The influence of the COVID-19 pandemic on managerial functions: Theory verified by Delphi method

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Abstract: The aim of the article is to analyse the performance of managerial functions in the context of the COVID-19 pandemic. The first part of the article focuses on a systematic literature review (SLR) aimed at identifying the most frequently researched managerial functions in the context of changes due to the pandemic and the difficulties in performing these functions. A total of 211 articles from the Web of Science database were analysed, 18 of which were relevant to the present research. Based on the SLR conducted, two research questions were identified and answered by conducting a three-round Delphi survey among the experts interviewed (a total of 23 company managers). The results show that during the COVID-19 pandemic, the managerial function of planning has the highest importance and was performed the most often, followed by the function of leading. The managers gave minor importance to the organising function, which was statistically confirmed by Friedmann ANOVA followed by post hoc analysis – the Bonferroni-Dunn test. The results also confirmed a satisfactory level of expert agreement on the data obtained (Kendall W ~ 0.7–0.84), confirming the relevance of the findings. Also, several internal barriers that affected the work of managers were identified. The results are somewhat unusual, as most of the constraints faced by managers were imposed by the external environment, such as government regulations or sanitary measures. This discrepancy suggests that companies should emphasise improving their crisis management in the future. The results obtained thus provide the basis for further research in the area analysed. At the same time, it is possible to move away from the COVID-19 situation and transform the issue into managerial management in crises.

Keywords: Systematic literature review, crisis management, planning, internal barriers.

Introduction

Until 2019, the global pandemic was seen as something that could not happen in the modern world. However, the disease called COVID-19 showed the world the opposite when, on March 11, 2020, the World Health Organization declared a global pandemic. The situation led to several restrictions in various areas, which all had the common goal: limit the spread of the disease. As the disease spread among people, the governments usually ordered/recommended people to stay at

home, which led to the necessity of people working or studying remotely (whenever possible). Due to these measures, as well as due to the sickness itself, many things in many areas of life had changed, which resulted in "millions of deaths, job losses, and a multitrillion dollar decline in economic output" (Panwar et al., 2022, p. 5).

The extent of the impact of this situation on businesses differed by the sector in which they operated. The more significant impact was on the sectors that can only operate with the presence of people, e.g., tourism (Utkarsh & Sigala, 2021), culture (Kraus et al., 2020), and sports (Ratten, 2020). Business in this sector was considerably limited in many European countries (at least at the beginning of the pandemic). A minor impact was on the sectors that were able to function but had to face problems, e.g., regarding the shortage of employees (Messabia et al., 2022), fewer supplies (due to the collapse of supply chains; Chatterjee & Chaudhuri, 2022), specifics of working from the office as well as working from home (Manko, 2021) or the necessity to sell online (Schleper et al., 2021; Singh & Singh, 2022).

All the problems that arose in businesses during the COVID-19 era had to be dealt with by people, especially by managers (for this paper, there will be no difference between business owners and managers, both groups will be called managers). Managers are the people responsible for achieving the organisation's goals. Usually, to do that, they use several managerial functions (most often planning, organising, leading, and controlling (Jones & George, 2017)). Due to the COVID-19 situation, some skills, abilities, and people's knowledge changed (Hartmann & Lussier, 2020). For example,

many people had to learn how to face rapid changes (Zaoui et al., 2021), how to use technologies that allowed them to work from home (Hartmann & Lussier, 2020), or how to deal with a higher level of stress they were facing (Koch & Schermuly, 2021). Thus, it can be assumed that these changes also affected managers and the performance of their functions.

Since the correct performance of these functions is crucial to maintaining the business's overall performance, it is necessary to study the changes that can influence them. Significantly, the changes that occurred due to such events as the COVID-19 pandemic are essential to analyse because this type of event represents a global problem whose solution can give instructions on how to solve similar (even less significant) problems in the future. Thus, the aim of this paper is to analyse the performing of managerial functions in the context of the COVID-19 pandemic. In more detail, this research aims to empirically verify the changes and possible barriers to the performance of managerial functions revealed by systematic literature review and to identify additional ones (by using the Delphi method).

The authors of this research realise that managers who managed employees working from the usual workplace faced different challenges than managers who managed people working from home. Both groups dealt with restrictions, shortage of people or other resources, or changes in buyers' behaviour (transition to online shopping). The difference is that managers from the first group (usual workplace) had to change the processes to make sure people would not meet each other unnecessarily, often dealing with a more significant shortage of employees (some employees
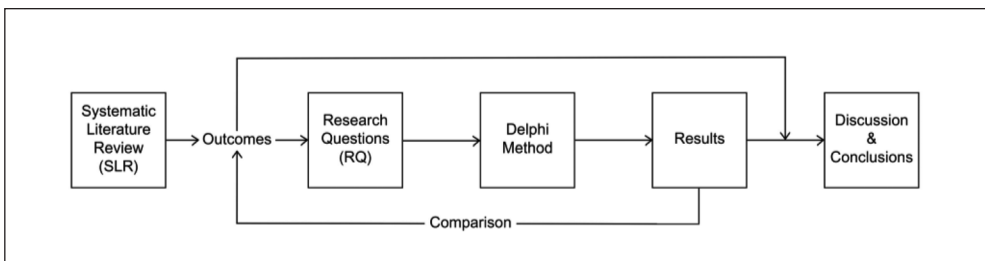

Fig. 1: Flowchart of the research framework

Source: own

positively tested on COVID-19 were able to work, however, they could not be present in the workplace due the restrictions). However, in our opinion, the managers from the second group (work from home) deserve special attention because they had to deal with the quick increase of remote working and its consequences (e.g., providing necessary IT equipment, and appropriate training) with more probability to affect managerial functions (e.g., organising and controlling of the work done) that are worth more detailed research. Thus, it was decided that this empirical research focuses only on the managers that managed people who worked predominantly from home).

The research structure follows the procedure framework shown in Fig. 1. The changes in the performance of managerial functions revealed in the existing literature are introduced by a systematic literature review (SLR), and the resulting research questions are presented. A Delphi survey is carried out to answer them. The survey results are then retrospectively compared with the results of the SLR framework. The research is concluded with a discussion and conclusions.

1. Theoretical background
1.1 Managerial functions
Firstly, it is necessary to define the managerial functions, which differ from author to author. Contemporary specialised books use many functions, such as planning, organising, commanding, coordinating, controlling, leading, decision making, influencing, motivating, staffing, and communicating (McNamara, 2009). However, the four functions (planning, organising, leading and controlling) are the most often used. They can be found in specialised books (Bateman & Konopaske, 2022; Certo & Certo, 2019; Jones & George, 2017; Robbins & Coulter, 2021). Thus, in this paper, managerial functions will be seen according to these authors.

Planning can be defined as "specifying the goals to be achieved and deciding in advance the appropriate actions needed to achieve those goals" (Bateman & Konopaske, 2022, p. 11). The second function is about "arranging and structuring work to accomplish organisational goals" (Robbins & Coulter, 2021, p. 307). "The process of guiding the activities of organisation members in appropriate directions" (Certo & Certo, 2019, p. 336) is the definition

of leading (sometimes also called "influencing)". And the aim of controlling is "to evaluate how well an organisation has achieved its goals and to take any corrective actions needed to maintain or improve performance" (Jones & George, 2017, p. 10).
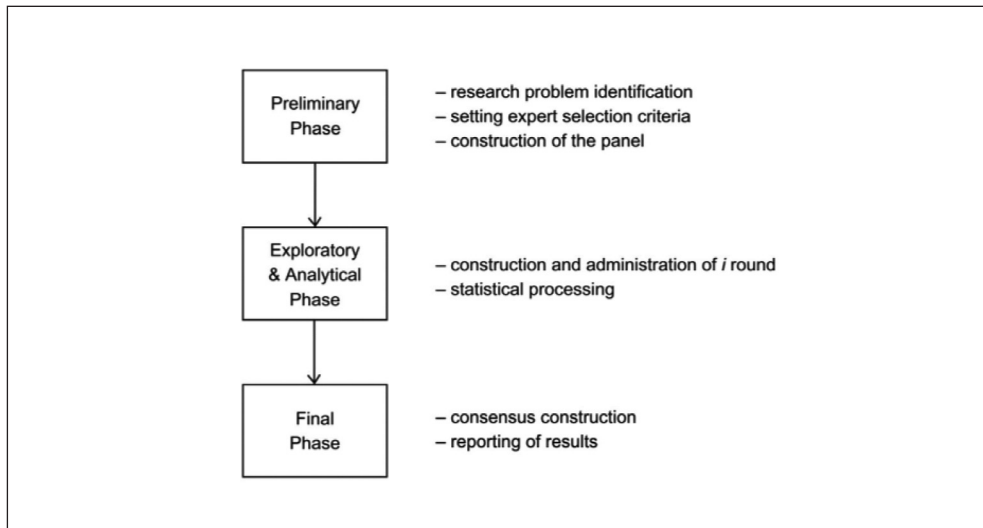
1.2 Delphi method
The Delphi method is used to analyse the selected issue to extend the findings from the systematic literature review with additional empirical data. This research methodology finds application in various domains, such as problem identification, solution finding, and discerning distinctions among multiple reference groups (Delbecq et al., 1975). The schematics of the individual phases of the Delphi method are shown in Fig. 2.

The Delphi method is a multi-round questioning design (most typically three rounds; e.g., Crucke & Decramer, 2016; Green, 2014) with controlled feedback (Dalkey & Helmer, 1962; Grime & Wright, 2016). The respondents are selected experts involved in the survey and chosen based on predefined criteria. The above ensures the presence of respondents with appropriate experience or expertise on the issue being researched (Ferreira et al., 2014; Habibi et al., 2014). To achieve higher reliability and objectivity in the research process, it is essential to guarantee sufficient heterogeneity (diversity) in the structure of the panel of experts selected (Okoli & Pawlowski, 2004). The recommended number of experts varies; e.g., Grime and Wright (2016) and Landeta (2006) suggest a number between 5 and 30, Gordon (1994) suggests 15–35 people and Witkin and Altschuld (1996) suggest below 50 people.

Concentrating on the rate of return, which may be affected by the vice-round system, where individual experts leave for various reasons, a rate of 50–80% can be considered, with 35–75% reported by Gordon (1994), and similarly 40–77% by Egerová and Mužík (2010).

Delphi can be classified as a qualitative research method. However, the statistical evaluation of the method is supplemented with quantitative elements. For the implementation and evaluation of the survey in this study, the approach used was that of García-Uceda et al. (2017), who work with descriptive statistics in the framework of the inter-round evaluation, and with Kendall's coefficient of concordance for the latter rounds (the 3rd or more; Egerová & Mužík, 2010).

1.3 Identified changes in the performance of managerial functions – Systematic literature review

To identify changes in the performance of managerial functions due to the COVID-19 situation, a systematic literature review was done on the Web of Science database in January 2023. The research questions focused on: i) identifying the most often researched managerial functions in the context of changes due to COVID-19; and ii) the difficulties of performing these functions. To do this, the keywords "covid," "change," and "management" were searched for in the "Management" category (English language publications with no restriction regarding the year of publication). Although 211 articles were found initially, only 18 papers were relevant to answer the research questions.

The resulting papers are shown in Tab. 1 and categorised according to the managerial function they were concerned with (the last column of Tab. 1). Within this category, publications are sorted according to the year of publication. Tab. 1 details the methodological approach, the type of management, the geographical focus, and the sample for each publication.

As to the methodological approach, eight papers are based on questionnaires, six

on interviews, two are based on case studies, one is theoretical, and one is a literature review. In most papers (five), the type of studied management is not specified. In four cases, the paper is based on business owners' opinions, and the rest is focused, e.g., on public sector managers, HR managers, and project managers. As to geographical focus, studies about European management predominate.

At first, it was revealed that no publication that aimed to analyse the changes in the performance of managerial functions directly exists in WoS. At this point, the search for this type of publication was expanded to all sources, and finally, one paper was found in Google Scholar (thus, it will not be part of the following SLR, but it cannot be omitted). Miklosevic et al. (2022) interviewed operation managers in 35 Croatian companies in 2022 to discover the problems managers faced in performing their managerial functions. They found that managers had to deal with changes related to planning and organising functions (both because of the absence of workers). On the other hand, the controlling function was the least affected function (almost no changes).

The 18 papers included in SLR mainly mention changes in the performance of some

Tab. 1: Overview of the papers

Citation	Methodological approach	Focus on management type	Geographical focus	Sample	Managerial function
(Soluk, 2022)	Questionnaire	Family firms' owners	Germany	112 family firms' owners	Planning
(Cervinka & Novak, 2022)	Case study	Managers	Czechia	8 managers, leaders, and workers in the SMEs	Leading
(Yue & Walden, 2022)	Questionnaire	Managers	USA	414 full-time US employees	
(Ayoko et al., 2021)	Literature review	Managers	–	–	
(Koch & Schermuly, 2021)	Questionnaire	Agile project management	Germany and USA	168 German and 292 American employees in project-related firms	
(Racaite-Samusiene et al., 2021)	Interview	Public sector managers	Lithuania	6 top and middle-level managers of municipal administration	
(Schleper et al., 2021)	Case study	Operations and supply chain management	UK	Management scholars and Marks & Spencer's head of procurement	
(Amis & Janz, 2020)	Conceptual/ theoretical	Managers	–	–	
(Messabia et al., 2022)	Interview	Owners of restaurants	Canada	6 restaurant owners	Organising
(Almazrouei & Zacca, 2022)	Questionnaire	Public sector managers	Austria	55 public sector managers	Leading, organizing, controlling
(Gonçalves et al., 2021)	Questionnaire	HR management	Portugal	136 HR managers	Leading, organising
(Rashid & Ratten, 2021)	Interview	Entrepreneurs	Pakistan	20 entrepreneurs	Leading, organising
(Manko, 2021)	Questionnaire	Managers	Various	158 managers (from various types of organisations)	Planning, leading
(Tomcikova et al., 2021)	Questionnaire	HR management	Slovakia	137 HR managers	Planning, organizing
(Zaoui et al., 2021)	Questionnaire	Strategic innovation management	Marocco	57 managers	Planning, leading, organizing
(Dănilă & Adam, 2020)	Interview	Project management	Romania	5 project managers	Planning, leading, organizing
(Hartmann & Lussier, 2020)	Interview	Sales manager	North America or global	8 managers (various types)	Organising, leading
(Kraus et al., 2020)	Interview	Family firms' owners	Austria, Germany, Italy, Lichtenstein, Switzerland	27 top managers or responsible areas managers of family businesses	Leading, organising

Source: own

managerial functions while their aim is focused on different issues. In Tab. 1, the papers are sorted into categories according to the managerial function they deal with. If they are dealing with more than one, it is clearly stated.

The most often mentioned function that changed due to COVID was leading (altogether in 15 papers). In these 15 papers, motivation was the most often mentioned change regarding leading function (7 times). It was identified that for managers during the COVID-19 era, having the ability to motivate employees was necessary (Rashid & Ratten, 2021), as well as having emotional intelligence and empathic capabilities (Schleper et al., 2021). It is because COVID-19 caused a decrease in employees' motivation, loss of morale, and resignation (Cervinka & Novak, 2022) as well as emotional exhaustion due to the accumulation of unfinished tasks (Koch & Schermuly, 2021) and the inability of employees to keep on task (Manko, 2021). Also, it was revealed that some managers could inspire, influence, motivate, and encourage their followers (Racaite-Samusiene et al., 2021) or take care of employees' physical and mental health (Hartmann & Lussier, 2020).

Secondly, communication during COVID-19 has changed. It was accelerated (Cervinka & Novak, 2022) and ongoing on several platforms, often online, such as WhatsApp or Facebook (Kraus et al., 2020; Rashid & Ratten, 2021). It was necessary to allow employees to have all the information they needed (Manko, 2021) and communicate transparently (Yue & Walden, 2022), to get used to the change.

The last identified common topic regarding leading was the challenge of leading people working remotely. For managers, it was necessary to have skills in working virtually (Ayoko et al., 2021) and also it was necessary to immediately provide training in these skills to the employees (Almazrouei & Zacca, 2022; Gonçalves et al., 2021; Hartmann & Lussier, 2020).

The COVID-19 situation influenced the leading of strategic innovation management initiatives (Zaoui et al., 2021) and of people working on projects (Dănilă & Adam, 2020). Also, more attention should be paid to employees (people-centred approach) as a response to the COVID-19 situation (Amis & Janz, 2020).

As to organising, the function was mentioned in 9 papers. They include several topics such as coping with the immediate necessity to work from home, together with having adjusted the work system and providing necessary technology (Almazrouei & Zacca, 2022; Kraus et al., 2020) as well as the related change of the work organisations (Gonçalves et al., 2021). Also, it was identified that organisations and their management had to adapt to buy or sell online (Rashid & Ratten, 2021) or to deal with the regulations of constant closures and openings (Messabia et al., 2022) and thus constantly rescheduling tasks (Hartmann & Lussier, 2020). Regarding employees, managers had to deal with their shortage (Messabia et al., 2022), with the changes in the process of their selection and recruitment (Gonçalves et al., 2021) or even with the fact that no employees were hired during the COVID-19 era at all (Tomcikova et al., 2021). Also, the same as with the leading, the COVID-19 situation influenced the organising of strategic innovation management initiatives (Zaoui et al., 2021), and of people working on the projects (Dănilă & Adam, 2020).

Regarding planning, five papers were found that mentioned this function. The lesson learned from this situation is that organisations should have prepared plans for these types of situations (Tomcikova et al., 2021) because the planning was problematic for some organisations at that moment (Manko, 2021) or to have a strategy on how to finish on time (Dănilă & Adam, 2020). Also, it was identified that long-term planning was not possible anymore, and organisations had to adapt to short-term planning (Soluk, 2022). The same as with leading and organising, the COVID-19 situation influenced the planning of strategic innovation management initiatives (Zaoui et al., 2021).

As to controlling function, this was surprisingly mentioned only once in the paper written by (Almazrouei & Zacca, 2022), who pointed out that the performance and KPIs of organisations had lower values and it was necessary for managers to adapt their style of management to monitor their employees remotely.

To summarise, the most often mentioned topics in current literature about the performance of managerial functions during the COVID-19 are motivation, communication, the necessity to provide training for gaining specific abilities and skills (regarding remote working), as well as providing the necessary technology for employees, the necessity to change the processes (due to, e.g., online selling, and remote work), to react quickly to immediate changes (closure and re-openings, rearranging scheduled tasks),

to deal with the shortage of employees, to adapt to short-time planning, and to monitor the work of employees. In light of these identified changes, the first research question was stated.

RQ1: What changes in the performance of managerial functions due to the COVID-19 situation identified in literature can be verified empirically?

Secondly, while processing the SLR, many difficulties in performing managerial functions in the COVID-19 era were revealed. Many organisations had to face financial difficulties (Cervinka & Novak, 2022; Messabia et al., 2022) and the need to lay off employees (Rashid & Ratten, 2021). Managers had to deal with a more significant amount of work (Racaite-Samusiene et al., 2021; Rashid & Ratten, 2021), faced problems regarding working, leading and monitoring employees remotely (Almazrouei & Zacca, 2022), problems with communication or obtaining information (Dănilă & Adam, 2020; Kraus et al., 2020; Manko, 2021), which altogether resulted in a lot of pressure and stress (Cervinka & Novak, 2022; Messabia et al., 2022; Schleper et al., 2021; Soluk, 2022). Thus, the second research question was stated in light of these identified difficulties.

RQ2: What difficulties and barriers in the performance of managerial functions due to the COVID-19 situation identified in literature can also be observed empirically?

2. Research methodology

The investigation took place from March to May 2023. During this period, the research problem was defined, the criteria for selecting experts were defined, the questionnaire was piloted, and the three-round survey was conducted with controlled feedback. The research aimed to identify the main managerial activities (related to managerial functions) most frequently performed by managers during the current counter-epidemiological measures.

The criteria for the selection of appropriate experts were as follows: i) an expert is a person who works in a managerial position and has worked in that position before 2020 (before the COVID-19 pandemic); ii) an expert is a person who has at least five subordinate employees (or the number of employees in the department they manage); and iii) an expert represents, from a management position, an organisation whose staff have carried out their work in a combined way – both in the workplace and from home – as part of the epidemiological response. The proportion of remote working was at least 50%.

Tab. 2 provides more detailed characteristics of the companies represented by experts (16)

Tab. 2: Characteristics of represented companies

	Category	Value	Percentage (%)
Total number of employees	<9	3	19
	10–49	3	19
	50–249	5	30
	250–499	3	19
	500+	2	13
Number of direct subordinates	5–9	6	38
	10–25	8	50
	26–50	1	6
	51–250	1	6
	251+	0	0
Levels of manager positions	Top	5	31
	Middle	7	44
	Operative	4	25

Source: own

who participated in all three survey rounds. The data shows that the distribution by size of organisation (in terms of number of employees) is distributed evenly, with a slightly higher representation of medium-sized enterprises. The number of direct subordinates most often ranged 5–25 (5 was a requirement for participation in the survey), corresponding to the most common level of effective management of a group of people. Similarly, the distribution of manager levels is even with a preponderance of mid-level managers.

The qualitative method of coding and subsequent data synthesis was used to evaluate the responses of the first round. The synthesis of the responses was used to unify the opinions and perspectives of each expert. It resulted in the set of the most often mentioned activities, which were subsequently divided into categories according to managerial functions. By coincidence, there was a symmetrical filling of each managerial function with five activities. Also, the four groups of managerial functions (according to the values assigned for each activity) can be compared, and their relationship can be analysed. In the second round, the experts rated the importance of these activities resulting from the first round. The 5-item version of the Likert scale, the most widely used scale (Freese et al., 2011), was used for the rating. The value 5 meant the highest level of agreement and the value one the lowest (thus, the value five meant that the expert "totally agreed that he/she performed the activity and thus it was important during the COVID pandemic"). Cronbach's alpha is used to measure the internal consistency/reliability of the questionnaire, ensuring that the items consistently measure the same construct.

Based on the above, a multi-sample Friedman test – non-parametric ANOVA (Q statistic) was calculated for comparison according to the relationship:

$$Q = \frac{12}{n \times K(K+1)} \sum_{k=1}^{K} R_k^2 - 3n(K+1) \tag{1}$$

where: $R_k = \sum R_{ik}$ n $i = 1$ – sum of group ranking; K – number of compared groups; n – number of monitored objects.

The non-parametric test was chosen concerning the results of the Shapiro-Wilk test, which indicated a significant deviation

of the data from normality $p < 0.001$. The observed effect size Kolmogorov-Smirnov – D is large (0.1991–0.2343). This indicates that the magnitude of the difference between the sample distribution and the normal distribution is significant.

In case of rejection of the hypothesis of concordance (Friedman test), a subsequent post hoc analysis, specifically the Bonferroni-Dunn test, is needed. IBM SPSS Statistics software is used to compute the post-hoc analyses, which performs Dunn's paired post-hoc tests in the first step. Then, the Bonferroni correction of multiple testing is applied by the software to obtain an adjusted p-value (Pereira et al., 2015).

The purpose of the third round of the Delphi survey is to determine the level of agreement among the participating experts. The experts indicated their agreement or non-agreement with the ranking of activities resulting from the second round. By this evaluation, the final ranking of the five activities within each function was determined. The tightness of the rating relationship (agreement) of the experts was measured for each managerial function separately using the non-parametric Kendall's coefficient of agreement (Kendall's W) according to:

$$W = \frac{\sum_{i=1}^{k} R_i^2 - \frac{(\sum_{i=1}^{k} R_i)^2}{k}}{\frac{1}{12} m^2 \times (k^3 - k)} \tag{2}$$

where: R_{ij} – evaluation by evaluator j for subject i; $R_i = \sum R_{ij}$ m $j = 1$; k – number of evaluated factors; m – number of evaluators.

The *RQ2* was answered by additional questions that were part of the first round of Delphi. These questions were evaluated by using coding and subsequent categorisation. After receiving the results, the answers were categorised according to the enterprise environment and were made by the authors.

3. Research results

The first survey round was conducted in April 2023 and aimed to obtain a wide range of responses.

A total of 23 selected experts were contacted, with 19 responses (83% return rate), providing 29 different answers. In addition, one expert was eliminated due to non-compliance (more than 50% of the working hours were worked remotely by employees). In total,

20 individual responses (activities) were obtained, and the corresponding managerial functions (planning, organising, leading, and controlling) were assigned to the resulting activities by the research authors. The individual activities and their assignment of managerial functions can be seen in the results of the second round of the survey (Tab. 3).

The second round of the Delphi survey was conducted in May 2023, where respondents (18) rated the importance of the performance of each managerial activity grouped by managerial functions. A total of 16 valid responses were obtained, with an overall return rate of 69.5%. The instrument's reliability was verified by the internal consistency of the items at an acceptable Cronbach's alpha of ~0.78 (Tavakol & Dennick, 2011). The results of the evaluation are shown in Tab. 3. The results indicate that experts gave the highest values (based on mean and median) to activities within the category of planning and leading, with the highest-rated activity being "Setting goals

Tab. 3: Results of the second round – Delphi method

Activities	Managerial function	Mean	Median	Mean	IQR*
Setting goals and tasks for remote work	Planning	4.437	4.0	3.712	1
Changes in financial planning		3.875			
Changes in marketing planning		3.625			
Increased demands on order planning (including international)		3.500			
Selection and allocation of online platforms and infrastructure		3.130			
Delegating tasks	Organising	3.560	3.0	3.100	2
Organising employee coverage		3.375			
Reorganisation and creation of new processes/activities		3.187			
Creating new structures and teams		2.940			
Ensuring sufficient access to technologies, and tools + training		2.437			
Caring for the mental health of employees	Leading	4.125	4.0	3.662	2
Coordination of workplace communication, including keeping employees informed of updates		3.937			
Flexible working hours (adjustment or implementation)		3.562			
New ways of motivation and benefits		3.440			
Increased demands on operational management		3.250			
Increase in feedback provided – due to limited physical contact	Controlling	3.875	3.5	3.475	1
Regular monitoring of processes and outputs		3.750			
Control of compliance with standards and regulations		3.500			
Random checks of completed work		3.250			
Implementation of measures for proactive risk management		3.000			

Note: *Interquartile range.

Source: own

and tasks for remote work" (4.437). On the other hand, the activity "Ensuring sufficient access to technologies and tools + training" (category of organizing) is the lowest-rated activity with a mean of 2.437.

Next, the Friedman test was performed, and Tab. 4 shows that the null statistical hypothesis of agreement is rejected at a p-value of ~0.0011.

Considering the rejection (p-value < 0.05), the data are subjected to post hoc analysis – the Bonferroni-Dunn test (Tab. 5).

From the post hoc analysis results, it is possible to identify significant differences in expert ratings only between the managerial function of organizing and the functions of leading and planning (adjusted p-value). No significant differences were found between other managerial

Tab. 4: **Friedman's ANOVA**

Variable	Average rank	Sum of ranks	Mean	Std. dev.
Planning	2.66875	213.50	3.66250	1.030469
Organising	2.71875	217.50	3.71250	0.798634
Leading	2.06250	165.00	3.10000	0.850912
Controlling	2.55000	204.00	3.47500	1.005995

Note: Friedman ANOVA; ANOVA Chi Sqr. ($N = 80$, df = 3) = 16.06347; $p = 0.001100$.

Source: own (processing using SW Statistica, 2023)

Tab. 5: **Post hoc analysis (Dunn-Bonferroni test) – Pairwise comparisons**

Sample 1 – Sample 2	Test statistic	Std. error	Std. test statistic	p-value	Adj. p-value
Organising-Controlling	−0.488	0.204	−2.388	0.017	0.102
Organising-Leading	0.606	0.204	2.970	0.003	0.018
Organising-Planning	0.656	0.204	3.215	0.001	0.008
Controlling-Leading	0.119	0.204	0.582	0.561	1.000
Controlling-Planning	0.169	0.204	0.827	0.408	1.000
Leading-Planning	−0.050	0.204	−0.245	0.806	1.000

Note: Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-side tests) are displayed. The significance level is 0.050. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Source: own (using IBM SPSS Statistics, 2023)

functions. The results indicate that activities related to planning, leading, and controlling are similarly rated (in terms of their performance and importance) by experts. It is the logical consequence of the fact that the experts rated organising as the function with the lowest rating of its performance and importance during the valid epidemiological measures (Tab. 5).

The third (final) round of the research took place at the end of May 2023 and aimed to assess the overall ranking in the different areas of managerial functions. Of 23 initial experts, 15 actively participated in this round, indicating an overall return rate of 65%, an above-average expected return rate (Egerová & Mužík, 2010; Gordon, 1994).

Changes in ranking compared to the second round (Tab. 6) occurred only between activities 2 and 3 in the organising function and between activities 4 and 5 in the controlling function. All values correspond to Kendall's W > 0.7, which, according to Habibi et al. (2014), indicates

a strong consensus among experts and enhances the relevance of the data obtained.

3.1 Barriers and difficulties of the COVID-19 era

The following section of the research focused on identifying barriers (*RQ2*) that influenced the performance of management activities/functions. The coding-adjusted identified barriers are shown in Tab. 7. The individual barriers were further categorised according to the distribution of the enterprise environment. The data show that most barriers come mainly from the internal environment.

Tab. 6: Final results – Delphi method

Activities	Managerial function (Kendall's W)	2nd round rank	Change	Final rank
Setting goals and tasks for remote work	Planning (W = 0.82)	1	0	**1**
Changes in financial planning		2	0	**2**
Changes in marketing planning		3	0	**3**
Increased demands on order planning (including international)		4	0	**4**
Selection and allocation of online platforms and infrastructure		5	0	**5**
Delegating tasks	Organising (W = 0.70)	1	0	**1**
Organising employee coverage		2	−1	**3**
Reorganisation and creation of new processes/activities		3	+1	**2**
Creating new structures and teams		4	0	**4**
Ensuring sufficient access to technologies, and tools + training		5	0	**5**
Caring for the mental health of employees	Leading (W = 0.84)	1	0	**1**
Coordination of workplace communication, including keeping employees informed of updates		2	0	**2**
Flexible working hours (adjustment or implementation)		3	0	**3**
New ways of motivation and benefits		4	0	**4**
Increased demands on operational management		5	0	**5**
Increase in feedback provided – due to limited physical contact	Controlling (W = 0.76)	1	0	**1**
Regular monitoring of processes and outputs		2	0	**2**
Control of compliance with standards and regulations		3	0	**3**
Random checks of completed work		4	−1	**5**
Implementation of measures for proactive risk management		5	+1	**4**

Source: own

Tab. 7: Barriers to managerial activities

Identified barrier	Area	Environment
Limited opportunities for employee development and education	Employees	Internal
Employees' illness		
Increased stress – reduced effectiveness of managerial decision-making	Management	
Difficulties in monitoring employees		
Limitation of time resources	Resources	
Lack of resources and limited budget		
Insufficient technological infrastructure	Property	
Restrictions on suppliers (e.g., communication limitations)	Suppliers	Industry
Customers – increased impatience and concerns	Customers	
Government and administration – issuance of regulations	Political/legal	External
Rapid changes in the situation and uncertain prognosis of development	Combination	
Lack of physical contact		

Source: own

4. Discussion

The empirical research revealed some interesting facts about the managerial functions performed during the COVID-19 situation. The results will be discussed according to the order of the findings in the literature, which will be suitably supplemented by the additional results of this research.

As to *RQ1*, in the literature, the most identified changes were related to the leading function. Although each managerial function is represented in this research by exactly five activities, their importance can be derived from the rating (the second round of Delphi) received regarding its performance and importance during the COVID-19 situation. In terms of leading, the activities within this category were highly rated (the average value for the whole group of activities related to leading is the second highest rated with a value of 3.662). Also, in the third round of Delphi, Kendall's W is the highest for the group of activities related to leading function (0.83), which indicates the most robust consensus among experts. This study identified five activities related to leading (third round of Delphi). In the first place was "Caring for the mental health of employees," which directly confirms the findings of Hartmann and Lussier (2020). The second was "Coordination of workplace communication, including keeping employees informed of updates," which is most in line with the findings of Kraus et al. (2020), Manko (2021), and Rashid and Ratten (2021), who were dealing with the communication's specifics during COVID-19. The third, "Flexible working hours (adjustment or implementation)," was not previously identified in the literature. The fourth, "New ways of motivation and benefit," is related to the whole group of (seven) publications that were related to motivation during COVID-19 (Cervinka & Novak, 2022; Hartmann & Lussier, 2020; Koch & Schermuly, 2021; Manko, 2021; Racaite-Samusiene et al., 2021; Rashid & Ratten, 2021; Schleper et al., 2021). The last activity, "Increased demands on operational management" was not previously identified in the literature. Thus, to summarise the managerial function of leading, the changes in motivation and communication identified by the literature were also observed empirically in the Czech Republic. However, the changes related to remote working (identified by SLR) were not, at least not in terms of leading function. Additionally, two activities that SLR did not directly identify resulted from the research. "Flexible working hours" could

E+M

be related to remote working; however, the "Increased demands on operational management" is too general and could relate to remote working, as well as motivation or communication.

In terms of organising, while the research of the literature revealed relative importance (9 papers mentioned it), in this research, the activities regarding organising were the lowest rated (average for the whole group of activities is 3.1), also it has the lowest value of Kendall's W (0.7). This study identified five activities related to organising. As the first was the "Delegating tasks," which was a logical consequence of the COVID-19 situation; however, in the literature, no such activity was identified. The second, "Reorganisation and creation of new processes/activities," is directly in line with the findings of Gonçalves et al. (2021), Hartmann and Lussier (2020), Messabia et al. (2022), and Rashid and Ratten (2021), who generally dealt with changes in processes that resulted from the situation. The third, "Organising of employee coverage," relates to the issues of employees identified by Gonçalves et al. (2021), Messabia et al. (2022), and Tomcikova et al. (2021). Regarding the fourth, "Creating new structures and teams," no such topic was previously identified in SLR. The fifth, "Ensuring sufficient access to technologies, and tools + training," was also revealed by Almazrouei and Zacca (2022) and Kraus et al. (2020) in terms of providing necessary technology. The "training" part was additionally mentioned by Gonçalves et al. (2021) and Hartmann and Lussier (2020), but rather in terms of the leading employees being trained rather than organising the training. To summarise the organising function, most of the critical changes identified by literature (7 out of a total 9) were also empirically verified; however, according to this research data, this function was not seen as important as others.

On the other hand, planning was considered by the experts to be the most important (in the second round of Delphi, the average value for the whole group of activities related to planning was the highest rated, with a value of 3.712). Also, Kendall's W was the second highest, with a value of 0.82. This result contrasts the prior SLR, which contained only five papers identifying changes related to this function. This difference can be attributed to many reasons, the most probable being that planning is not as interesting for researchers as

leading (leadership) is. As to individual results, the first activity in this group is "Setting goals and tasks for remote work." From the planning point of view, it was not explicitly mentioned in any literature; however, the issue of remote work, e.g., from an organisational or leading point of view, appears in the works of Almazrouei and Zacca (2022), Ayoko et al. (2021), Gonçalves et al. (2021), Hartmann and Lussier (2020), and Kraus et al. (2020). The second and the third are the "Changes in financial planning" and in "Marketing planning," which were not dealt with in any literature, same as the fourth, "Increased demands on order planning (including international"). The last, "Selection and allocation of online platforms and infrastructure," was not directly dealt with from a planning point of view. However, it is related to the communication topic dealt with within the leading function (e.g., Kraus et al., 2020) mentioned WhatsApp or Facebook communication during the COVID-19 situation). Also, the "infrastructure" part can be related to the papers of Almazrouei and Zacca (2022) and Kraus et al. (2020), who dealt with this subject in terms of its organisation. Thus, to summarise, no previously identified changes in the literature were empirically verified regarding planning. Only some similarities were found with research dealing with other functions. However, in this case, the changes identified by the literature were mostly general observations, such as "problematic planning," which is not an activity. Thus, it could not be revealed by this research. Only one exception was the shift to short-term planning observed by Soluk (2022), which was expected to be verified empirically; however, it was not.

The last function of controlling was mentioned only once in literature by Almazrouei and Zacca (2022), who stated that KPI results were worse and that managers had to adapt to monitor employees remotely. In practice, this statement was confirmed by the final set of activities in this research (Tab. 3). As to the overall rating in the second round of Delphi, this group of activities took third place with an average rating of 3.475.

Thus, to summarise, most of the changes identified by SLR in the functions of leading, organising, and controlling were verified empirically, only those in planning were not at all. Additionally, in contrast to the literature, where leading was the most often researched subject, followed by organising, the experts considered

the essential function planning, followed by leading and controlling.

Regarding *RQ2*, the literature identified several difficulties managers faced, with half also verified empirically. The barrier "Lack of resources and limited budget" identified by experts is consistent with the findings of Cervinka and Novak (2022) and Messabia et al. (2022). The barrier "Increased stress – reduced effectiveness of managerial decision-making" confirmed the identified (Cervinka & Novak, 2022; Messabia et al., 2022; Schleper et al., 2021; Soluk, 2022) difficulty of omnipresent stress. Also, the resulting barrier, "Difficulties in monitoring employees," confirms the finding of Almazrouei and Zacca (2022), who mentioned the problems with monitoring employees remotely. Additionally, the resulting barrier of "Employees' illness" points to problems in terms of employees, which was also the difficulty identified from the work of Rashid and Ratten (2021), who were dealing with the necessity to lay off employees (however, that could be caused by other reasons). Other two difficulties identified by literature (a greater amount of work and problems with communication) were not empirically verified in this research. On the other hand, this research revealed many other barriers (Tab. 7) that were not identified in the literature. Interestingly, the experts identified the slightest influence of the external environment and institutions, even though the survey was conducted in the Czech Republic, which was under the influence of unexpected and significant interventions of state institutions during the pandemic.

Conclusions

To conclude, this research verified most of the changes and barriers regarding the performance of managerial functions during COVID-19 that were identified previously in the literature. In addition, this research also revealed many additional changes and barriers that influenced managerial work during the COVID-19 era. It is important to note that the studied literature was primarily aimed at different topics than the changes in managerial functions due to COVID-19. Thus, the high number of previously non-identified activities that this research revealed should not be seen as criticising the literature but instead as complementing existing research.

Regarding the new findings from the Delphi method, the experts agreed that the most important and most often performed were activities related to the function of planning, as well as leading and controlling, from which "Setting goals and tasks for remote work" activity was the most important one. Activities related to organising were rated as the least important, with the activity "Ensuring sufficient access to technologies, and tools + training" as the least important one. These results are surprising because the necessity to react quickly (and thus re-organise resources) was expected to be revealed. The unexpected result can be explained by the fact that this research was aimed at the managers who managed people working from home, who often did not have to deal with the restrictions commanding them to close the business for a while (such as were, e.g., managers of the restaurants). So, the organisation of their employees' work was not seen as an issue compared to planning in such an unstable environment.

Additionally, this research identified several internal barriers that influenced managerial work, which is strange, given that most restrictions came from the external environment. Thus, businesses should work on better crisis management in the future.

Regarding future research, it would be interesting to know the opinions of experts who managed people working from the usual workplace. However, since the COVID-19 restrictions have primarily ended in many countries, and considering that people (managers) tend to forget the wrong things, to start this research now seems unwise because obtained results could be distorted.

As for the limitations of this research, the fact that the research was conducted only in the Czech Republic can be seen as one because different epidemiological measures were applied in every country. However, the measures that influenced the managers and their work the most (e.g., the recommendations/requirements that people stay home as much as possible) were very similar in Europe (with few exceptions).

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