

EFFECTS OF SMARTWORKING ON PRODUCTIVITY AND PERSONAL AND JOB WELLBEING IN A SAMPLE OF EMPLOYEES OF THE UNIVERSITY OF L'AQUILA

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ABSTRACT

The widespread use of smart working represents a relevant aspect in the complex context of change linked to the Covid-19 pandemic. Since March 2020, the University of L'Aquila, in order to protect students and employees' health, has adopted different measures against COVID-19, including the introduction of distance learning for students and smart working for almost all of its employees.

The aim of this study is to investigate the impact of smart working on job productivity and on workers personal and professional well-being.

A questionnaire consisting of 24 multiple-choice questions was sent by mail to all of the workers of the University of L'Aquila. Participation was free and voluntary. The data obtained were processed through software RStudio.

A total 510 workers, 245 men (48%) and 265 women (52%), responded to the questionnaire. The advanced age group was 50-59 years (226 workers). We divided our sample into 3 subgroups, based on the task: teaching staff (247 workers, 48.5%), administrative staff (228 workers, 44.7%) and "other" staff, a miscellaneous subgroup (31 employees, 6.8%). Almost all the employees state they have worked at their home (94.7%), with their own PC (97.2%). In all subgroups, the majority of employees declared they "worked more hours" than usual (70.8% administrative staff, 58.8% teachers, 53.3% "other") with a statistically significant difference in administrative staff both compared to the other 2 subgroups ($p = 0.023$; $p = 0.032$) and reports an "increase in perceived job intensity", especially among office workers (administrative staff vs teachers; $p = 0.012$). The most of the office workers believe that smart working has positively impacted on "work efficiency" and "their ability to reach goals in adequate time", while among teachers, 55% believe that smart working had a negative impact on the relationship with colleagues (vs 30% of administrative staff) and 41% on team working dynamics and efficiency (vs 21% of administrative staff). Regarding the impact of smart working on the different aspects of personal life (dimension investigated by asking workers to report a maximum of 3 out of 8 possible options), most employees stress they were able to "use their time better" (29.9%), "be more productive at work" (15.8%), "better assist family members in difficulty" (13.9%); only 3.8% indicated "have more free time" and 5.6% "increase trust in the Administration". The advantages most reported are "reduction of travel times and costs" and "more flexibility and working autonomy" while only a minority of employees, mostly men, reporting having had "more time for themselves". Among the disadvantages, the most common concern "isolation from the working environment", "excessive extension of working hours and stress from lack of disconnection", especially in women and "difficulty of managing work spaces", especially in men. Overall, almost 70% of the total sample expressed a good degree of satisfaction with the smart working experience, resulting the administrative staff being the most satisfied subgroup. ($p < 0.05$). Office employees are more interested in continuing with this type of work, both with respect to teachers ($p = 0.0007$) and with respect to "other" staff (0.023).

The recent pandemic emergency has made it necessary new organizational models in the workplace, including the massive use of smart working. This has led to the possibility of exploring the effects of remote work on workers' well-being, both in professional and personal terms. Our sample appears overall satisfied with the smart working experience. Greater flexibility, reduction in travel costs are the most positive aspects perceived by workers while isolation from the workplace and stress due to lack of disconnection the critical issue reported. Further studies could be useful to focus on the effects of remote work on the employees' personal and working wellbeing in order to create organizational models that protect the overall wellbeing of workers, while maximizing work efficiency and performance.

INTRODUCTION

The recent Covid-19 pandemic emergency and the consequent urgency to contain the spread of the virus by limiting interpersonal contacts, made it necessary to adopt new organizational models in workplace, including the massive use of smartworking. Although in 2017 was enacted a legislative degree (D.Lgs. 22 May 2017, n.81) in order to promote its diffusion,

smartworking was not widespread in Italy during the pre-pandemic period, with only about 4.8% of workers involved. During the lockdown almost 70% of Italian workers adopted remote work, while it is estimated that about 81% of workers all over the world have changed work setting [Eurostat, 2020]. Several Authors have focused on smartworking effects on psychophysical health, family and personal well-being

and working efficiency. (Cuerdo-Vilches t., 2021, Ghisleri C, 2021, Parent-Lamarche A., 2021). Previous studies results are not always concordant. The most reported advantages are the reduction of travel times, the increase of staff motivation and productivity, a greater ability to respect deadlines, while the difficulty in monitoring the performance, the possible onset of communication problems between colleagues and the absence of ergonomic devices at home, with an increased possibility of musculoskeletal symptoms, the most critical points [Baker R., 2018; Côté P. 2008; Pillastrini P. 2009; Will J.S., 2018]. Some Authors pointed out a greater possibility to experience psychological symptoms such as anxiety, irritability and isolation with negative repercussions on personal well-being [Kotera Y., 2020; Grant C.A., 2013]; other on the contrary, reported a reduction in perceived stress and a better concentration [Hilbrecht M., 2008; Vittersø J., 2003]. There is not unanimous consensus even regarding the effects that remote work would produce on family life. Some studies reported positive effects, also in relation to the possibility of remote workers to take care more closely of relatives that need assistance, while according to other Authors smartworking would lead to an imbalance between family and professional life, with an overlap of the two areas, and difficulty to effectively manage both [Hartig T., 2007; Mann S., 2003; Nakrošienė A., 2017]. The University of L'Aquila, as early as March 2020, suspended almost all teaching and curricular activities in presence, adopting "remote" attendance models and organizing the administrative activities in "remote" mode. The University had already conceived, in 2018, a pilot project for the gradual introduction of agile work which had involved a group of employees. This project aimed to propose a work model based on a result-oriented organization, with a large degree of decision-making autonomy of the workers on the methods, times and places of carrying out his / her work activity, and on the management's ability to organize activities and check its progress according to targets. With the Covid 19 pandemic emergency, special rules were then introduced for agile work valid for all staff, with the aim of protecting the health of workers, by limiting interpersonal contacts and travels. Although the purposes of emergency agile work transcends those of the traditional smartworking (organizational improvement and work / life balance of employees), this experience had led to the establishment of an unusual working context. The works that refer to the university setting are extremely limited in Literature (Cupertino F., 2021).

Aim

The purpose of our survey is to monitor the impact of smartworking in terms of perceived productivity, and personal and working well-being among the employees of the University of L'Aquila. Differences between men and women and between the two different groups of University workers were also investigated

MATERIALS AND METHOD

All employees were invited to participate with an email. The questionnaire, consisting of 24 multiple choice questions, was developed following a model already used in 2018 by the Italian Ministry of Education, University and Research in a pilot study. Par-

ticipation was free and voluntary. Socio-demographic and occupational informations were collected together with data on aspects characterizing smartworking. The survey took place between February 19 and March 11, 2021.

Data analysis

Data was analysed by RStudio software. We considered as variables gender (women / men) and job (administrative staff and professors). Normality was verified by Shapiro-Wilk test. Kruskal-Wallis test was used for statistical significance and for comparisons between couples, when necessary. Differences were estimated to be significant for p values <0.05.

RESULTS AND DISCUSSIONS

Socio-demographic data and family situation

A total of 510 employees of which 245 men (48%) and 265 women (52%) took part in the survey, out of 919 subjects involved, with a participation rate of 55.5%. 1 subject was <30 years, 49 between 30 and 39 years, 110 between 40 and 49 years, 226 between 50 and 59 years, 124 > 60 years. 70.6% of employees reported having one or more children; 129 employees (25.3%) reported the presence at home of people in need of assistance. 388 (76.1%) and 106 (20.7%) were respectively University and High School graduated. 247 employees (48.5%) were professors, 228 (44.7%) belonged to administrative staff (147 women and 81 men); 31 (6.8%) did not declare their job (15 women and 16 men).

Smartworking experience

Almost all of the employees (478, corresponding to 94.7%) declared that they had worked at home, 184 (37%) used a supplied pc, 241 (49%) their own pc and 71 (14%) their own pc sharing documents on cloud space.

Perceived work intensity

Work intensity was perceived increased by 73.6% professors (77% women vs 70.1% man) and by 60% of administrative employees (64.1 % women vs 51.3% men) with statistically significant differences between jobs (professors vs administrative staff, p = 0.012109) but not between women and men (F vs M, p = 0.146327).

Flexibility and working hours

70.1% professors (73.7% women vs 68.7% of men) and 58.5% administrative employees (63.7% women vs 47.5% of men) declared that agile work led them to work more hours than usual with a statistically significant difference between genders (p = 0.0198122) and jobs (p = 0.023132). The largest differences could be observed between the subgroups of female teachers and male administrative employees (p = 0.00698) and between male teachers and male administrative employees (p = 0.019903). Over 30% of the total sample declared that it was not possible for them to take adequate breaks, given the intensity of the work.

Effect of agile work on different aspects of working life

Results are reported in Tab. 1. and Tab.2.

PROFESSORS	Positive Impact	No Impact	Negative impact
Efficiency / ability to achieve objectives in adequate time	95 (39%)	99 (40%)	50 (21%)
Ability to take initiatives and propose solutions	71(29%)	130 (53%)	42 (18%)
Relationships with colleagues	15 (5%)	95 (39%)	131(55%)
Relationship with the manager / boss	12 (4%)	184 (77%)	44 (19%)
Dynamics and team working efficiency	55 (23%)	88 (36%)	99 (41%)
Participation in decision making	33 (14%)	143 (59%)	65 (27%)

Tab.1 - Effects of smartworking on different aspects of working life-Professors

ADMINISTRATIVE STAFF	Positive Impact	No Impact	Negative impact
Efficienza/capacità di raggiungere gli obiettivi in tempi adeguati	111(49%)	82 (37%)	32 (14%)
Efficiency / ability to achieve objectives in adequate time	100 (45%)	104 (46%)	19 (9%)
Ability to take initiatives and propose solutions	48 (21%)	109 (49%)	66 (30%)
Relationships with colleagues	54 (24%)	139 (62%)	29 (14%)
Relationship with the manager / boss	84 (38%)	89 (39%)	51 (23%)
Dynamics and team working efficiency	67 (31%)	129 (57%)	28 (12%)
Participation in decision making			

Tab. 2 - Effects of smartworking on different aspects of working life-Administrative staff

No statistically significant differences were found for the items “efficiency / ability to achieve goals in adequate times” and “ability to take initiatives and propose solutions”. According to 55% professors, smartworking negatively affected the relationship with colleagues vs 30% of administrative staff, with a statistically significant difference ($p = 0.02098$), particularly evident between female professors vs female administrative employees ($p = 3.5e^{-05}$), male professors vs female administrative employees ($p = 0$), male professors and male administrative employees ($p = 0.014102$). A significant difference between the two groups of workers ($p = 8.35e^{-06}$) was also found with regard to the effects on the “relationship with the manager / boss”, with the subgroup of female employees reporting the more positive effect (female professors vs female administrative staff ($p = 0.001921$); male professors vs female administrative staff ($p = 0.000359$)). Teachers and administrative staff also reported statistically different opinions on the “dynamics and efficiency of team working” ($p = 0.0008411$), particularly evident in the comparison

between female employees respectively with both female professors ($p = 0.00603$) and male ones ($p = 0.003621$). For “participation in the decision-making process”, the subgroup analysis highlighted differences in all the comparisons performed (female teachers vs female administrative staff ($p = 0.00661$), female teachers vs male administrative staff ($p = 0.027549$), male teachers vs female administrative staff ($p = 0.000524$) and male teachers vs male administrative staff ($p = 0.005738$)).

Interaction and collaboration with other subjects.

Almost all of the employees stated they have continued to interact with colleagues, with the manager and with other team-working members. Only 19 (3.8%) reported having not had interactions or collaborations with other subjects.

Help and support from colleagues.

Table 3. reports the answers provided by the two groups of workers.

	PROFESSORS	ADMINISTRATIVE STAFF	TOTAL
Never	20 (8,2%)	15 (6,6%)	35 (7,5%)
Rarely	38 (15,6%)	26 (11,5%)	64 (13,6%)
Sometimes	102 (41,8%)	83 (36,7%)	205 (43,5%)
Often	61 (25%)	60 (13,6%)	121 (25,7%)
Always or almost always	23 (9,4%)	42 (18,6%)	55 (11,7%)

Tab.3 - Help and support from colleagues

A BETTER USE OF TIME	29,9%
TO SAVE ENERGY	11%
TO INCREASE CONFIDENCE IN THE ADMINISTRATION	5,6%
A BETTER FIN ALIZATION OF PROFESSIONAL POTENTIALS	11%
TO ASSIST MORE EFFECTEVELY FAMILIES IN DIFFICULTIES	13,9%
BE MORE PRODUCTIVE IN WORK	15,8%
BE MORE ENTHUSIAST OF YOUR OWN WORKING DAYS	9%
HAVE MORE TIME FOR YOURSELF	3,8%

Tab. 4 - "Working in agile mode has allowed you to...?"

	PROFESSORS			ADMINISTRATIVE STAFF			TOTAL		
	F	M	Total	F	M	Total	F	M	Total
Interested	49,5%	49%	49,2%	65,1%	61,8%	63,9%	57,3%	55,1%	56,1 %
Uncertain	25,25%	24,9%	25%	21,5%	22,2%	22,2%	24	23,2%	23,5%
Not interested	25,5%	26,1%	25,8%	13,4%	16%	14,1%	18,7%	21,7	20,4%

Tab. 5 - Interest in continuing with smartworking

Working in agile mode has allowed you to ...?

We asked employees to indicate what working at home allowed them to do. Each employee could choose up to 3, among 8 possible options. The results are reported in the table below

Interest in continuing with smartworking

The most of the employees (56,1%) declared to be interested in continuing with the agile work experience vs 20, 4% not interested and 23,5% uncertain (Tab. 5, Graphs G1., G2.)

Statistical differences were appreciated between teaching staff and administrative staff ($p = 0.000721$) but not between men and women, ($p = 0.2828$). Female administrative employees was the most positively inclined subgroup especially in comparison with male teachers ($p = 0.022733$), the most wary of this possibility. Evaluating the presence of people who need assistance at home, no differences were found between employees who declared presence and those didn't ($p = 0.4918$).

Reported advantages with regard of working and personal well-being.

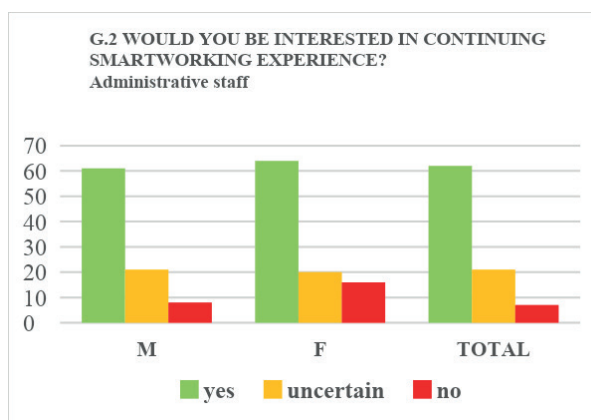
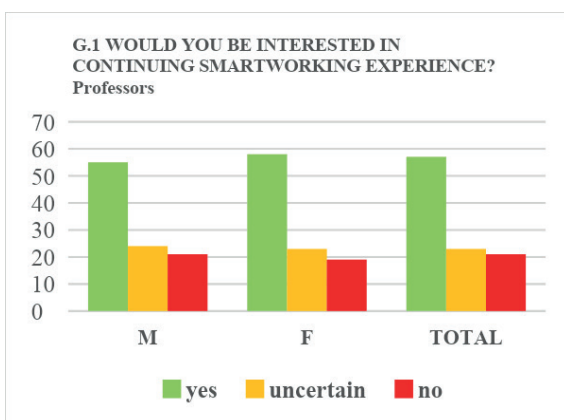
Each employee classified six possible options related

to plausible advantages from the one considered most important (6 points) to the least important (1 point) (Table 7).

The most reported advantages were the "reduction of travel times and costs", appreciated more by the teaching staff with a statistically significant difference compared to the administrative staff ($p = 0.2662$) and the "greater flexibility" more reported by the administrative staff ($p = 0.002278$). The comparison between subgroups showed the most satisfied subgroup was represented by female employees, especially in the comparison with male professors ($p = 0.005936$). No statistically significant differences emerged by gender or by job for the other options.

Disadvantages with regard of working and personal well-being.

Similarly, each employee classified six possible disadvantages from the one deemed most important (6 points) to the least significant (1 point) (Table 8.). Statistical analysis carried out did not reveal significant differences between the two groups of workers, nor between men and women for all possible disadvantages. The most complained disadvantages con-



Tab. 6 - G1. Interest in continuing with smartworking- Professors G2. Interest in continuing with smartworking - Administrative Staff

	<u>PROFESSORS</u>				<u>ADMINISTRATIVE STAFF</u>			
	F		M		F		M	
	Mean	mode	mean	mode	mean	mode	mean	mode
Greater flexibility and / or organizational autonomy in work	4,4	4	4,2	4	4,8	5	4,6	5
Reduction of travel times / costs	5,1	6	5,2	5	4,4	4	4,3	4
More time for yourself	2,1	1	2,3	1	2,3	1	2,6	2
More time for the care of children and other, family members	3,2	3	3,1	3	2,8	3	3	3
Stress reduction	2,6	3	2,8	2	3,2	3	2,9	2
Increase of working efficiency	3,5	3	3,4	3	3,6	3	3,6	3

Tab. 7 - Advantages with regard of working and personal well-being

	<u>PROFESSORS</u>				<u>ADMINISTRATIVE STAFF</u>			
	F		M		F		M	
	Mean	mode	mean	mode	mean	mode	mean	mode
Isolation from the working context	4,5	4	4,8	5	4,7	5	4,9	5
Difficulty in managing working times	3,4	3	3,5	3	3,7	4	3,4	3
Difficulty in organizing workspaces at home	3,5	4	3,5	4	3,7	4	3,5	4
Excessive prolongation of working hours / stress from “no disconnection”	4,8	5	4,4	4	4,5	4	3,8	3
Difficulty in managing care needs for oneself and for family members	2,7	3	2,3	2	2,3	2	2,3	2
Poor increase in working efficiency	2,6	3	2,4	2	2,4	2	2,7	3

Tab. 8 - Disadvantages with regard of working and personal well-being

cerned the “isolation from the working environment” and the “excessive prolongation of working hours”, followed by the “difficulties in managing work spaces at home”.

General and global evaluation of the agile work experience.

The overall evaluation of the agile work experience was reported in Table 9.

A scenario of overall appreciation of the agile work experience emerged, with 59% teachers and 77% administrative employees reporting the experience as very satisfactory or satisfactory. The administrative staff group provided the most positive overall rating (very satisfactory or satisfactory) with higher percentages than the teaching staff ($p = 0.0007286$), with a trend that is even more evident in women. The comparison of subgroups showed a significant difference between male professors vs female administrative employees ($p = 0.000295$), men professors vs male administrative ($p = 0.0148029$) and between female professors vs female administrative employees ($p = 0.003361$). The comparison of female professors vs male administrative staff showed a marginal significance ($p = 0.052534$). The sub-group expressed the highest degree of satisfaction was therefore represented by the women of the administrative staff.

CONCLUSIONS

The recent pandemic emergency has made it necessary to unexpectedly adopt in a short time new organizational models in the workplace, including the massive use of smart working thus determining the possibility of exploring the effects of remote work on the well-being of workers, in professional and personal terms. Our survey, aimed at the administrative and teaching staff of the University of L'Aquila, found a good degree of adhesion, having chosen to participate 55,5% of all the subjects involved. The questionnaire administered, already used by MIUR, investigated multiple aspects related to smartworking, both concerning work and personal well-being, and relating to perceived work intensity and the advantages and disadvantages identified by employees. Our sample reported as the most positive aspects the greater flexibility and reduction of costs related to travel, while isolation from the workplace and the stress of not being disconnected were the critical issues highlighted. Our analysis showed an increase in working efficiency and perceived productivity, reported above all by administrative staff, as already underlined by some Literature data (Nibusinessinfo, 2020; The Balance Careers, 2020), but not in line with other recent evidence (Moretti A., 2020). Our sample appeared overall satisfied with the smart working experience, with

	PROFESSORS		ADMINISTRATIVE STAFF	
	F	M	F	M
Very satisfactory	11 (11%)	19 (13%)	39 (27%)	24 (30%)
Satisfactory	48 (48%)	64 (44%)	78 (55%)	34 (43%)
Indifferent	12 (12%)	16 (11%)	8 (5%)	8 (10%)
Unsatisfactory	23 (23%)	38 (26%)	12 (8%)	12 (15%)
Very unsatisfactory	5 (6%)	8 (6%)	9 (5%)	2 (2%)

Tab. 9 - General and global evaluation of the agile work experience

the highest degree of satisfaction expressed by administrative staff, especially women. This finding is not in line with the results of previous studies carried out in the pre-pandemic period, (Golden T.D., 2005; Golden T.D., 2006), nor with what is reported by more recent studies (Moretti A., 2020). Almost half of the teachers declared themselves interested in continuing the agile work experience, as well as over 60% the administrative employees who are, in this case too, the subgroup having expressed the most positive opinion. Employ-

ees underlined an increase in perceived work intensity and work effectiveness, although most of them, especially teachers, complained of negative effects in the relationship with colleagues. Further investigation studies would be useful to obtain other evidence about the effects of remote work on the personal and working spheres of employees, in order to create organizational models that support the protection of the overall well-being of workers, while maximizing work efficiency and the performance.

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