, informational, leisure or emotional purposes, could even develop into dependences related to the new technologies, further affecting employees' work progress [14,15]. This situation is expected to arise in workplaces that are considered somewhat unfavourable, such as the case of the currently isolated work-from-home [12,16].

The previous is in accordance with earlier findings that people's anxiety detected in relation to using new technologies has been acknowledged as a significant reason for the weak implementation of these in the working tasks [17,18]. Similarly, it was found that the increased use of smartphones can lead employees to a continued and uncontrolled verification of smartphone status to the point of developing a smartphone addiction [10]. Hence, this conflicting ICT and

smartphone use comes accompanied by increased distractions and interruptions, after which job assignments and results come to be questioned [19].

2.2. Job Demands-Resources theory

The JD-R theory [7], widely used to explain working environments and execution, claims that the working conditions can be divided into two categories, job demands and job resources. These are assumed to influence employees' working activities, which further impact organisational outcomes. Job demands and resources might induce negative and positive impacts, provoking employees' sensations of strain and motivation, shaping their working tasks, which in turn impacts job performance. It has been considered that job demands and resources induce individual positive and negative effects, yet they also interact with each other and have a cooperating impact [20].

According to Bakker and Demerouti [7,20,21], job *demands* are presented with job features related to the workload and tasks with particular complexity, requiring employees' specific physical or psychological effort and energy for their delivery. They can refer to physical, psychological, social or organisational aspects of the job related to the strains encountered in working activities. However, different levels of job demands can be found depending on the industry, varying from more physical (e.g., job in construction) to more cognitive efforts (e.g., science careers, remote workers). Job *resources* are connected to support, efficiency and motivational job facets, which, if met, are expected to fulfil employees' basic psychological needs, relatedness, competence, autonomy. Crucial for the motivation, satisfactory achievement of their goals or engagement, they are characterised by functional job elements that could reduce employees' efforts and stimulate individual development.

Job demands and resources have included another more specific depiction, referring to personal demands and resources. Personal demands describe employees' personal requirements, which they set for their effort and performance at work [21,22]. They have been observed through workaholism, emotional instability, perfectionism or performance expectations [21,23,24]. Personal resources denote the capacities, employees' ability to control the working environment, impacting in this way their goal-related outcomes, motivation and performance [25,26]. Most commonly, personal resources have been explored by the level of employees' self-efficacy, autonomy, optimism or self-esteem [21,27,28]. It has been considered that the resources help mitigate the negative impact of the demands, generate access to other resources that would facilitate this process or reinforce resources that are lacking [29]. Thus, the research attention has been more widely driven to the personal resources, usually assuming the actual presence of these rather than their deficiency [7].

Nonetheless, depending on employees' perception of the job objective's difficulty, the final task might require major or minor demands and resources, bringing those in a position to be under or overestimated as valuable antecedents of employees' strain or motivation, and consequently job performance [29,30]. Challenging job demands are usually paired with reduced employees' psychological or physical resources, producing detrimental effects on job tasks execution [31]. Consistently, the lack of job resources, more evident in demanding jobs, such as remote work, largely depends on the job tasks and context and acts as barriers towards productive work outcomes [25]. Lack of resources might contribute to an increased perception of demanding job tasks, meaning that if employees do not count on personal resources which could help in the working process, they perceive that resistance and are more susceptible to work demands. That translates both demands and resources' impacts into negative ones for the employees' activities [29]. Therefore, when employees face critical job demands and do not count on adequate resources that would assist in achieving those demands (i. e., they identify resource deficit), then weak cognitive and emotional states could be expected to take place [31].

With this in mind, a gap in the research has been recognised. This study observes the adverse impact of personal demands and resources on disturbing or stimulating working processes, being those of great importance for the new way of work-from-home due to the Covid-19 isolation.

Considering the current situation of ICT and smartphone use for working from home, particularly accentuated due to the Covid-19 pandemic, we propose a model where job demands will be observed through the lens of ICT anxiety and job resources within the scope of smartphone addiction. Following the JD-R theory, we conceptualise the variables and provide reasoning for the proposed relationships in the subsequent sections.

2.3. ICT anxiety impact in the work-from-home

In general use, ICT or technology anxiety has been considered one of the most substantial personal barriers to adopting and using technology [32–34]. Describing an individual's feeling of discomfort while interacting with technology, ICT anxiety shows the user's tendency to be reluctant to employ new technologies [35]. It underlines the importance of having endeavour for ICT use, helping to avoid interference in the interaction with new technologies [36]. The apprehensiveness and hesitation in using the necessary technology for completing a task occur possibly because of lack of preparation or previous negative experiences, resulting in a dead-end [37]. ICT anxiety is considered to generate high levels of unpleasant sensations about the current or forthcoming use of the device and is defined as the fear that using the precise technology might have negative consequences, such as destroying the equipment, losing information or making similar mistakes [38,39].

In consideration of the job-design literature, it was suggested that employees must feel assertive in using new technologies to handle them efficiently. On the contrary, their job tasks might be disrupted [40,41]. Thus, employees scoring high in ICT anxiety are believed to present troubles in performing their daily job activities efficiently and effectively [42].

Companies implementing telework during the Covid-19 crisis recognised the importance of providing employees with a working climate that would enable the normal development of all the usual practices yet in a work-from-home environment. Nevertheless, the home office transition has identified difficulties and obstacles in providing all the necessary equipment and ensuring its correct and continuous implementation, affecting the continued working process and disrupting companies' outcomes [6]. The anxiety that employees have been experiencing since the pandemic has played a vital role in how they have carried out their work-from-home job tasks [4]. The degree to which the employees feel confident and competent in using ICT determines their capacity to efficiently and continuously integrate new technologies in accomplishing working tasks [17].

In view of the JR-D premises depicting job demands, it has been evidenced that employees working from home with optimal use of a specified technology will work with minimal interruptions and more efficient results [43]. Subsequently, if the conditions mentioned above are not met due to questionable personal performance with ICT, it is expected that negative effects could take place. Employees' ICT anxiety, triggered by the use of new technologies, such as the company's hardware or software implemented in the home office due to Covid-19 isolation, provokes the tasks to be perceived as difficult, risky or problematic. That prevents employees from completing their working assignments with efficacy and constancy [40,44]. The first hypothesis proposes that:

H1. Employees' ICT anxiety perceived when using the company's new technologies will incite (a) interruptions in the working tasks and (b) lack of job efficacy in the work-from-home.

2.4. Smartphone addiction impact in the work-from-home

Frequent use of technology reinforces smartphone use while leaving short-term consequences on attention and distraction and long-term effects on personality disorders, such as addiction [45]. Smartphone addiction is a form of technology-related addictive behaviour associated with a compulsive, problematic and excessive usage of smartphones, to the point of creating a dependence [46]. It is described as the uncontrollable use of smartphone devices, which harms an individual's relationships, time management and behaviours [11]. The consequences of this bond are found to result in health and social problems, poor performance and negatively affecting personal and professional communication [47]. Individuals experiencing smartphone addiction, quickly found their relationships conflicted because of the intense attachment, engagement and even anxiety they generate in the interaction with smartphones [10,48]. They use their smartphones constantly, excessively and obsessively, which leads them to the heavier use of the device, interfering with all aspects of their daily lives, including work [11,49].

The smartphone implementation for working duties was principally meant to simplify tasks and communication, given the possibility to the employee to be more responsive to work activities, having access to all the necessary tools anytime and anywhere, in this way increasing productivity. However, precisely this constant engagement was confirmed to bring to work overload, smartphone addiction or conflicts using a company's technology [10,50]. When employees experience smartphone addiction, do not have the capacity to correctly respond to obligations, the ability to control working tasks turns out to be smaller and the accurate achievement of the operational goals more problematic. Hence, the addictive use of smartphones for personal and professional purposes during working hours damages employees work capability and efficacy [48].

The evidence from the Covid-19 confinement demonstrates an expanding use of smartphones, developing from individuals' need to stay informed, connected and cope with the emergency [1,2,51,52]. Smartphones are massively transforming into the unique possibility for ubiquitous operation, establishing new practices for working while intensifying addictive behaviours [53–55]. Employees whose working tasks demand extensive use of the company's ICT and smartphone are expected to experience negative outcomes in their interactions [11,50, 56]. Namely, smartphone-addicted employees present impaired concentration and collaboration at work, provoked by the practice of continuously checking the smartphone for messages [10].

Under the JR-D theory, the excessive use of new technologies during the work-from-home situation resulting from the Covid-19 pandemic is expected to have a damaging effect on employees' work-related activities [28]. Consequently, because of the habitual and uncontrolled use of smartphone devices and apps, smartphone addiction may lead employees to neglect assignments, provoke distractions, and weaken their work efficacy [45,46,50]. Accordingly, the following hypothesis assumes that:

H2. Employees' smartphone addiction will incite (a) interruptions in the working tasks and (b) lack of job efficacy in the work-from-home.

2.5. Interruption and efficacy impact on the work-from-home performance

Attending the principles of the JR-D theory, we recall that job strain elements impose a negative effect on job motivation and performance. In contrast, job motivation aspects positively impact employees' job performance [20]. Therefore, job performance will be determined by the way employees' working tasks develop [57].

In accordance with this is the previous literature, reporting difficulties in employees' working processes related to the mentioned ICT and smartphone usage, evidenced by the trouble to concentrate on a task

for a longer time, and so make more mistakes [10,48]. They get to be easily and greatly distracted by their simultaneous use of several devices, showing ICT and smartphone use concerns and recognising the need to check their smartphones constantly. This can further provoke a lack of application and continuous disruptions in their daily working activity [11,44]. The interruptions that employees experience, refer to obstructions in the working process, prompting hassle to concentrate and interfering with working duties [10]. These uncontrolled sources of interruption eventually reduce employees' work efficacy and performance [40,42]. Then, it is supposed that:

H3. Perceived interruptions in the working tasks will inhibit employees' (a) job efficacy and (b) job performance in the work-from-home.

Job performance has been considered a vital factor to describe organisational outcome and success [10]. How employees perform in their working activities directly determines companies' results, so it is crucial to encourage efficient working [58,59].

Additionally, job performance is primarily dependent on the efficacy with which the task is executed, especially when this efficacy involves a working environment where new technologies use is critical [60]. The time needed to accomplish working duties, the execution of the schedule and the focus and course of action will describe the level of efficacy that employees reach, which in turn will determine their performance at work [42,48,61]. Hence, the final hypothesis expects that:

H4. Employees' job efficacy will affect their job performance in the work-from-home.

Fig. 1 presents the proposed model for determining employees' job performance in the work-from-home environment during the Covid-19 isolation.

3. Method

3.1. Procedure

After a thorough literature review on the home office characteristics, appearing to be especially critical during the Covid-19 quarantine, the constructs and scales to be researched were carefully chosen. A pre-test with ten managers and twenty individuals with experience in a remote work environment was performed to guarantee relevant and comprehensive enquiry. Next, first-time work-from-home employees were consulted to more accurately observe this specific situation imposed by the Covid-19 restrictions. The final questionnaire was distributed in English, and it was delivered online at websites expected to reach remote employees. Respondents were asked to report their experience with aspects affecting their work-from-home performance during Covid-19 after filter questions substantiating their home office activity due to the pandemic. In the introduction of the survey, a description was given about the home office during COVID-19 isolation to avoid ambiguity and problems of interpretation related to work characteristics. The similarity of responsibilities and quantity of working tasks between the home office and physical office was highlighted.

The sampling was carried out with purposive sampling, a non-probabilistic sampling method, which is recommended specifically to research a specific predefined group [62]. Given that the survey target were employees working from home during Covid-19, and an adequate record of work-from-home employees, who could participate in the research, was not available to the authors, the chosen technique was considered appropriate.

3.2. Measures and analyses

The scales used for the research were adapted from the previous literature to the context of the study. For the conceptualisation and measurement of the constructs, the following studies were consulted:

Thatcher et al. (2007) - for company ICT anxiety, Aldás-Manzano et al. [63] - for smartphone addiction, Wang and Suh [64] - for interruption, Taylor et al. (2013) - for job efficacy, and Mascagna et al. [65] - for job performance.

All items, presented in detail in Table 1, have been measured using 5-point Likert scales, ranging from 1 (strongly disagree) to 5 (strongly agree). Company ICT anxiety, smartphone addiction, interruption and job efficacy were considered formative and the job performance a reflective variable, following the suggested practice bearing in mind constructs' theoretical conceptualisation and correct interpretation [66, 67].

According to recommendations from the literature [68], Partial Least Squares - Structural Equation Modelling (PLS-SEM) was employed for the data analyses, as the methodology that best suits the proposed model characteristics, using the SmartPLS3 software [69]. Therefore, matching the usual criteria and procedure for complex models handling reflective and formative constructs, the robustness check for the measurement model was first confirmed. Then, the explanatory and predictive power of the structural model was proved. Finally, the significance and relevance of the suggested relationships was corroborated.

4. Results

4.1. Sample description

The final sample counts with 363 contributions, indicating a sampling error of $\pm 5.14\%$, at a 95% confidence level for the case of maximum uncertainty. A power analysis was performed to determine the suitable size of the sample. G*Power software eas used. With a sample of N = 363, at a standard level of significance $\alpha = 0.05$, effect size $f^2 = 0.15$ and eight predictors, the obtained 99.99% power level, exceeded the recommended 80%, was confirmed to be satisfactory [70, 71].

The socio-demographic characteristics of the sample show that the majority of the respondents are women (53.2%), the most common age is from 35 to 44 years (44.1%), and almost all of them own a university degree (96.7%); more participants indicated to be married (50.7%), without children (55.9%). The greatest representation was found in the job sectors like education and training (36.9%), science, technology, engineering, and mathematics (20.1%) and information technology (16.8%).

4.2. Measurement model assessment

Following the recommended PLS-SEM procedure, reliability and validity of the indicators and constructs are observed in the measurement model, where the convergent and discriminant validity is also evaluated [72]. Given the treatment of formative, besides reflective variables, collinearity must, likewise, be assessed.

In the process of the measurement model estimation (Table 1), first, the scales had to be refined, leaving out one item from the smartphone addiction scale due to multicollinearity problems. Second, the coefficients of the items building formative and reflective constructs were confirmed to be significant at a 95% confidence level (t ≥ 1.96).[1] Third, the reliability and internal consistency of the scales were validated with Cronbach's alpha (α ≥ 0.7) and composite reliability (CR > 0.7), and the

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[1] When formative constructs are analysed, the size and direction of the items' weights is not decisive for their retention in the construct, but only the significance. However, if the weights are not statistically significant, the loadings of the same items should be observed. The loadings' significance is the sufficient condition for maintaining the item for construct measurement The preferable, although not restricted, loading value is 0.5. This is opposite to how reflective constructs are treated, where items' loadings, beside statistically significant, are required to be equal to or higher than 0.70 [78].
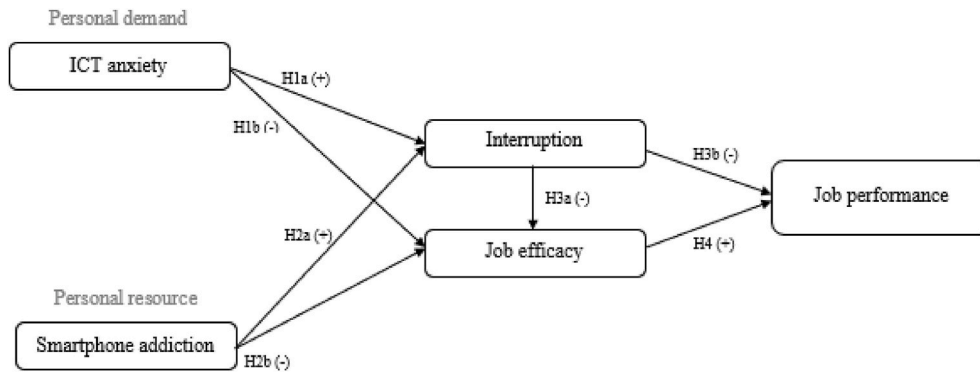
Fig. 1. Proposed research model.

Table 1
Measurement model estimation.

Company ICT anxiety	w (weights)	λ (loadings)
Construct name and measurement items		
I feel apprehensive about using the company's ICT.	.785	0.911
It scares me to think that I could cause the company's ICT (software or hardware) to destroy a large amount of information by hitting the wrong key.	.304	0.648
I hesitate to use the company's ICT for fear of making mistakes that I cannot correct.	.153	0.577
Smartphone addiction		
Using a smartphone is one of my main daily activities.	.710	0.818
If my smartphone is not working, I really miss it.	-.030	0.671
My smartphone is important in my life.	-.273	0.577
I cannot stand not using my smartphone for several days.	deleted	
I would be lost without my smartphone.	.736	0.812
Interruption		
My work is always interrupted when working from home.	.385	0.906
I feel my work environment is quite disturbing when working from home.	.344	0.921
My concentration is inhibited when working from home.	.366	0.914
Job efficacy[a]		
Work plans often change in mid-course while working from home.	-.070	0.471
I spend too much time in meetings, rather than at work when working from home.	-.123	0.326
I experience many interruptions in my daily work when working from home.	.712	0.909
I dedicate long hours, but I still accomplish very little, when working from home.	.403	0.805
My colleagues and I spend a lot of time talking about personal matters when working from home.	.188	0.536

Job performance (AVE = .73; α = .87; CR = .91)	λ (loadings)
The home office helps me achieve my business objectives more efficiently than working from the usual office.	.876
The adoption of the home office is useful to improve my performance within the company.	.915
The adoption of the home office is useful to improve the performance of everyone within the company.	.831
The adoption of the home office is useful to increase company profits.	.792

Note: all loadings are significant at confidence level $p < 0.05$.
[a] Reverse code scale.

convergent validity was verified through the average variance extracted values (AVE $\geq$ 0.5) [73].

Attending the established practice when formative constructs are observed [68,74], multicollinearity problems had to be ruled out, corroborating the good values of the Variance Inflation Factor (VIF < 5). After that, applying the Fornell and Larcker Criterion [75], the

discriminant validity was evidenced by AVE values of the reflective constructs showing greater figures than their squared correlations with other constructs (Table 2).

Harman's single-factor test [76] was assessed to discard problems of common-method bias for the proposed model. It was concluded that the unique factor described 24.37% of the variance, while the cumulative variance explained by all the factors in the model assumed 60.05%.

Finally, the Standardised Root Mean Square Residual (SRMR = 0.05) and the Normed Fit Index (NFI = 0.93) were estimated to confirm a good model fit of the proposed model, with a value largely below the recommended cut of 0.08 and above 0.90, respectively [77–79].

4.3. Hypotheses testing

In the process of the structural model estimation, multicollinearity issues had to be discarded among the predictor constructs, sustaining appropriate values (VIF < 5) [78].

Before proceeding to the hypotheses testing, it was necessary to confirm that R^2 of the dependent variables exceeded 0.1 [80]. For the case of this research, these measurements showed suitable values for interruption ($R^2 = 0.11$), job efficacy ($R^2 = 0.59$) and job performance ($R^2 = 0.20$), by which a good explanatory power of the model could be affirmed.

Subsequently, it was proceeded with the proposed hypotheses estimation, where the fulfilment of all of them was corroborated (Table 3).

Next, Q^2 values larger than zero for interruption ($Q^2 = 0.04$), job efficacy ($Q^2 = 0.25$) and job performance ($Q^2 = 0.10$), validate the satisfactory predictive relevance of the endogenous constructs in the model.

Finally, to control the explanatory power of the model and guarantee the investigation of employees with no vast differences in their remote work perceptions and intentions, control analysis was carried out. Analysis was performed to control for the effect of several factors

Table 2
Latent variables correlation matrix.

	ICTA	SA	I	JE	JP
Company ICT anxiety (ICTA)	–				
Smartphone addiction (SA)	.09	–			
Interruption (I)	.20	.12	–		
Job efficacy (JE)	-.24	-.16	-.76	–	
Job performance (JP)	-.02	.04	-.38	.35	–
Age	.008	-.243	-.081	.044	.015
Gender	-.084	.106	-.072	.042	.104
Education	-.004	.063	.119	-.135	.022
Marital status	.054	-.126	.084	-.024	-.073
Family situation	-.045	.056	-.143	.133	.068
Country	-.055	-.050	-.054	.044	-.013
Previous work-from-home	.030	.003	.166	-.158	-.136
Job sector	-.032	.158	-.092	.108	.113

Table 3
Structural model estimation.

Hypothesised relationships	Coefficient β (t Value)	p-level	Result
H1: Employees' ICT anxiety:			
(a) increases interruptions in the working tasks	.192 (3.674)	0.000	Supported
(b) reduces job efficacy.	-.081 (2.103)	0.036	Supported
H2: Employees' smartphone addiction:			
(a) increases interruptions in the working tasks	.102 (2.025)	0.043	Supported
(b) reduces job efficacy.	-.065 (1.738)	0.083	Supported
H3: Interruptions in the working tasks:			
(a) reduce employees' job efficacy	-.738 (23.576)	0.000	Supported
(b) reduce employees' job performance.	-.256 (3.306)	0.001	Supported
H4: Employees' job efficacy affects job performance.	.159 (2.017)	0.044	Supported

considered in the previous literature as potential influencers to employees' behavioural responses in terms of performance [11,81]. The aim was to determine whether the significance of the interactions proposed in the model would stay unaffected after the inclusion of the control construct [82–84]. The results exposed that age (β = −0.013; p = 0.787), gender (β = 0.079; p = 0.082), education (β = 0.076; p = 0.185), marital status (β = −0.048; p = 0.272), family situation (β = 0.010; p = 0.842), country (β = −0.033; p = 0.485), the previous implementation of work-from-home (β = −0.070; p = 0.160) and job sector (β = 0.073; p = 0.150) did not alter any of the relationships composing the model. In line with these findings, the consistency of the implications could be concluded for portraying employees' conduct in respect to remote work during a crisis.

5. Discussion and conclusion

As observed in the previous literature review, teleworking has been implemented, even before the Covid-19 pandemic, to generate an autonomous and productive working environment. Nonetheless, the job routines in home settings have shown to be highly demanding, quite accentuated during the quarantine, so many employees experience degradation in their job efficiency and performance [85–87]. Experts have been reporting different circumstances that employees experience in work-from-home due to Covid-19. Work-family interface, children's school tasks, search for Covid-19 spread news, delays because of virtual communication problems or job disruptions owing to lack of established rules of engagement all have become a part of everyday errands of the work-from-home agenda [86]. The hardware and software functions of the technology that companies integrate with this transition process have been underlined as a crucial issue in its adoption and use. It was suggested that if not employed according to users' controlled requirements and capacities, new technologies could jeopardise the working tasks, giving rise to distressing behaviours, for instance, new technologies-related anxiety and addiction [11,88].

In light of this, the study's objective was to observe how the difficulties in using new technologies, precisely companies' ICT and smartphones, influence the working process and progress. Answering the call to not underestimate the interaction with technology that individuals present since the pandemic while recalling the possible negative consequences of the challenging work-from-home [1,4], this research contributes to understanding better how to design remote work functions and environment in times of crisis. Reflecting the principles of the JD-R theory [7], the results supported all the proposed hypotheses. Thus, it was confirmed that employees' ICT anxiety - H1, perceived when using the company's equipment (job demand), and their smartphone addiction – H2 (job resource) provoke job interruptions (strain) and all these together negatively affect job efficacy (motivation). ICT anxiety, as one of the major impediments for technology use, demands from employees

certain confidence when implementing ICT in their job tasks [34]. It acts as an indicator of efficient working, so it was likely to find disrupted and troubled working tasks for higher levels of ICT anxiety [17,41].

Furthermore, employees used to excessive interaction with smartphones, lack resources to reach job goals [10,49]. Hence, in line with the proposed, working quality is found corrupted, expectedly fomenting job debilitation [11]. Moreover, employees' efficacy and performance are conditioned to a great extent by the interruptions they undergo – H3, which explains why employees experiencing job obstacles, in the sense of interferences of their duties, are known to suffer impediments in the course of adequate practice [10,40,42]. This is why attention should be put on the avoidance of distracting elements. Finally, it was evidenced that job efficacy is positively related to employees' performance – H4, evidencing the likelihood of productive working from home during a crisis [59]. In fact, interruption's impact on job performance seems to be slightly higher than the impact of efficacy on performance, meaning that although employees consider themselves efficient in their jobs, suffering interruptions could vastly jeopardise their performance. It can be concluded that, to achieve an adequate job performance in the work-from-home, both distraction and efficacy elements of the working activity should be addressed, as the factors that could increase or decrease job operation. As well, validating that the proposed relationships were not altered in any way by the control variables, the findings could guarantee homogeneous implications regarding employees' perceptions of and behavioural responses to working from home. Therefore, ICT anxiety and smartphone addiction represent the working environment conditions, implying that if the required demands and resources are not considered suitable, job operation will be harmed, leaving direct negative consequences on job performance [89,90].

5.1. Theoretical contribution

Despite the intensified integration of smartphones and other technologies across different industries and job positions, little comprehension is possible of the impact of the Covid-19 pandemic on employees' perceptions and reactions to the work-from-home specifics. This research, tackling the need for superior knowledge, has represented the working environment through the psychological states emphasised as critical by employees' working from home due to Covid-19 isolation measures.

The proposed model has confirmed the JD-R theory for the home office setting, explicitly focusing on employees' relationship with ICT and smartphones, and has further contributed with a distinctive investigation of personal demands and resources in the newly given circumstances of the work-from-home due to crisis. This investigation underpinned the possible adverse effects of both demands and resources, which rise significantly in conditions of challenging job settings. The conclusions, driven from the results of this research, show to be in accordance with the previous literature studying job performance as the crucial aspect of companies' success influenced by positive or negative working practices (Bai et al., 2019; Bakker & Demerouti, 2018). Notably, it is evidenced the importance to highlight the observation of employees' responses to companies' attributes as the key to a consolidative and sustainable working environment.

Extending the knowledge on employees' experiences with work-from-home is especially relevant for the current situation when companies are obliged to transit towards virtual functioning. Still, the applicability of the conclusions to general remote work is considered suitable, given the nature of the new technologies related encounters. Finally, offering a clearer picture of the Covid-19 work-from-home aftermath, the insights provide understanding to identify obstacles in the working process and protect firms' operation.

5.2. Managerial implications

Given those mentioned above, it is clear that a user-friendly working

environment is a must. Companies' choice of suitable technology for the work-from-home continued function and their capacity to make this usage easy and controllable will create a comfortable working climate. Their support in using new technologies that would facilitate working processes would foster positive perceptions and behavioural responses. Therefore, companies need to avoid all hassles that employees deal with in the work-from-home setting to diminish interruptions and increase efficacy in the operational activities. An improved employees' performance will be guaranteed.

To begin with, employees report experiencing more distractions, provoked by the fear to use companies' ICT, when the transition to working-from-home has been done without preparation and training [85,91]. According to the current evidence aiming to establish applicable practices for assuring sound performance during Covid-19 [6], it would be recommendable for managers to organise courses for the equipment use and tutorials, which employees could lean on each time they face a problem with the specific hardware or software. The efficacy and interruptions are affected by employees' hesitation and apprehensiveness regarding ICT, which could be handled through better information about their use. Therefore, enterprise social media, an open chat or forum where employees could share knowledge and discuss related issues with their co-workers, could make learning to use the system faster and easier, making employees more confident, assertive, and relaxed in ICT usage [92]. With most employees working from home and the recurring global cyberattacks, companies are searching for ways to secure their remote workforce and data, urging the upskilling to be the absolute necessity. Providing training on ICT security and privacy could be one option to combat employees' anxiety about making a mistake.

To continue, while smartphones can be a valuable tool for seamless work and communication with colleagues, it cannot be forgotten that these devices have an extended use, and especially in times of Covid-19 crises when people point out their needs for information and support, safety and security, formal or informal communication [1,19]. Therefore, companies could offer opportunities for a functional inclusion of smartphones as part of the regular working equipment, but only to the extent to which employees feel comfortable. Smartphone use has become one of the leading daily activities of individuals, presenting impatience and irritation by the impossibility to access the device, which is why smartphone use for job purposes must be well planned and strictly specified. It could be helpful for companies to consult their employees before deciding so that they do not induce an uncontrolled usage of smartphones, which could later have serious adverse outcomes. Moreover, given the actual addiction that many employees are already recognising [87], managers should try engaging them in tasks that would mitigate their use of smartphones, at least during working hours. Including social activity or friendly supervision among colleagues, such as smartphone-free hours and inciting more physical contact, could substitute smartphone communication. In the current Covid-19 situation, when the need for company is emphasised, proposing assignments that understand higher professional interaction with colleagues or working in groups via video call could alleviate employees' need to use their smartphones constantly and lessen the level of dependence they create with the device [3,6].

Finally, unrestricted by anxious or addictive behaviours, employees should not experience distractions that undermine their focus and concentration. Additionally, they would not experience a change in plans, disruption in tasks or congested working, being able to complete their job with efficacy. All of this will help employees achieve their job-related objectives, improve personal and collective performance, and enhance companies' function.

5.3. Limitations and future research lines

While the findings of this research improve the insights of working from home in a pandemic, the conclusions disclose limitations, which offer avenues for future research. Thus, firstly, the restricted generalisation of the results could be improved with an extended study collecting a more extensive data sample representative of a particular industry. Secondly, a more comprehensive JD-R model could be proposed, where demands and resources from the company's perspective will be simultaneously integrated with personal ones. In this way, it could, likewise, be expected to obtain better R^2 results of the endogenous constructs. Although the current constructs represent employees' capacity to work from home, additional dimensions such as multi-tasking, information technology ability or self-organisation might be explaining more variance.

Furthermore, bearing in mind the Covid-19 provoked stress, pessimism or phobia that individuals have been experiencing during the Covid-19 quarantine, it can be beneficial to investigate more thoroughly these challenging psychological states, so that their source could be found and they could be addressed from the basis, as the factors indirectly affecting personal and professional decisions and outcomes [55, 93]. It could be helpful to introduce a variable like the strength of the situation [94] to quantify the extent to which the parameters of the situation (working from home vs office) allow individuals to succumb to their smartphone addiction, for instance. Finally, similarities and differences between employees' sensations during Covid-19 work-from-home and those perceived in the after-Covid-19 working from home or physically in the office might be contemplated. In this way, more clear advantages and disadvantages of the home office, considering the level of social supervision, likewise, could be contrasted as a strategy for implementing remote work as an alternative for companies' different operations.

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