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Advantages and disadvantages of remote work in six areas of project management depending on the frequency of remote work

Wpływ częstotliwości pracy zdalnej w czasie pandemii COVID-19 na pracowników zespołów projektowych

Keywords:

remote work, COVID-19 pandemic, project team

Abstract:

Purpose: The aim of the article is to identify the advantages and disadvantages of remote work in six areas of project management depending on the frequency of remote work. The study is of theoretical and empirical nature. The theoretical part presents the factors influencing remote work during the COVID-19 pandemic. Its empirical part presents the employees' opinions on the impact of working remotely (online) during the COVID-19 pandemic on working in project teams.

Methodology: Literature review and critical analysis of web research. A study was conducted on a group of 82 respondents working remotely on projects, members of the Project Management Institute Poland Chapter (PMI PC). Six areas of project management were analysed, including: working time, communication, labour costs, work environment, risk of computer malfunction and conditions for teamwork. The data obtained through questionnaire surveys was analysed using a statistical package. Factor analysis was used for statistical analyses. To extract the factors, the principal components method was adopted, and the VARIMAX procedure was used as the rotation method. A descriptive statistical analysis was performed.

Findings: Project team employees discover a number of positive and negative effects of working remotely. The positive ones include: the

possibility of adapting work to private life, greater punctuality of performed tasks, saving time and money as it is not necessary to travel to work, increased satisfaction with the effects of work and a sense of security against contracting the virus due to the lack of contact with other employees. The negative ones include: limited direct contact with other employees, no traditional conversations over coffee for discussions and conversations with colleagues, limited access to company resources, no financial support from the employer, increased costs of office work at home, susceptibility to cyber-attacks, increased stress due to problems with remote cooperation with other employees and weakening interpersonal relations.

Implications: The study provides new evidence on the most salient risks and challenges faced by remote workers in project teams. They demonstrate different factors affecting remote work depending on the frequency it is performed.

Originality/Value: The research results fill the research gap and broaden the knowledge about the impact of various factors on the remote work of project team employees during a pandemic. They constitute practical recommendations and are a source of knowledge for managers of various levels and employees working remotely.

Słowa kluczowe:
praca zdalna, pandemia
COVID-19, zespół
projektowy

Streszczenie:

Cel: Celem artykułu jest ukazanie wpływu częstotliwości pracy zdalnej na pracowników zespołów projektowych podczas pandemii COVID-19. Opracowanie ma charakter teoretyczno-empiryczny. W części teoretycznej ukazano czynniki wpływające na pracę zdalną w czasie pandemii COVID-19. W części empirycznej w ramach badań ankietowych przedstawiono opinie pracowników dotyczące wpływu pracy zdalnej (*on-line*) w trakcie pandemii COVID-19 na pracę w zespołach projektowych.

Metodologia: Przegląd literatury i krytyczna analiza *web research*. Przeprowadzono badania na grupie 82 respondentów pracujących zdalnie przy projektach, będących członkami stowarzyszenia Project Management Institute Poland Chapter (PMI PC). Pozyskane w badaniach ankietowych dane przeanalizowano za pomocą pakietu statystycznego. Do analiz statystycznych zastosowano analizę czynnikową. Dla wyodrębnienia czynników przyjęto metodę głównych składowych zaś jako metodę rotacji wykorzystano procedurę VARIMAX. Przeprowadzono opisową analizę statystyczną.

Wnioski: Pracownicy zespołów projektowych odkrywają szereg pozytywnych i negatywnych skutków pracy zdalnej. Do pozytywnych należą: możliwość dostosowania pracy do życia prywatnego, większa terminowość wykonywanych zadań, oszczędność czasu i pieniędzy w związku z brakiem konieczności dojazdu do pracy, wzrost satysfakcji z efektów pracy oraz poczucie bezpieczeństwa przed zakażeniem się wirusem z uwagi na brak kontaktu z innymi pracownikami. Do

negatywnych zaliczono: ograniczony bezpośredni kontakt z innymi pracownikami, brak tradycyjnych rozmów przy kawie na dyskusję i rozmowy z kolegami, ograniczony dostęp do zasobów firmy, brak wsparcia finansowego ze strony pracodawcy, wzrost kosztów pracy biurowej w domu, podatność na zagrożenia cyberatakami, wzrost stresu z uwagi na problemy ze współpracą zdalną z innymi pracownikami oraz słabnące relacje międzyludzkie.

Implikacje: Badanie dostarcza nowych dowodów na temat najistotniejszych zagrożeń i wyzwań, przed którymi stoją pracownicy zdalni w zespołach projektowych. Analizie poddano sześć obszarów zarządzania projektami obejmujących: czas pracy, komunikowanie się, koszty pracy, środowisko pracy, ryzyko działania komputerów oraz uwarunkowania pracy zespołowej.

Oryginalność/Wartość: Wyniki badań wypełniają lukę badawczą i poszerzają wiedzę na temat wpływu różnych czynników na pracę zdalną pracowników zespołów projektowych podczas pandemii. Stanowią praktyczne rekomendacje i są źródłem wiedzy dla menedżerów różnych szczebli i pracowników pracujących zdalnie.

JEL:
D81, D83, M54

Introduction

The outbreak of the COVID-19 epidemic in March 2020 was not only a difficult time for society, but also a testing time for companies around the world showing how quickly they adapt to sudden and unpredictable changes (Vahdat, 2021). COVID-19 has changed the way we work and the way businesses operate (Stride, Renukappa, Suresh and Egbu, 2021).

Remote work became more attractive on a global scale and accelerated the digitization of societies. The pandemic has increased the number of people working remotely, and people view it as an accelerator of digital transformation (Nagel, 2020, p. 871).

In addition, the pandemic contributed to maintaining employment (Webster, Khorrana and Pastore, 2021). It gave more opportunities for employees to perform remote work anywhere outside the company. Employers introduced a number of organizational changes to adapt working conditions to the new pandemic requirements (Wu, 2021).

For many workers, working from home during the Covid-19 lockdown was associated with social isolation, long working hours and conflicting work – family demands (Adisa, Ogbonnaya and Adekoya, 2021). Remote workers find themselves having to demonstrate that they are productive working from home at the same time as adjusting to Covid-19 requirements and pressures (Matli, 2020, p. 1239). For many workers, it was really challenging to convert their homes into a dedicated working space (Adisa, et al., 2021).

Remote work has a number of advantages and disadvantages. It causes some problems and difficulties for both the employee and the employer, but all in all it is a valuable solution (Makowiec, 2015, p. 187). The advantage of remote work is a flexible form of employment, ensuring a better possibility to coordinate professional work and family responsibilities (Grzybowski, 2008, p. 73). Working from home offers great flexibility and is valued by the majority of employees (Yeganeh, 2021). Working under self-organized conditions translates into greater involvement and increased motivation to work (Mozerys, 2008, p. 123). Employees are more likely to work remotely if they are knowledgeable about their work and there is a high level of trust between them and their supervisors (Martínez-Sánchez, Pérez-Pérez, Vela-Jiménez and de-Luis-Carnicer, 2007). In addition, they see that remote work is positively linked to productivity. When performing remote work, employees acquire fundamental and strategic skills and competences, including analytical thinking, problem solving and time management (Wiśniewski and Wiśniewska, 2017, p. 28). Organizations realize that remote work offers them many benefits, such as lower overheads, higher managerial control, more robust information systems, and fast digital decision-making (Yeganeh, 2021).

There are also negative consequences of working remotely, such as: technostress, mental fatigue, conflict outside of work, persistent digital connectivity and inability to disconnect, cybersecurity problems, isolation and negative synergy due to less contact with colleagues (Caparrós, Ruiz, 2022).

For the effectiveness of remote working, workers are required to have access to internet connections and computing devices of good quality (Matli, 2020, p. 1248).

Poor ICT infrastructure causes stress and discomfort for employees (Matli, 2020, p. 1248). Some of the workers working remotely tend to overwork themselves by spending long hours on work than they usually do only at the office during normal working hours (Donnelly and Johns, 2020; Shipman, Burrell and Huff Mac Pherson, 2021).

Moreover, communication problems may impair the level of employee satisfaction and the results achieved by them (Carragher-Wolverton, 2022). The disadvantages also include the lack of access to IT services and appropriate equipment. Apart from technology investments, organisations must also invest in human capital so that they have motivated and driven remote workers (Matli, 2020, p. 1240).

The pandemic accelerated the digitization of project management and had an impact on teamwork in remote project teams (Wu, 2021). Working from home adds a new dimension to the way people work (Jamal, Anwar, Khan and Saleem 2021). Home conditions are very different from work performed within the enterprise. Access to appropriate resources and adaptation to new requirements are needed. More importantly, to ensure effective work, adequate resources and IT support are necessary (Whyte, 2019). In addition, remote work requires reconciling work and home duties (Prodanova and Kocarev, 2021).

It also demands changing the existing work habits and behaviour of employees, such as self-discipline during professional isolation, the ability to work remotely with colleagues and superiors (Zhong, Xia, Hu, Wang and Tiong, 2018). In fact, remote work may weaken staff ties, hinder teamwork, and diminish the benefits of collective intelligence (Caparrós, Ruiz, 2022).

Remote work requires the skilful use of various communication channels to shape virtual relationships with employees and managers. This is particularly important as home workers often feel lonely, which may, in turn, lower their ability to interact remotely with colleagues (Kurupparachchi, 2009). Therefore, a good communication system should be developed to compensate for the decreased amount of contact (Klekowski, 2013). It is also necessary to introduce a new approach to management and implement a non-personal form of employee control (Klekowski, 2013).

Employers, leaders and human resource teams should be more thoughtful about the risks and challenges employees face when working from home (Adisa, Ogbonnaya and Adekoya, 2021). The frequency of remote working influences the degree of commitment to the workplace (Pataki-Bittó and Kun, 2022). Occasional remote work increases involvement (Caillier, 2013; Kelliher and Anderson, 2009), while longer periods of remote work reduce the degree of involvement in the workplace (Sardeshmukh, Sharma and Golden, 2012).

The aim of the article is to identify the advantages and disadvantages of remote work in six areas of project management depending on the frequency of remote work. Implementation of projects and managing a project team requires flexibility, experience and extensive knowledge. Oftentimes people who are great at individual work are not necessarily able to find themselves in project work that requires other management competences, as well as resistance to self-isolation. Developing an efficient project team working remotely as well as appropriate communication and proper interpersonal relations are key to the success of each project (Hoegl and Muethel, 2016). Therefore, digital project managers play an important role here as they maintain the flow of information, enable knowledge transfer, and set expectations and goals so that everyone knows their role and progress in the project (Wu, 2021).

Research methodology

Empirical research was preceded by studies of the literature. To obtain primary data, an electronic survey was developed online, to be completed by specialists in the field of PMI PC project management. 200 people were invited to participate in the research. 82 people submitted correctly completed questionnaires (N = 82). These were

respondents who worked remotely on projects in various industries. The research was conducted in the period from November 2021 to March 2022.

For the purposes of the research, three frequencies of remote work during a weekly working day were adopted. The first one referred to occasional remote work involving 1–2 days a week. The second one covered 3–4 days of work a week, and the third one concerned permanent remote work for 5 days.

The research was carried out in cooperation with the Institute of Management and Quality Sciences of the University of Zielona Góra and the Project Management Institute Poland Chapter (PMI PC).

The aim of the research was to show the impact of the frequency of remote work on the employees of project teams during the COVID-19 pandemic. Six selected areas of project management were analysed, namely: working time, communication, labour costs, work environment, risk of computer malfunction and conditions for teamwork (PMBOK, 2017).

The research was conducted using the questionnaire survey method. The survey followed a 5-point R. Likert scale: 1 – I strongly disagree, 2 – I disagree, 3 – I neither agree nor disagree, 4 – I agree, 5 – I strongly agree.

The first area of analysis was working time. The respondents assessed 5 factors listed in Table 1. The second analysis area was communication. The respondents rated 7 factors (Table 2). The third area of analysis was labour costs. The respondents assessed 5 factors which are presented in Table 3. Work environment factors constituted the fourth area of the analysis. The respondents rated 5 factors (Table 4). The fifth area of analysis concerned the risk of computer operation. Seven factors were assessed (Table 5). The sixth area of analysis covered the conditions of teamwork. Within the last area, the respondents assessed 10 factors (Table 6).

Factor analysis was employed for statistical analyses. To extract the analysed factors, the principal components method was adopted, and the VARIMAX procedure was applied as the rotation method. In order to assess the adequacy of the data for factor analysis, the Bartlett sphericity test ($p = 0.000; <0.05$) and the Kaiser-Meyer-Olkin (KMO) sampling adequacy measure were used. KMO coefficient was 0.60, higher than the recommended threshold of 0.50. Chi-square statistics were also listed as well as degrees of freedom concerning the number of independent observations.

Characteristics of the research group

82 employees who were working remotely due to the pandemic participated in the research. The group of respondents was dominated by those working for large enterprises (69.5%). Half of all the respondents were international corporations. The share

of medium-sized enterprises was 19.5%, the micro ones accounted for 6.1% and small enterprises amounted to 4.9%. About 70% of the respondents were involved in services. Those in charge of manufacturing activity accounted for 13.2%, 15.8% were concerned with mixed activity (trade, services and production), and those involved in commercial activity were only 2.4% of the respondents. The surveyed enterprises represented various industries, mainly IT (40.2%), industrial production (10.9%), and health protection (10.9%). The remaining were: finance and insurance (9.7%), education (6.1%), transport (4.8%), construction (4.8%), as well as trade and food industry (with 2.4% each).

Due to the time of operation on the market, enterprises with many years of experience prevailed. Over 63.4% of companies had been operating on the market for more than 16 years. 14.6% of entities had operated from 13 to 16 years. About 8% of companies had operated from 9 to 12 years. The companies operating on the market for less than a year amounted to 3.6%.

The key issue was the frequency of remote work. According to the research, as many as 59.8% of managers and specialists use company computers and work remotely from home, full-time, 5 days a week. This mainly applies to work in corporations (48.9%) and in medium-sized enterprises (24.5%). In small companies, less than 6% of the respondents worked remotely for 5 days, and in micro-companies it was about 4% of the respondents.

Hybrid work, including stationary and remote work, performed 3–4 days a week, was carried out by 21.9% of respondents. Working remotely 1–2 days a week was suggested by 18.3% of the respondents.

Presentation of the results

The first area of analysis was the identification of working time factors. Factors influencing individual work were identified (Table 1).

For employees working remotely 1–2 days a week, the result of the analysis was a one-factor solution with load values greater than 0.8. The most frequently indicated effects of remote work were the possibility of flexible working time at home (0.98), greater timeliness of performed tasks (0.94) and the need to spend more time to operate the computer (0.91). Moreover, the respondents pointed to savings in time and money due to the lack of necessity to commute to work (0.89) and the possibility of adjusting work to private life (0.88).

For employees working remotely 3–4 days a week, the result of the analysis was the two-factor solution, where the sums of the squared loads after isolation are greater than 0.9. Within the first component, the key problem was the need to spend more time to operate the computer (1.27). The respondents also indicated the possibility of

adapting work to private life (1.14), greater timeliness of tasks (1.13), saving time and money due to the lack of necessity to commute to work (0.98) and the possibility of flexible working time at home (0.97). Within the second component, there was only one answer with the highest value and it was related to the need to spend more time to operate the computer (1.01).

Table 1 Analysis of factors in the area of working time

Factors	Frequency of remote work during the week			
	1–2 days	3–4 days		5 days
	Component	Component		Component
	1	1	2	1
Possibility of flexible working time at home	.948	.976	.441	.952
Greater timeliness of performed tasks	.945	1.133	-.295	.897
The need to spend more time to operate the computer	.910	1.276	1.015	.708
Time and money savings due to the lack of necessity to commute to work	.895	.983	.507	.873
Possibility to adapt work to private life	.885	1.148	.271	.936
Method of extracting factors – main components. Varimax rotation method				
KMO	.643	.846		.804
chi-square	84.748	794.848		262.330
df	10	15		10

Source: compiled on the basis of the results of the analyses.

For employees working remotely 5 days a week, the result of the analysis was a one-factor solution with load values greater than 0.8. Four questions turned out to be crucial – theorems. For employees who constantly work remotely, the most important is the possibility of flexible working time at home (0.95), the possibility of adapting work to private life (0.93), greater timeliness of performed tasks (0.89) and savings of time and money due to the lack of necessity to travel to work (0.87).

The second area of analysis was the identification of factors related to communication while working remotely (Table 2). For employees working remotely 1–2 days a week, one component was obtained containing seven statements with load values greater than 0.8. According to the respondents, the unfavourable factors affecting communication while working remotely are: no traditional conversations over coffee, no time for discussions and conversations with colleagues, no direct contact with other employees, which may limit professional development, and limited direct contact with other employees (each 0.97). Moreover, difficult access to company documents (0.86). The indicated factors forced employees to be more independent in solving problems

and inspired them to search for optimal solutions. Factors facilitating communication were convenient online access to the office (0.94) and quick information exchange via the Internet (0.87).

Table 2 Factor analysis in the area of communication while working remotely

Factors	Frequency of remote work during the week			
	1–2 days	3–4 days	5 days	
	Component	Component	Component	
	1	1	1	2
No traditional conversations over coffee	.979	.951	.976	-.038
Lack of direct contact with other employees may limit professional development	.977	.951	.881	.418
Limited direct contact with other employees	.971	.965	.933	.188
Convenient access to the online office	.947	.838	.936	-.307
Using virtual platforms (e.g. Zoom, Google Meet) allows visual communication with employees	.782	.963	.856	-.390
Fast information exchange via the Internet	.877	.923	.855	-.387
Difficult access to company documents	.867	.617	.596	.747
Method of extracting factors – main components. Varimax rotation method				
KMO	.812	.816	.813	
chi-square	141.060	294.231	497.124	
df	21	21	21	

Source: compiled on the basis of the results of the analyses.

For employees working remotely 3–4 days a week, the result of the analysis was the one-factor solution, where the sums of the squared loads after isolation were greater than 0.9. Limited direct contact with other employees and the use of virtual platforms that allow visual communication with employees (0.96 each) were significant problems. Moreover, the respondents indicated the lack of direct contact with other employees, which may limit professional development, the lack of traditional conversations over coffee and limited direct contact with other employees (0.95 each). The positive side of communication was the fast exchange of information via the Internet (0.92).

For employees working remotely 5 days a week, the analysis result was a two-factor solution with load values greater than 0.8. Within the framework of the resulting first dimension, there were six theorems. They concerned the lack of traditional conversations over coffee (0.97), convenient access to the online office (0.96) and limited direct contact with other employees (0.93). In addition, the problem of the lack of direct contact with other employees was indicated, which may limit professional development (0.88), the use of virtual platforms allowing for visual communication with employees

(0.85) and quick information exchange via the Internet (0.85). Within the second component, on the other hand, the highest value was obtained by one statement indicating difficult access to documents in the company (0.74).

The third area of analysis was the costs of remote work (Table 3). As a result of the analysis, one component was obtained for the three remote work frequency areas. The analysis involved five theorems that turned out to be equally valid for all frequencies of remote work. Charge values greater than 0.8 were obtained.

Table 3 Factor analysis in the area of remote work costs

Factors	Frequency of remote work during the week		
	1–2 days	3–4 days	5 days
	Component	Component	Component
	1	1	1
Own costs of acquiring hardware, software, internet services	.904	.947	.861
Use of private computers	.889	.963	.947
No financial support from the employer	.982	.958	.971
Limited access to company resources	.880	.968	.977
Increase in the cost of office work at home (higher electricity, heating and water consumption)	.868	.800	.828
Method of extracting factors – main components. Varimax rotation method			
KMO	.791	.886	.873
chi-square	87.027	101.988	315.557
df	10	10	10

Source: compiled on the basis of the results of the analyses.

In the opinions of those working remotely 1–2 days a week, the key factor was the lack of financial support from the employer (0.98). A noticeable cost for the employees was the purchase of their own computer hardware, software and the cost of the Internet services (0.90). For employees working remotely 3–4 days and 5 days a week, the biggest problem was limited access to company resources. In addition, the need to use private computers when working remotely 3–4 days a week (0.96) and the lack of financial support by the employer when working 5 days a week (0.97). For about 80% of respondents, an increase in the cost of office work at home was significant (higher consumption of electricity, heating and water). Employees noticed the negative effect of remote work during the pandemic, which was shifting the costs of remote work to employees, including in many cases the use of private computers.

The fourth area of analysis was the work environment (Table 4). According to the respondents working remotely 1–2 days a week, the sense of security concerned with

unlikeliness of contracting the COVID-19 virus due to the lack of contact with other employees was the most important (0.95) and the lack of full control of the employer over the employee (0.93).

Table 4 Factor analysis in the area of work environment

Factors	Frequency of remote work during the week		
	1–2 days	3–4 days	5 days
	Component	Component	Component
	1	1	1
A sense of security concerned with unlikeliness of contracting the COVID-19 virus due to the lack of contact with other employees	.958	.716	.839
The employer does not exercise full control over the remote worker	.930	.956	.718
It is not the style of work that counts, but the effects of activity	.910	.957	.919
Increased satisfaction with the results of work	.876	.966	.945
The ability to work even when ill	.850	.858	.920
Method of extracting factors – main components. Varimax rotation method			
KMO	.744	.819	.683
chi-square	73.721	88.043	247.819
df	10	10	10

Source: compiled on the basis of the results of the analyses.

For people working remotely 3–4 days a week, the increase in satisfaction with the results of work (0.96) and the effects of the activity, not the style of work (0.95) turned out to be the most important. In the group of people working 5 days a week, the increase in satisfaction with the effects of work (0.94) and the ability to work even during illness (0.92) were also the most important.

The fifth area of analysis was the technical risk of computers operating remotely (Table 5). As a result of the analysis, one component was obtained for each of the analysed frequencies of remote work. For the purposes of the analysis, the solutions were adopted whose sums of charge squares after isolation were greater than 0.8.

For those working remotely 1–2 days a week, the most important problem was incomplete control over the company's documentation (0.97), the risk of computer viruses (0.96) and increased susceptibility to cyber-attacks (0.96).

Table 5 Factor analysis in the area of technical risk of computer operation during remote work

Factors	Frequency of remote work during the week		
	1–2 days	3–4 days	5 days
	Component	Component	Component
	1	1	1
Incomplete control over the company's documentation	.971	.960	.959
Danger of the appearance of computer viruses	.964	.937	.967
Increased vulnerability to cyber-attacks	.960	.944	.974
Danger of information leakage during the communication process and information delivery to unauthorised recipients	.931	.965	.969
Technical problems with the operation of the computer	.880	.924	.893
No company computers for remote work	.812	.923	.734
Technical problems with the operation of the Internet	.802	.863	.866
Method of extracting factors – main components, Varimax rotation method			
KMO	.842	.839	.823
chi-square	114.365	179.561	551.780
df	21	21	21

Source: compiled on the basis of the results of the analyses.

Those working remotely 3–4 days a week, perceived the dangers of information leakage during the communication process and information delivery to unauthorised recipients (0.96), incomplete control over the company's documentation (0.96) and vulnerability to cyber-attacks (0.94). For those working remotely 5 days a week, the increased susceptibility to cyber-attacks was indicated in the first place (0.97). Then the danger of information leakage during the communication process and its delivery to unauthorised recipients (0.96) as well as the danger of computer viruses (0.96). Technical problems related to computer operations were more often reported by employees working 3–4 days and 5 days a week than by those working 1–2 days. The lack of company computers for remote work was most often indicated by employees working remotely for 3–4 days.

The sixth area of the analysis was the determinants of teamwork, taking into account interpersonal relations (Table 6). For the purposes of the analysis, 10 solutions were adopted, the sums of the squared charges of which, after isolating, were greater than 0.8.

In the group of people working remotely 1–2 days a week, two components were obtained. Within the first component, answers to three questions turned out to be important. According to the respondents, there was increased stress due to problems with remote cooperation with other employees (0.94). The positive effect, however,

was an increase in satisfaction with the effects of work (0.87). The difficulty turned out to be less access to training (0.82). On the other hand, in relation to the second component, casual dress while working at home had a positive effect (0.92). The negative aspect was weakening interpersonal relations (0.78) and the lack of direct contact with other employees, which may limit professional development (0.76).

Table 6 Analysis of factors in the area of determinants of teamwork

Factors	Frequency of remote work during the week			
	1–2 days		3–4 days	5 days
	Component		Component	Component
	1	2	1	1
Increased stress due to problems with remote cooperation with other employees	.947	.262	.963	.968
Increased satisfaction with the results of work	.872	.464	.974	.959
Less access to training	.820	.524	.564	.942
Positive relationships among colleagues	.782	.530	.946	.946
Raising competences in the use of computer programs	.771	.581	.970	.968
Working from home causes stress and disrupts family life	.662	.720	.972	.955
Home conditions make it difficult to work remotely – lack of psychological comfort and calm	.630	.713	.968	.917
Lack of direct contact with other employees may limit professional development	.577	.761	.969	.985
Weakening interpersonal relations	.572	.782	.901	.940
Casual dress code when working from home	.245	.929	.829	.588
Method of extracting factors – main components. Varimax rotation method				
KMO	.859		.902	.874
chi-square	215.187		247.035	1011.745
df	45		45	45

Source: compiled on the basis of the results of the analyses.

In the group of people working remotely 3–4 days a week, one component was obtained. The respondents indicated the increase in satisfaction with the effects of work (0.97) in the first place. Still, among negative effects they listed no direct contact with other employees, which may limit professional development (0.96) and the fact that home conditions make it difficult to work remotely, resulting in a lack of psychological comfort and calm (0.96).

One component was also obtained in the group of people working remotely 5 days a week. In the first place, the lack of direct contact with other employees was indicated, which may limit professional development (0.98). In addition, an increase in stress

due to problems with remote cooperation with other employees (0.96) was listed. It is also necessary to raise competences in the use of computer programs (0.96). Despite a lot of difficulties and limitations encountered, the respondents finally pointed out an increase in satisfaction with the effects of work.

Discussion

The results of the research broaden the knowledge on the impact of various factors on remote work in selected areas of project management. They allow confronting the expectations of employers with the expectations of employees, which significantly affect the effects of work, motivation and intra-organizational relations between the employees themselves as well as the employee and the manager. Remote work requires independence and the ability to manage time and solve problems. It requires coping with professional isolation and lack of face-to-face interaction with employees.

The restrictions imposed during the pandemic had the most influence on the emotional state and perceived stress of employees (Pataki-Bittó and Kun, 2022). Despite the fact that in all the studied groups the increase in stress resulting from remote work was reported, it can be concluded that stress motivated the respondents to more effective work. It is important that managers pay attention to alleviating stress experienced by employees.

“Communication and cooperation gained a central role in our accelerated world to which a mutual good relationship with co-workers is simply indispensable” (Pataki-Bittó and Kun, 2022). In the employees’ opinion, the problem was the lack of face to face meetings and ordinary conversations about professional and personal problems. The social bond was a problem not only from the employee’s perspective, but also in teamwork (Mitchell, 2021). An effective on-line communication system fostering the development of relationships between employees and managers and contributing to an increase in employee satisfaction with the results of work was helpful. Virtual communication supported by technological tools turned out to be effective as a result of the well-established relations between employees and superiors. Regular, real-time communication can give team members confidence that they are pursuing the same goals (Mitchell, 2021).

In the conditions of changes, human capital plays a key role, especially employees’ knowledge, their skills and ability to adapt to new (remote) working conditions, especially in projects. Research findings provide guidance for managers and employees using technology to work remotely during and after the pandemic.

It is also worth noting that in the context of the frequency of remote work, the results of the conducted research do not yet provide clear answers as to the benefits

or limitations that could be assigned to a particular group, i.e. the number of days of remote work per week. It is worth mentioning, however, that in the case of employees who work remotely from 1 to 2 days a week, they are exceptionally sensitive to changes resulting from remote work.

Conclusions

The presented research results demonstrate the existence of many factors influencing the remote work of project teams depending on the frequency of its execution. The research has shown many positive and negative dependencies resulting from the conditions of working from home during the crisis. A lot of aspects were suggested that an autonomous employee and a manager who is under the pressure of a dynamic environment must face.

A factor analysis was used to reveal related sets of important factors influencing remote work of project teams. The analysis involved six groups concerning: working time, communication, labour costs, work environment, risk of computer malfunction and teamwork.

The research results led to interesting conclusions. It turned out that employees in the new situation resulting from the pandemic are satisfied with the effects of working remotely. They were able to coordinate the tasks carried out in time and space and demonstrated great commitment to solving problems related to remote work.

In all the surveyed groups, an increase in satisfaction with the effects of work was observed. However, in order to achieve greater efficiency, employees had to work much longer.

The pandemic led to greater flexibility of employees in terms of adjusting their professional duties to the threats resulting from changes in the environment. It influenced the change in the organization of work by moving from working within a company to organizing work at home on one's own. Remote employees independently shaped the work-life balance.

The pandemic affected the autonomy of employees in the selection of resources (tangible and intangible) to perform work, with many limitations related to the lack of direct contact with the supervisor, colleagues or clients. It resulted in more effective management of resources available at the employee's home and at the company's premises. It often involved taking actions and decisions in the scope of using the existing reserves and searching for the necessary resources on the market. Employees experienced decentralization in managing knowledge and information as well as their own competences. Employees' skills regarding their mobility, flexibility and adaptation to changing conditions gained in importance.

The findings also reflect the impact of external factors, including the sense of security related to potential contracting COVID-19 due to the lack of contact with other employees. This factor was the most important for people working remotely 1–2 days a week. Threats to work safety caused by external factors include the risk of computer viruses and increased susceptibility to cyber-attacks – especially for people working remotely 5 days a week.

There was a noticeable increase in the cost of office work at home (higher consumption of electricity, heating and water). Employees noticed the negative effect of remote work, which was the lack of financial support from the employer. In many cases they used private computers and incurred the cost of the Internet service.

The article provides valuable information on the benefits and expenditures of working remotely and virtual project teams. A lot of managers have noticed that teleworking can become a new way of working for many employees. A significant proportion of employees are willing to change their jobs exclusively to digital work. And some employees want to use their experience by working stationary and remotely.

The changes caused by the pandemic forced greater integration of remote teams and increased the importance of constant and direct communication between employees. The management of virtual relationships in the project team has gained in importance to ensure efficient implementation and coordination of tasks. Moreover, it is important to care for good interpersonal relations in the team, giving employees a sense of belonging to the team and satisfaction from teamwork.

The presented research has its limitations. The research was conducted during a pandemic with completely different conditions (more rigorous than now, one year later). The research results are not representative, as they concern people working remotely on projects who are members of the Project Management Institute Poland Chapter (PMI PC). It is worth considering various industries in future research. Therefore, this study encourages future researchers to conduct surveys of respondents working in various positions in various organizations and industries.

The presented literature review and the results of own research are a contribution to further research into the study of the factors and implications of remote work in the post-pandemic era. The research should be focused on maintaining and strengthening the advantages of remote work and eliminating its negative effects on individual employees and project teams. Furthermore, the research should focus on improving the competencies of managers in managing virtual relationships in project teams.

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