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CHAPTER 7

Impact of the Covid-19 pandemic on the operation of construction companies in the Czech Republic

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Abstract

The Covid-19 pandemic has significantly impacted national economies worldwide. In order to prevent the spread of the virus, governments were often forced to take action and impose certain restrictive measures. The extent of the particular measures adopted differs from country to country, as well as among the individual sectors of the economy with regard to the possibility of the spread of the virus. This paper contains a study of how the Covid-19 pandemic has affected the operation of Czech construction companies. Data from the construction industry were collected during February and March 2021 using a web-based questionnaire survey. Consequently, the data cover both the first and the second state of emergency (with the associated lockdowns) declared in the Czech Republic. A total of 120 construction contractors took part in the survey. Furthermore, interviews with 10 experts in the field were conducted. The results revealed a slight decrease in sales; however, in many other aspects, construction companies managed to adapt to the government restrictions quite successfully. These adaptations included very limited layoffs of employees and working from home for a limited number of administrative staff. A vast majority of companies did not have to suspend their operations at all. The measures had a greater impact on large companies employing foreign workers and on projects which were more demanding in terms of supply of special equipment, as well as on projects implemented outside the Czech Republic. As the pandemic did not affect the construction sector significantly, only a limited number of respondents reported participation in

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government aid programs aimed at companies whose business had been severely restricted by the governmental measures.

Key words: *construction, contractor, Covid-19, restrictive measures, lockdown, operation, pandemic*

JEL classification: *D22, E22, I15, J20*

1. Introduction

The Covid-19 pandemic has affected both the everyday life of individuals and the operations of companies in various segments of the national economy. Many countries opted for a hard lockdown in the first half of 2020, while some other countries applied a less restrictive approach, for instance Sweden (Yarmol-Matusiak et al., 2021). Yarmol-Matusiak et al. also pointed out that restrictive measures imposed in the early stages of the pandemic were made under a high degree of uncertainty and variations among them led to different trajectories of Covid-19. Following the scope of the restrictive measures taken by governments in individual countries, the degree of their impact on economic activity varied significantly. One of the main challenges the governments faced was finding a balance between the protection of human lives and maintenance of economic activity, since lockdowns of the economy resulted in decreased public budget income as well as higher expenses such as economic impact payments, stimulus programmes for businesses and unemployment benefits.

Restrictive measures were primarily directed at economic sectors where a higher risk of virus transmission could be expected. Therefore, the travel industry and tourism belong to sectors mostly affected by lockdown (Pan and Yue, 2021), while the manufacturing and construction industries could maintain operations in compliance with strict social distancing rules designed to combat the spread of the disease. In this relation, it was demonstrated that the impacts of lockdown were highly heterogeneous from geographical, economic sector, and socio-economic perspectives (Faber et al., 2020).

This study aims to reveal the impact of the Covid-19 pandemic on the construction sector in the Czech Republic. Taking into consideration that the Czech Republic has become one of the worst-hit countries in terms of daily new confirmed Covid-19 deaths per million people (Hovet, 2021), this paper aimed to clarify how the actions taken by the Czech Government influenced the operation of construction companies and the execution of construction projects.

The next section introduces the research background, while the following third section describes the data and methods. In the fourth section, the results are presented and discussed and the final section formulates the conclusions, limitations and future research directions.

2. Literature review

2.1 Covid-19 and its impact on the construction industry

The construction industry belongs among the important sectors in the European Union, contributing 5.7% to the Gross Added Value in 2020 (Eurostat, 2021). Since typical outputs of construction activities include buildings, transport infrastructure and various kinds of utility facilities (e.g., wastewater treatment plants), it is clear that such projects are time and cost demanding, complex and exposed to significant levels of risk (Burcar Dunovic,

Radujkovic and Vukomanovic, 2016; Leśniak and Janowiec, 2019; Car-Pusic et al., 2020; Car-Pušić et al., 2020). For this reason, it is difficult to slow down or even interrupt the course of work on these projects as they need to be implemented in accordance with their time schedules and by contractually agreed deadlines. Furthermore, construction activities need to continue as they bring important socio-economic benefits (Cetkovic et al., 2017; Hromádka et al., 2020). Consequently, project managers and construction contractors must seek solutions to ensure the continuation of construction regardless of internal problems or external influences. From an investor's point of view, cost-effective solutions must be taken into consideration (Rogulj and Jajac, 2018; Dahlin and Pesämaa, 2021; Marović, Perić and Hanak, 2021) because the amount of investment funds might be limited. However, with the spread of the new coronavirus, governments were forced to act and it was obvious that the pandemic would considerably affect the economy as a whole, including construction (Franzese, 2020).

The execution of construction projects during the pandemic became quite challenging for contractors. Strict lockdowns meant the contractors faced various difficulties such as disruption of the supply chains, immobility of the workforce and shutdown of transportation systems (Biswas et al., 2021). In this relation, Morris reported the following main critical challenges for construction projects: cancellation of planned projects and delays/suspension of existing projects, supply chain uncertainty, raised new risks related to delays, and workforce and financial issues (Morris, 2020) that should be identified and managed by both owners and contractors (Majumder and Biswas, 2021). These challenges further increase the level of uncertainty during the execution of a construction project. To tackle the uncertainty, contractors need to consider adopting innovative methods and technological advancements facilitating resilience, employing change management, remote operations, digitalisation and agile principles (Assaad and El-adaway, 2021; Leskova et al., 2021; O'Keeffe and Papadopoulos, 2021), which are often costly (Zima et al., 2020). For instance, reduced frequency of the reasons for project delays was observed on the example of wearable technologies (AL-Sahar et al., 2021).

A specific challenge relates to the workforce as a highly variable resource involved on the construction site (Sing et al., 2016); therefore, effective management of health and safety must be implemented (Damon, 2014). It has been reported that a high number of construction workers tested positive for Covid-19 (Alsharef et al., 2021) on construction site and, therefore, it is necessary to follow safety practices in order to prevent disruption of construction project activities, as reported by (Kapecki, 2020; Araya, 2021b). According to (Amoah and Simpeh, 2020; Araya, 2021a; Simpeh and Amoah, 2021), the most common measures included the wearing of face marks, wearing of hand groves, wearing of face shields, social distancing, hand sanitising and temperature screening.

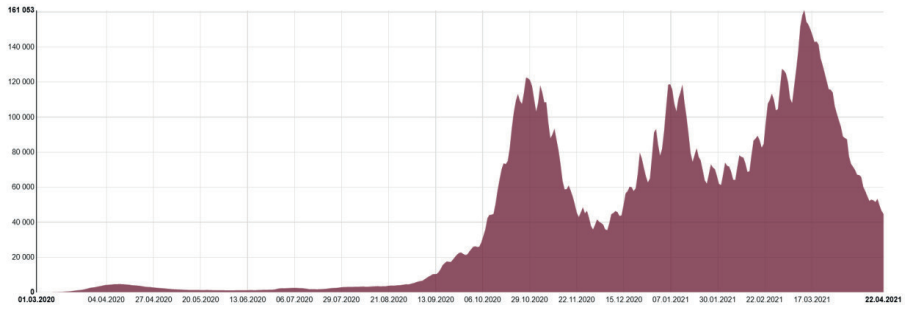
Pandemic effects such as delayed supply chain flows and reduced number of workers and their interaction on the site naturally resulted in a reduced productivity (Araya, 2021a; King et al., 2021). In order to help contractors

tackle these negative consequences, companies may apply for various kinds of financial aid.

2.2 The epidemic and the Government measures in the Czech Republic

The first 3 cases of the novel coronavirus in the Czech Republic were recorded on 1 March 2020, all related to travellers from Italy. In response to the outbreak and the threat to public health, a state of emergency was declared by the Government on 12 March 2020 at 14:00 hours for a period of 30 days. Due to the course of the epidemic in the Czech Republic, the state of emergency was subsequently extended until 17 May 2020. It was the longest state of emergency ever declared in the Czech Republic to date. The government can declare a state of emergency in cases of natural catastrophe, environmental or industrial accident or other threat which to a significant extent threatens life, health, property, public order and security (Czech Republic, 1997). During the first state of emergency, a strict lockdown was imposed resulting in a relatively low number of infected citizens. In this period, the Czech Republic was considered as a very successful country in terms of handling the pandemic (the maximum numbers of people concurrently infected with laboratory-proven Covid-19 was around 4,500, see Figure 1). However, after the measures were relaxed during the summer months, the epidemic gained momentum in the autumn of 2020, and by March 2021, the number of people concurrently infected with laboratory-proven Covid-19 had already exceeded 150,000 (The Ministry of Health, 2021) – an enormous number considering the population of the Czech Republic is around 10.7 million. The second state of emergency was declared on 30 September 2020 in connection with the onset of the second wave of the pandemic in the country and lasted until 11 April 2021. The need to declare an official state of emergency relates to the range of measures that the Government can order (for example, freedom of movement cannot be restricted without a state of emergency being put in place first).

Figure 1: A graph showing the number of people with laboratory-confirmed Covid-19 infection;



Source: The Ministry of Health, 2021

The measures that were adopted by the Czech Government against the spread of Covid-19 can be divided into three main groups: (1) general measures (concerning activities such as education, sports, cultural and other, mandatory face masks, retail restrictions and restrictions on assembly of persons); (2) measures concerning foreigners and border crossing; and (3) economic measures (e.g., restrictions on open market transactions, extension of the deadline for the filing of tax returns, adoption of business support programmes, etc.). Clearly, all three groups of measures affected construction companies to a certain extent. The real effect of the governmental measures on the operation of construction companies and on the execution of construction projects was the subject of this research and is presented in the following sections.

3. Data and methods

A web-based questionnaire survey was conducted in order to identify the ways in which the Covid-19 pandemic had affected Czech construction companies' operations. The survey consisted of 35 questions and was divided into 5 sections. The first section included general questions concerning the basic characteristics of respondents. The next set of questions related to the workforce, the third section focused on economic consequences and the fourth asked about the execution of construction projects. The last section focused on other relevant aspects relating to Covid-19 which could not have been thematically included in the previous sections.

Quantitative data were collected during February and March 2021 and the dataset thus covers both the first and the second state of emergency declared in the Czech Republic, which is sufficient to provide insights regarding almost the entire period of the pandemic. In total, 494 potential respondents were invited to take part in this survey on an anonymous basis. Since the survey focused, among other things, on the execution of construction projects, only construction contractors were considered as potential respondents. A total of 120 valid responses were received, corresponding to a 24.3% response rate. Such a relatively high response rate indicates that the topic investigated in this paper is of high importance for construction practitioners in the Czech Republic. The quantitative data was analysed using graphical and tabular representation, as well as with the support of relevant statistical methods: the chi-square test of independence to reveal potential relationships between categorical variables and the relative importance index (RII) to assess the importance of particular factors that had been examined.

For chi-square test of independence, the null hypothesis suggests that there is no relationship between examined categorical variables. The chi-square test of independence was tested on a 5% significance level. RII requires the use of ordinal grading scale and is in the interval 0 ÷ 1. The higher the RII value, the higher importance of a particular factor is recorded. The RII is calculated according to the following equation (Ljevo et al., 2017):

$$RII = \frac{\sum w}{A \times n}$$

where *w* represents individual grade given to each factor, *A* stands for maximum assessment grade for each factor and *n* is the total number of respondents.

From the perspective of company size according to (*Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises, (2003/361/EC)*, 2003), 37.5% of respondents are classified as micro companies, 35.8%, 21,7% and 5.0% as small, medium-sized and large companies, respectively. Due to the low representation of large companies in the sample, medium-sized and large companies were merged into one joint category for the purpose of further analysis. An overwhelming majority of respondents were companies operating on the market for over 20 years (62.5%), 18.3% between 11 and 20 years and the rest (19.2%) for ten years or less.

As far as the specialisation of the respondents is concerned, most of them were active in the area of civil engineering (i.e., residential buildings, public and industrial buildings), but the sample also included companies focusing on transport structures, water management structures and special structures (e.g., masts and utility tunnels).

The quantitative part of the research was supplemented with qualitative data in order to identify potential causes, effects and consequences that could not be detected from the quantitative point of view. For this purpose, 10 interviews with experts in the field were conducted. A basic description of the interviewed is provided in Table 1.

Table 1: Basic characteristics of the interviewed experts

Position	Experience in years	Specialisation
Sales and technical preparation manager	8	Railway and road construction projects
Head of the sales department	6	Railway projects
Head of external affairs	20+	Buildings, transport infrastructure
Sales manager	5	Civic construction
Executive Director	20+	Civil engineering
Supervisory board member	10	Road construction projects
Economist	7	Civil and transport engineering
Senior developer	20	Developer projects
Construction coordinator	14	Civil engineering
Head of the HR department	10	Civil and utility engineering

Source: Author's research

4. Results and discussion

The quantitative data obtained through the questionnaire survey and the qualitative data from the interviews are presented and discussed together in the following sections. In particular, qualitative data were used to explore quantitative data in more detail. This sort of a combined method gives additional value to quantitative data and the findings are grounded in the respondent's experiences and opinions.

4.1 Workforce issues

The main goal of the companies was to prevent as much as possible the spread of the virus among their employees. A total of 87 respondents (i.e. 72.5%) reported that some of their employees had been infected with Covid-19. One of the measures that companies can apply to limit the spread of the virus is to organise work in teams that do not meet each other. That is, homogeneous groups where individual workers always work together and do not come into contact with workers from other groups. A total of 40 respondents (i.e. 33.2%) reported that they used a system of separate homogeneous teams. In the case of micro companies, this was only 8 respondents, while 18 and 14 respondents in small, and medium plus large companies, respectively, have implemented this system. The potential dependence of the categorical variables of company size and the frequency of using homogeneous work teams was tested using the chi-square test of independence. The p-value for the chi-square statistics of 7.869 with two degrees of freedom was 0.020. Since the p-value was lower than the significance level (5%), we rejected the claim about independence of the examined variables. Accordingly, the use of homogeneous work teams depends on the size of the company and it can thus be concluded that companies with more employees have more often organised work through separate work teams.

Another common measure, in addition to dividing workers into homogeneous teams, was working from home. In the sample studied, 36.6% of companies reported that they had not introduced working from home at all. The remaining companies did introduced it, mainly for staff members who were not directly involved in the construction work itself. Experts reported that these people included, for example, sales staff, preparatory workers or parents who had to look after their children when schools were closed due to the lockdown. One of the experts also mentioned the fact that many workers showed a significant drop in performance when working from home, and retrospectively assessed the introduction of a remote work in their company as disadvantageous.

In order to keep the construction companies running, it was essential to provide for sufficient personal protective equipment (PPE, including face masks etc.). A majority of companies did not report a problem in purchasing PPE (68.3%), while the remaining companies (31.7%) had trouble meeting their PPE demand. The experts reported that while some companies faced PPE shortages during the first state of emergency, during the second lockdown they rather struggled with the high cost of PPE. The construction industry had some advantage in this respect, as many companies regularly use FFP2

respirators as a standard on construction sites (for use in demolitions and other dust-generating activities), so they often had sufficient stocks of their own. It was mentioned during the interviews that some companies sewed their own cloth face mask (during the first state of emergency) or produced their own disinfectant in the company laboratory.

In the context of the Government's restrictive measures, there was a significant reduction in travel abroad, with 104 respondents indicating that no foreign trips were undertaken when the state of emergency was in place. In 16 companies, there were some international trips; in 4 cases, travel took place with significant complications caused by border closures, the hazard classification of the destination country and the associated restrictions upon return (mandatory self-quarantine, testing, etc.). Restrictions on cross-border travel significantly complicated projects abroad, which is why companies prepared plans for a possible conservation of buildings (IDNES.cz, 2020).

The issue of employment of foreign workers is shown in Table 2. The question of whether there was a significant outflow of workers back to their home countries is important because the Czech construction industry employs a significant number of foreign workers on construction sites, mainly from Ukraine and Slovakia.

Table 2: Foreign workers during the state of emergency.

Foreign workers in companies	Relative frequency
Everyone returned home	42.0%
A minority stayed	17.4%
A majority stayed	40.6%

Source: Author's research

The data in Table 2 show that a large proportion of companies struggled due to the departure of foreign workers; specifically, in 42% of companies employing foreign workers, all foreigners returned home, while in another 17.4% of companies only a minority remained in the Czech Republic. In this context, some construction companies decided to pay foreign workers a certain share of their wages even during their absence, in order not to lose employees during the pandemic because recruiting workers from outside the EU is an administratively demanding procedure (Kafka, 2020). Respondents reported that the most common occupations in respect of which they faced a shortage of workers were blue-collar jobs (e.g., bricklayers), designers, construction managers and drivers. Because the governmental measures did not prohibit the operation of construction companies, in 94.2% of cases there was no need to lay off workers. Only six companies experienced layoffs, which can be attributed to a decline in market demand for construction works.

4.2 Covid-19 related economic impacts on construction companies

A review of the literature points to the fact that the Covid-19 pandemic and the associated restrictive measures might have resulted in investors delaying project implementation. Therefore, the questionnaire sought to establish how the market situation had evolved in the context of supply and demand. According to 56.7% of respondents, the relationship between supply and demand has not changed. A total of 26.7% of the respondents among construction companies perceived a decrease in supply on the market while 16.6% stated that there was less demand (i.e. tenders for the supply of construction works) from investors. This difference in perception is likely to be due to a number of factors such as the size of the project, the particular segment of the construction industry and location. In the absence of more detailed data, it is not possible to provide a clear explanation for the different perception of the market situation. However, it can be concluded that the market situation has not changed radically because construction activity in the Czech Republic was not directly restricted by governmental measures and many investors, especially public procurers, cannot postpone projects in a situation where national and EU subsidies are allocated based on fixed deadlines for project completion.

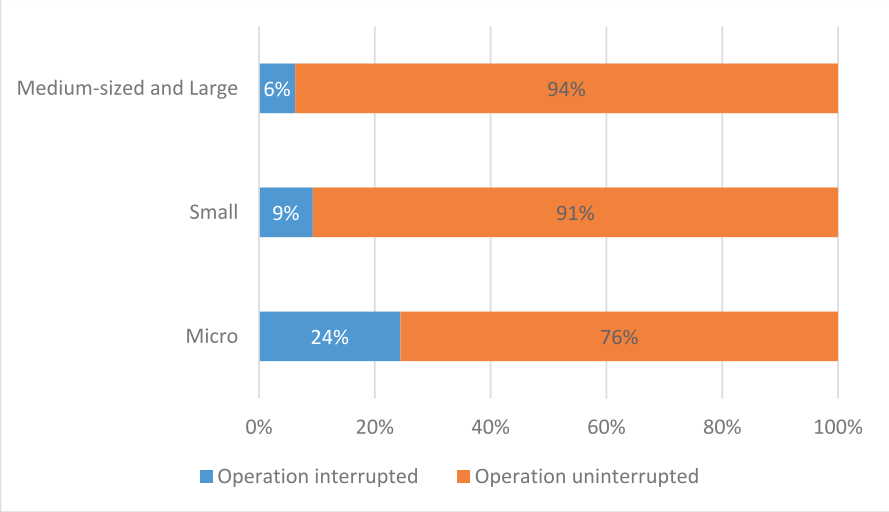
The situation on the construction market is also reflected in the answers regarding the turnover achieved. A total of 85.8% of respondents stated that their turnover during the state of emergency was comparable or only slightly lower than in previous years. Only 17 out of 120 companies reported a decrease in turnover of more than 25%. Such a significant decrease was due to the necessity to interrupt business operations in the case of 8 companies, while another significant factor was delaying the project by the investor.

Another aspect that was studied was the impact of the pandemic on wages in the companies. Since most of the companies achieved comparable turnover, it is not surprising that 75.8% of them did not adjust salaries during the state of emergency. Only 13 companies reduced wages and, conversely, wages increased in 16 companies. The experts' responses show that the Covid-19 pandemic did not affect wages because the construction industry as such was not directly restricted by governmental measures; most companies continued operating and implementing contracted construction projects.

In terms of business interruption, this occurred in 17 respondent companies (i.e. 14.2%). In the case of micro companies, business was interrupted in 11 companies, while only 4 and 2 respondents in small, and medium plus large companies, respectively, had to interrupt operations. The use of the chi-square test is inappropriate in this case as the expected frequency is less than 5 in more than 20% of the cells. However, it can be estimated based on the data that flexibility and ability to maintain operations during the pandemic increased with the size of the company as measured by the number of employees (see Figure 2). Most companies that had to suspend operations did so because some employees had been infected. In a situation where one employee in a micro company contracted the infection, other employees who had been in contact with that employee had to be quarantined as well and this, consequently, lead to an interruption in operation. Eurovia is an example

of a larger company that had to interrupt operation – it experienced a 14-day interruption of operations at the beginning of the pandemic (in March 2020), when the company faced a shortage of personal protective equipment (Lidovky, 2020).

Figure 2: Relative frequency of interruptions in construction companies' operations according to their size



Source: Author's research

A final question concerning the economic aspects was whether companies applied for governmental support programmes (e.g., as part of the "Antivirus" programme). Considering the fact that a large proportion of the companies did not have to interrupt their operations and had comparable revenues to the pre-pandemic period, it was not surprising that a total of 75.8% of them did not utilise any support programme. The chi-square test of independence was used to investigate, the scope in which support programmes were used according to company size. In micro, small, medium-sized plus large companies, the relative frequency of use of these programmes was 15.6%, 23.3% and 37.5%, respectively.

The p-value for the chi-square statistics of 11.922 with two degrees of freedom was 0.003. Since the p-value was lower than the significance level (5%), we rejected the claim about independence of the examined categorical variables. Accordingly, the use of support programmes depends on the size of the company and it can thus be concluded that companies with more employees have more often applied for government support.

4.3 Construction projects under the conditions of the Covid-19 pandemic

Information from practice as well as the literature suggested that the execution of construction projects could have been significantly affected. The set of the first three questions dealt with whether (1) dealings with public authorities regarding preparation and implementation of projects got longer; (2) project financing was put in jeopardy; and (3) there were problems with construction materials supply. These questions were evaluated using the 5-point Likert scale, where 1 meant the no/minimum disruption while 5 meant large/ significant disruption, and RII. The values obtained are indicated in Table 3 according to company size.

Table 3: RII values for dealing with public authorities, project financing and material supplies according to company size.

Factor	RII (micro companies)	RII (small companies)	RII (medium-sized and large companies)	RII (all)
Longer dealings with the authorities	0.742	0.735	0.781	0.750
Project financing	0.484	0.516	0.500	0.500
Supplies of material	0.498	0.470	0.481	0.483

Source: Author's research

The data in Table 3 show that dealings with the authorities got very prolonged (RII=0.750), which consequently led to project delays. In contrast, the assessment of the two remaining factors was more moderate, with both project financing (RII=0.500) and material supply (RII=0.483) represented only a moderately significant interference with projects. An interesting finding was the comparable assessment of the above 3 factors across all company size groups. The interviews revealed that the main reason for the longer dealings with the authorities was related to the introduction working from home and shorter office hours on the part of public administration. There were significant delays, ranging from weeks to months, in the processing of administrative steps. Some public offices were also unable to provide staff working from home with remote access to their systems.

There were no major problems with project financing, but one expert mentioned that he had noticed increased caution on the part of banks in approving new projects. Thus, from the perspective of construction companies, project financing was not at risk; however, some complications appeared on the part of the investors.

In terms of construction materials, complications occurred in more demanding projects that required supplies from abroad. In the interviews, experts mentioned, e.g., a delay in delivery of special cooling equipment from Turkey by several months, and a delayed delivery of cross-ties for a railway

reconstruction to Slovakia from Serbia (via Hungary), and the lack of plastic or steel products. The delivery of materials was complicated by limitations to truck traffic and delays at customs offices. Therefore, it can be concluded that supply chain problems were mainly related to larger construction projects with regard to sourcing materials/equipment from outside the EU.

A total of 70 (58.3%) construction company representatives reported that there had been a delay in one of their construction projects. In most cases, the cause of the delay was on the part of the investor (43.3%), while in 15.0% of the cases the delay was caused by the contractor. A fairly significant proportion of respondents (41.6%) indicated that there were no delays to projects during the emergency.

The next question concerned project interruptions. In 43 cases (35.8%), respondents indicated that the overall situation forced them to suspend the implementation of a construction project. When analysed in more detail, differences among companies of different sizes were found, namely 26.7%, 41.8% and 40.6% of micro, small, and medium plus large companies, respectively, had suspended work on one of their projects (see Table 4). Consequently, it was investigated whether there was a relationship between company size and the relative frequency of interruptions.

The p-value for the chi-square statistics of 2.643 with two degrees of freedom was 0.267. Since the p-value was higher than the significance level (5%), we could not reject the claim about the independence of the examined categorical variables. Accordingly, there is no relationship between the size of the company and the relative frequency of project interruptions. Experts add that project interruptions are more frequent due to reasons on the investor's part and that public investors sometimes cancel already agreed projects or postpone them to a later date.

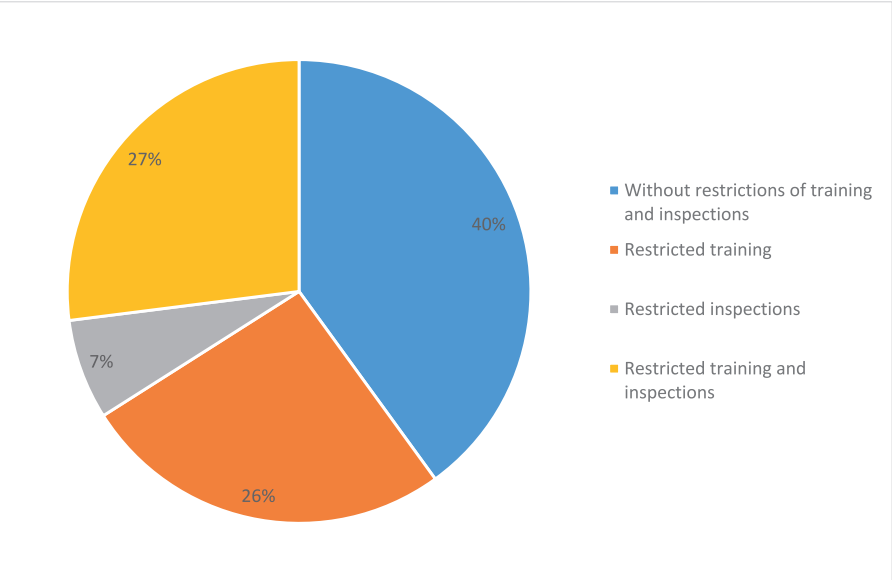
Table 4: Relative frequency of construction project interruptions in companies

Company size group	Some projects were interrupted	No projects were interrupted
Micro	26.6%	73.3%
Small	41.8%	58.1%
medium and large	40.6%	59.3%

Source: Author's research

Restrictions on the mobility and assembly of persons could also have an impact in terms of site inspections and mandatory employee training. The data in Figure 3 shows a larger proportion of the study population had to deal with complications in conducting site inspections and training. Again, these problems may have had a negative impact on the smoothness of the execution of construction work and, therefore, on the adherence to the planned schedule of works.

Figure 3: Analysis of complications in training and site inspections



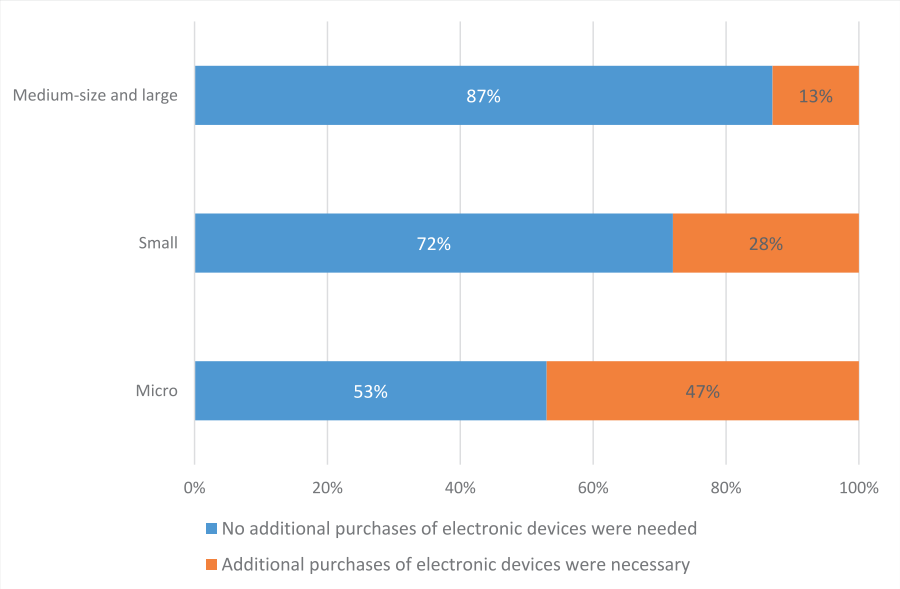
Source: Author's research

The limitations of face-to-face meetings also affected the preferred mode of negotiation between two or more entities. Since a high number of stakeholders is typical for construction projects, the limitations on assembly of persons necessitated replacing face-to-face meetings with other communication methods. The most commonly used communication methods included e-mail (39.2%), telephone (29.2%) and video conferencing (3.5%). In-person meetings were mentioned as the most common method of communication only by 1.3% of respondents. As the situation forced companies to use electronic means of communication to an increased extent (due to limitations of face-to-face meetings and working from home), the questionnaire also dealt with procurement of electronic devices.

Figure 4 shows significant differences among company size categories. A significantly higher proportion of medium and large companies (47%) needed to purchase additional electronic equipment compared to only 13% of respondents from among micro companies. The p-value for the chi-square statistics of 10.558 with two degrees of freedom was 0.005. Since the p-value was lower than the significance level (5%), we rejected the claim about independence of the examined categorical variables. Accordingly, the frequency of additional purchases of electronic devices is dependent on the size of the company, hence it can be argued that companies with a larger number of workers needed to purchase additional equipment more often. In the case of micro and small companies, i.e. companies with relatively low number of employees, it can be expected that the number of technical and

economic staff is small and they can manage with the existing equipment (PCs, telephones). However, in larger companies where the system of separate teams was more often used and where the absolute number of employees working from home was higher, there was a need to purchase additional devices so that all employees could work and communicate properly from home (this was very important, for example, in a situation where an employee was placed into quarantine, i.e., could not physically enter the office, but was still able to work from home).

Figure 4: Purchases of additional electronic devices in companies



Source: Author's research

4.4 Other issues related to the Covid-19 pandemic

Restrictions on face-to-face meetings also had an impact on the way company audits were conducted. In companies undergoing an audit, the following outcomes were reported: in 60% of cases the audit was conducted in a standard way; in 29% only by remote means; and in 11% by a combination of the auditors' personal presence at the audited company and video conferencing. As already mentioned, the state of emergency was declared twice in the Czech Republic. One of the questions included in the questionnaire asked which one had a more significant impact on construction companies. A total of 35% of the respondents reported that the first state of emergency had a more significant impact; 44% believed the second state of emergency had a greater impact, while 41% considered the impact of the two instances where the state of emergency was declared to be comparable.

In the case of the first state of emergency, businesses were mainly faced with a lack of personal protective equipment and restrictions on movement and assembly of persons; working from home was implemented to a large extent, while the number of infections was relatively low in the first half of 2020 (see Figure 1). In contrast, the second state of emergency was characterised mainly by the rapid spread of Covid-19 in the population, with the number of people infected or quarantined increasing nearly 30-fold. Although the impacts of the two instances when the state of emergency was declared on the construction industry were generally comparable, they differed in their causes. In the case of the first state of emergency, it was primarily the unpreparedness of the Government and enterprises (e.g., a lack of personal protective equipment, missing IT equipment), while in the case of the second state of emergency, the problem was primarily the high number of infected and quarantined persons.

In the interviews, experts were asked whether compliance with the Government's restrictive measures was a problem for their companies. Individual opinions varied, but in general it can be said that they did not usually cause serious complications; however, the measures were strongly criticised for their unpredictability and frequent and sudden changes. Experts also said it was difficult to comply with the measures in terms of, for example, the duty to conduct regular testing for Covid-19 during the second state of emergency, the mandatory wearing of face masks during the first state of emergency, and also due to people's general resistance to the restrictions motivated by doubts about their meaningfulness.

Following the end of the second state of emergency, the Pandemic Act was adopted by the Czech Parliament to provide a legal framework necessary to combat the ongoing pandemic. In this context, experts report that they do not perceive a difference between the impact of the state of emergency and that of the Pandemic Act on their company's activities. Most of the governmental measures remained in force even after the state of emergency ended and their scope is influenced by the current epidemiological situation rather than their legal basis.

5. Conclusion

This paper provides insight into the situation in the Czech construction sector during the Covid-19 pandemic. In particular, it demonstrated the ways in which the Government's restrictive measures adopted during the state of emergency affected construction contractors. This impact was studied from three perspectives: workforce issues, effects on the business operations of companies, and the execution of construction projects.

The results of this study show that the real impact of the Covid-19 epidemic was rather moderate. Since the Czech Government's lockdown did not apply to the industry in general, including construction, most companies could successfully deliver construction works with only minor complications. In this context, it should be noted that building material stores were closed for the general public; however, entrepreneurs (construction companies and

craftsmen) were able to purchase materials without any restrictions.

Construction is a process requiring a high level of flexibility, which is why companies were mostly able to cope with existing obstacles. Main challenges were related to the delivery of materials to the construction site, project delays, and the distribution of personal protective equipment, especially in the early stages of the pandemic and the state of emergency declared in the Czech Republic. However, some companies were forced to interrupt certain projects or even interrupt the operation of the whole business. The findings also suggest that restrictive measures have encouraged digitalisation in construction, especially with regard to communication between various project stakeholders.

This study was limited in several ways. Due to the sample size, it was not possible to analyse data in terms of the type of work (e.g., building construction, road construction etc.) and project size. It is possible that these aspects might reveal additional variation in the impact of the pandemic on the construction industry. Therefore, this is a key area to be explored further. Future research should also consider the potential effects of individual measures taken by contractors beyond the scope of governmental restrictions and their effect on the companies' resilience to Covid-19 related impacts.

Acknowledgment

This research has been supported by the University of Rijeka under the project number uniri-pr-tehnic-19-18 and by the Brno University of Technology under the project number FAST-S-21-7472.

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