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## Covid 19 vs. start-ups. Have corporations modified their attitudes towards co-operation with start-ups?

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### Abstract

*Corporate accelerators play an pivotal role in the development of start-up products and services. They are the key link connecting young innovative companies with corporations. They provide the necessary know-how in product or service development, support in choosing the right commercialisation strategy, internationalisation of start-ups and also provide access to a network of investors. The interest of corporations in participating in acceleration programmes is related to an option of acquiring new innovative solutions, technologies that give them a market advantage. The success of the programme is determined by the level of commitment of all parties involved to such model (start-up-accelerator-corporation). The COVID-19 pandemic has significantly affected the operational considerations of the market players. This paper aims at examining the pandemic impact on the propensity of corporations to cooperate with start-ups within the framework of acceleration programmes run by start-up accelerators. The research is presented from three dimensions: a) the size of the corporation calculated as the number of people employed, b) the seniority of the corporation's cooperation with start-ups, c) whether the corporation has a strategy and procedures for cooperation with start-ups.*

*On the grounds of the findings obtained from the representatives of 25 corporations, it was concluded that the technology users are limiting their activities aimed at cooperation with start-ups and are not making major changes in this area, focusing instead on minimising the risks involved and securing their core business. The pandemic has not contributed to corporations' opening up to start-ups, which so far have not been of interest to them. And the majority of respondents have no opinion on the statement that start-ups, observing the market turbulence, can quickly adapt their activities to the evolving needs of technology users. There were also correlations between the assessment of the pandemic impact and selected corporate characteristics.*

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## 1. Introduction and literature review

### 1.1. Introduction

Corporate accelerators are one of the tools for start-ups to raise funds for financing their activities, but they also create opportunities for cooperation between them and corporations with mutual benefit [1]. As part of the accelerator's activities, a large entrepreneur who is an industry partner, i.e. a recipient of start-ups' solutions, is given a unique opportunity to outbid the competition with no need to commit substantial resources, including financial ones, in the process of searching for innovative solutions [2]. At the same time, it acquires the ability to work with an external ecosystem of small product and service providers, which leads to a more efficient use of new technologies, contributing to winning sustainable market advantages [3,4]. On the other hand, for start-ups, which are in the early development phases, cooperation with corporations creates an opportunity to tailor the offered product or service to the real needs of the large corporation to which the solution is addressed [5]. This allows them to verify their product and market fit and the specific nature of a particular industry. This type of cooperation also gives an opportunity to acquire often the first customer, which is an invaluable support to the development of a young, innovative company [3,6]. The impact of the COVID-19 pandemic on various sectors of the economy has become the focus of many studies and analyses. The report prepared by Startup Poland [6] shows that in developed economies in the last 3 years the cooperation of large corporations with start-ups has become a trend, which has led to the fact that almost every large organization declares willingness to cooperate with innovative companies. The report shows that the pandemic outbreak had an impact on the expectations of start-ups as well as corporations towards collaboration.

Therefore, taking into account that previous studies have focused on macroeconomic aspects of changes caused by pandemic, the aim of this research was to find out whether Covid-19 has had an impact on the corporation-start-up co-operation, including the behaviour of corporations towards start-ups participating in acceleration programs [7]. The above question was related to three aspects: a) the size of the corporation calculated as the number of people employed, b) the seniority of the corporation's cooperation with start-ups, c) whether the corporation has a strategy, procedures for cooperation with start-ups.

Learning about changes in their preferences and expectations may contribute to better design of future accelerator programmes, especially since the participation of a large company in the programme is often one of the most important reasons for start-ups to participate [8].

This paper is structured as follows: selected theoretical aspects concerning the operation of accelerators and their main features. Next, the research methodology and the findings of undertaken survey are presented. Finally, conclusions, limitations and directions for future research are presented.

### 1.2. The theoretical aspect

Corporate accelerator programmes are becoming an integral part of start-up ecosystems and an important tool used by established companies to improve their competitiveness [2]. Accelerators are intermediaries with an important role because they provide start-ups with quick access to a large entrepreneur and his network of relationships with collaborating entities such as contractors [9]. Start-ups are focused on leveraging these networks to maximise the benefits of the aforementioned programmes. Accelerator programmes provide participants with a range of benefits and a huge body of knowledge [10,11]. Noticeable variations in the operation of accelerators can be seen in the areas of feedback, making investments and collaborating with networks. At all stages, accelerators act as "match makers", providing start-ups with relevant feedback to refine the product and adapt the business model to the needs of the market, including the corporation [11]. In order to effectively leverage start-up innovation as well as

to effectively use corporate accelerators in the corporation's innovation strategy, specific design dimensions - value proposition, process, people and place - must be systematically addressed [11]. There are different types, models of cooperation between corporations and start-ups and for this reason choosing the right plan and formula for this cooperation can be a hard nut to crack [12]. As a result of research on the determinants related to the effectiveness of acceleration programmes, a number of factors inhibiting cooperation between companies with an established position on the market and start-ups using acceleration programmes have been identified. Collaboration can be inhibited, inter alia, by: competition for material resources and personal goals, the presence of potential collaboration risks, or different approaches to work culture by corporations and start-ups [13]. Researchers have also shown that fostering the commercialisation of innovations and start-up eco-innovation systems requires appropriate interactions between universities, government and industry - the stronger they are, the more effectively they will drive the commercialisation of technologies and provide faster access to potential solution users [1,13].

## 2. Research methods and Sample

The present research was conducted using the computer assisted online interviewing (CAWI) technique on a respondent sample comprising 25 corporations. Completed questionnaires were received from corporations representing the following industries: a) the transport industry (24%), b) three companies each represented the technology industry, financial services, media, publishing and entertainment (12%), c) two companies were from the insurance industry (8%), and in the remaining eight cases (32%), companies operated in other industries.

The corporations surveyed were characterised by a high level of variation in their headcounts. Nearly 7 corporations employed between 250 and 1000 people. In turn, 5 corporations employed between 4000 and 5000 people.

The surveyed entities were characterised by different lengths of cooperation with start-ups. Six of them cooperated with start-ups for less than a year. For five corporations, the period was between one and two years. For eight large companies, the period of cooperation was between two and three years. Six of the surveyed companies had a cooperation period of more than three years. Out of the sample, 10 companies (40%) have a strategy or procedure for working with start-ups. Only one in five companies has an internal corporate fund or other structure for investing in start-ups.

## 3. Data collection

The research process comprised the following steps:

1. Preparation of the survey questionnaire.
2. Identify and confirm with 10 accelerators the number of corporations that have been involved in accelerator programmes.
3. Development of a database containing a list of corporations participating in accelerator programmes.
4. Selecting, in consultation with accelerators and corporates, CAWI as the most appropriate technique for the research underway.
5. Generate and send via accelerators individual survey links for corporations.
6. The surveys received were coded and stored on a server. Both data quality and completeness were continuously monitored. PS Questio software based on SPSS Data Collection was used for this purpose.

Statistical analyses were performed using IBM SPSS Statistics 25 software. Descriptive statistics analysis with the Shapiro-Wilk test, frequency analyses, Student's t tests for independent samples and Spearman's  $\rho$  rank correlation analyses were performed. The classical threshold of  $\alpha = 0.05$  was considered as the level of significance; however, test statistical probability scores of  $0.05 < p < 0.1$  were interpreted as significant at the level of statistical trend.

## 4. Survey findings

### 4.1. Basic descriptive statistics of the quantitative variables measured

In the first step, basic descriptive statistics of the quantitative variables under study were calculated together with Shapiro-Wilk tests, checking normality of the distributions of the quantitative variables under study. Table 1 shows that three of the examined variables - assessing the veracity of statements regarding: greater interest in cooperation of technology users, lower priority of cooperation with start-ups and awakening of companies' interest in start-ups, which previously were not in their interest - distributions close to normal distribution were noted. Only when it comes to assessing the veracity of the aspect of increasing the ability of start-ups to adapt their activities to the evolving needs of technology users, a distribution different from normal distribution was noted. In such a situation it is advisable to verify the value of skewness of the distribution of the mentioned variables. If this value falls into +/- 2 bracket it should be assumed that the distribution of the examined variable is not significantly asymmetric to the average. Such a value was observed in the case of all examined variables. For this reason it was decided to perform statistical analyses using parametric tests.

Table 1. Basic descriptive statistics of the quantitative variables under study.

|  | <i>M</i> | <i>Me</i> | <i>SD</i> | <i>Sk.</i> | <i>Kurt.</i> | <i>Min.</i> | <i>Max.</i> | <i>W</i> | <i>p</i> |
|--|----------|-----------|-----------|------------|--------------|-------------|-------------|----------|----------|
| Increased interest in cooperation among technology users   | 3.88     | 4         | 1.88      | 0.43       | 0.87         | 1           | 9           | 0.92     | 0.059    |
| Declining priority of cooperation with start-ups   | 6.64     | 7         | 2.16      | -0.28      | -0.45        | 2           | 10          | 0.96     | 0.386    |
| Stimulation of companies' interest in start-ups that have not previously been of interest to them        | 4.80     | 5         | 1.87      | 0.02       | 0.39         | 1           | 9           | 0.93     | 0.085    |
| Increase the ability of start-ups to adapt their activities to the evolving needs of the technology user | 5.32     | 5         | 1.86      | 0.08       | 0.93         | 1           | 9           | 0.86     | 0.003    |

M - mean; Me - median; SD - standard deviation; Sk. - skewness; Kurt. - Kurtosis; Min and Max - the lowest and highest values of the distribution; W - the result of the Shapiro-Wilk test; p - significance

#### 4.2. Assessment of the pandemic impact on corporate-start-up collaboration

It was then decided to verify the main research question of this study. A series of frequency analyses was performed, with the results presented in histograms. Firstly, the evaluation of the statement 'greater interest in cooperation among technology users' was taken into consideration. As can be seen in Fig. 1, the vast majority of responses fell within the low (1-4 points) and average (5-6 points) scores. Only one corporate representative gave an answer indicating a high level of agreement with the statement presented (9 points). Such results are clearly reflected in the average value, which was only 3.88 points (SD = 1.88), thus clearly below the theoretical value indicating the average intensity of the examined variable. The median, or middle value, was 4 points, while the dominant, or most frequently recorded value in the sample, was 5 points. When comparing the share of corporate representatives who disagreed with the statement presented (marking answers from 1 to 4 points) and representatives who agreed with the statement (marking answers from 7 to 10 points) there was a clear advantage for the former sample: 60% vs. 4%.

The statement 'declining priority for working with start-ups' was then taken into account. As can be seen in Fig. 2, in this case the proportion of responses was reversed, although the responses were more diverse. The proportion of corporate representatives who did not have their own opinion on the presented topic was lower - answers of 5 and 6 points were recorded for only 28% of respondents. The average score in the sample was 6.64 (SD = 2.16) with a median of as many as 7. The dominant value in this case was as much as 8 points, so the two measures of central tendency indicated results in the range of high agreement with the presented statement. When comparing the share of corporate representatives who disagreed with the presented statement and representatives agreeing with it, a clear advantage of the latter group was noted: 16% vs. 56%. However, this disproportion is smaller than in the case of the first of the analysed statements.

The distribution of responses to the statement 'awakening of corporate interest in start-ups that have not

previously been of interest to them' was then analysed. Representatives of corporations clearly did not have a well-defined opinion on this issue - as many as 52% of the surveyed corporate representatives gave such an answer. No 10 point answer was recorded in the surveyed sample, with a single case of complete disagreement with the presented statement (1 point). The mean score was 4.80 (SD = 1.87) with a median and dominant score of 5. There was a twofold prevalence of scores indicating low agreement with the statement made compared to high scores - 32% to 16%.

The results obtained for the statement 'increasing the possibility of start-ups to adapt their activities to the evolving needs of technology users' were similar to those obtained for the third statement. The share of answers indicating the lack of opinion in this respect of corporate representatives was even higher - as many as 64% of all respondents answered this way. In the sample, there was again no 10-point response with a single case of complete disagreement with the statement presented (1 point). The mean score was exactly 5.32 points (SD = 1.86) with a median and dominant score of 5 points. There was a slight predominance of scores indicating a high level of agreement with the statement made compared to low scores - 16% to 20%.

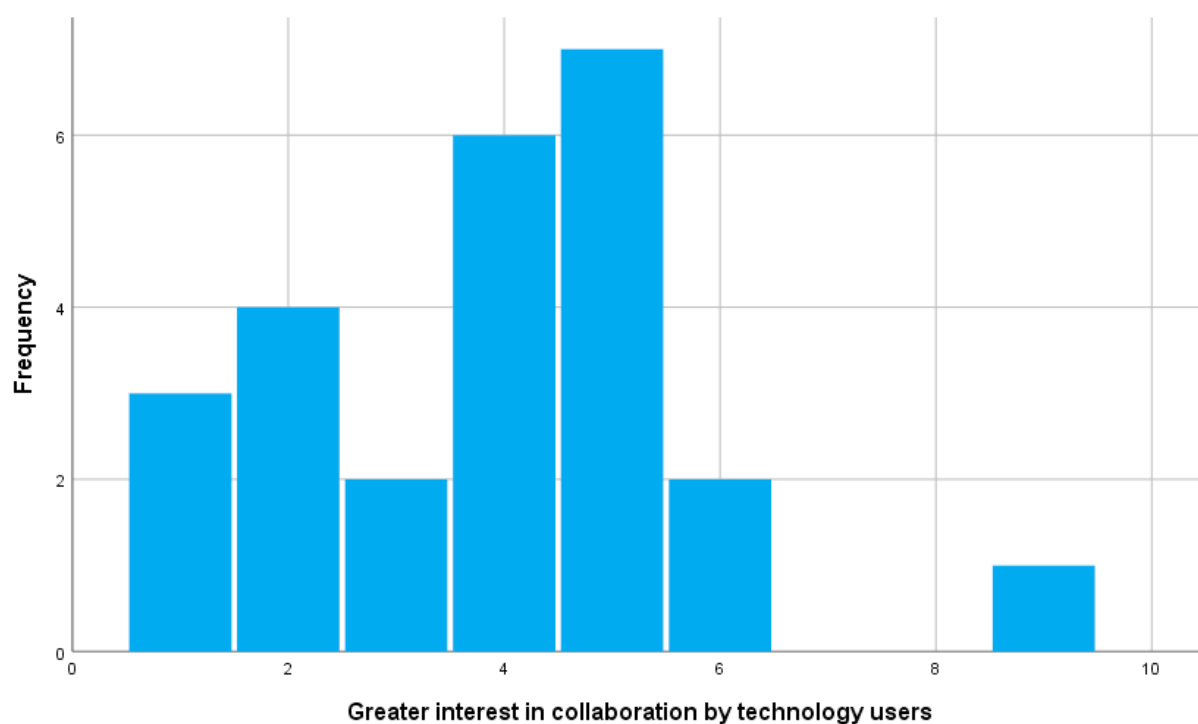


Fig. 1. Distribution of results for the statement 'greater interest in collaboration by technology users'.

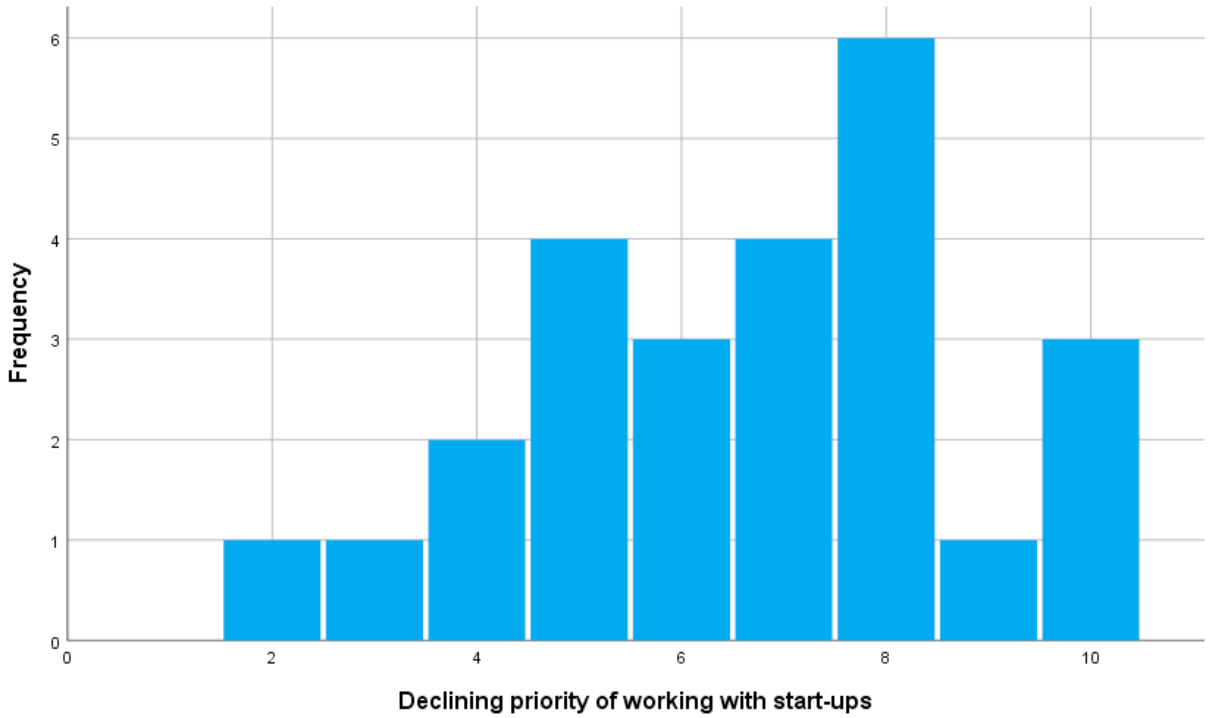


Fig. 2. Distribution of results for the statement 'declining priority of working with start-ups'.

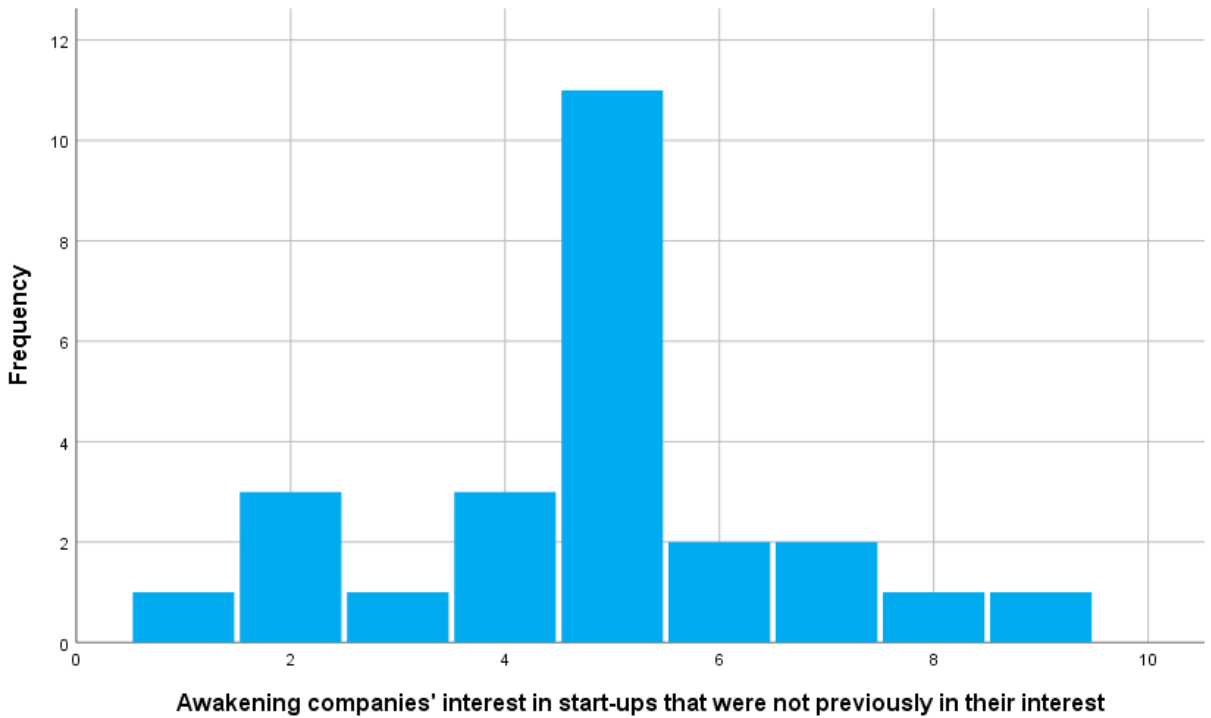
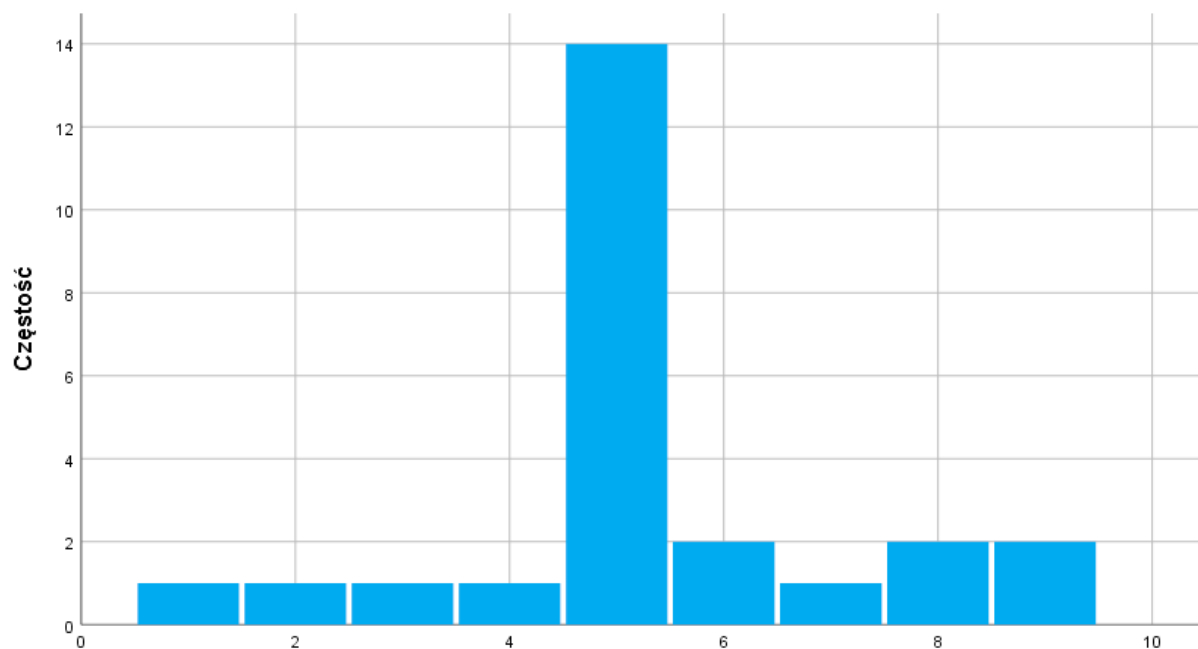


Fig. 3. Distribution of results for the statement 'awakening companies' interest in start-ups that were not previously in their interest'.



Key: częstość = frequency

Fig. 4. Distribution of results for the statement 'increase the ability of start-ups to adapt their activities to the evolving needs of the technology user'.

#### 4.3. Assessment of the pandemic impact on start-up-corporate collaboration and the number of people employed by the technology user

In the next step, it was checked whether the assessment of the pandemic impact on the start-up-corporation collaboration was related to the headcount level at the large company. A series of Spearman's  $\rho$  rank correlation analyses were performed. As can be seen in Table 2 one statistically significant relationship was recorded. The assessment that the pandemic had reduced the priority of working with start-ups was negatively related to the size of the company surveyed. This means that the larger the companies were, the less they agreed with the statement given. The strength of the relationship recorded was moderately high. The other three relationships examined were not even close to statistical significance.

Table 2. Assessment of the pandemic impact on start-up-corporate collaboration versus the company headcount .

|  |                | Company headcount |
|--|----------------|-------------------|
| Increased interest in cooperation among technology users   | Spearman's rcc | 0.288             |
|  | Significance   | 0.163             |
| Declining priority of cooperation with start-ups   | Spearman's rcc | -0.400            |
|  | Significance   | 0.048             |
| Stimulation of the companies' interest in start-ups that have not previously been of interest to them    | Spearman's rcc | 0.235             |
|  | Significance   | 0.258             |
| Increase the ability of start-ups to adapt their activities to the evolving needs of the technology user | Spearman's rcc | 0.257             |
|  | Significance   | 0.215             |

#### 4.4. Assessment of the pandemic impact on start-up-corporate collaboration vs. the seniority of the company's collaboration with start-ups



In the next step, it was tested whether the assessment of the pandemic impact on start-up-corporate collaboration is related to the seniority of the collaboration between companies and start-ups. Another series of Spearman's  $\rho$  rank correlation analyses were performed. As can be seen in Table 3 one statistically significant relationship was recorded. The assessment that the pandemic influenced the awakening of companies' interest in start-ups, which previously were not in their interest, was positively related to the seniority of the company's cooperation with start-ups. This means that the longer companies worked with start-ups, the more they agreed with the statement. The strength of the recorded relationship was moderately high. One relationship at the level of statistical trend was also noted. The assessment that the pandemic influenced the technology recipients to be more interested in cooperation was positively related to the seniority of the company's cooperation with start-ups. The strength of this association was also moderately high. The other two relationships tested were not even close to statistical significance.

Table 3. Assessment of the pandemic impact on start-up-corporate collaboration versus the seniority of a company's collaboration with start-ups.

|  |                | Seniority of the company's cooperation with start-ups |
|--|----------------|---|
| Increased interest in cooperation among technology users   | Spearman's rcc | 0.386   |
|  | Significance   | 0.057   |
| Declining priority of cooperation with start-ups   | Spearman's rcc | -0.253  |
|  | Significance   | 0.222   |
| Stimulation of companies' interest in start-ups that have not previously been of interest to them        | Spearman's rcc | 0.429   |
|  | Significance   | 0.032   |
| Increase the ability of start-ups to adapt their activities to the evolving needs of the technology user | Spearman's rcc | 0.203   |
|  | Significance   | 0.330   |

#### 4.5. Assessment of the pandemic impact on start-up-corporate collaboration and whether the company has a strategy/procedure for working jointly with start-ups

In the next step, it was decided to check whether companies assess the impact of the pandemic on start-up-corporate collaboration differently depending on whether they have specific policies / procedures towards collaboration with start-ups. A series of Student's t-tests for independent samples were performed. Three statistically significant differences were found (Table 4). Companies with a strategy/procedure for working with start-ups were less likely to agree with the statement regarding a lower priority for working with start-ups, and more likely to agree with the statements regarding the awakening of companies' interest in start-ups that were not previously in their sphere of interest, and the increased ability of start-ups to adapt their activities to the evolving needs of technology users. The strength of the recorded effects was high, as indicated by the value of Cohen's  $d$  coefficient. Only with regard to the statement on greater interest in cooperation among technology users was there no difference even at the level of statistical tendency.

Table 4. Assessment of the pandemic impact on start-up-corporate collaboration and the company's possession of strategies / procedures for working with start-ups.

|  | Yes (n = 10) |      | No (n = 15) |      | $t$  | $p$   | 95% CI |      | $d$<br>Cohen |
|--|--------------|------|-------------|------|------|-------|--------|------|--------------|
|  | $M$          | $SD$ | $M$         | $SD$ |      |       | $LL$   | $UL$ |              |
| Increased interest in cooperation among technology users | 4.00         | 2.36 | 3.80        | 1.57 | 0.26 | 0.800 | -1.42  | 1.82 | 0.10         |

|  |      |      |      |      |       |       |       |       |      |
|--|------|------|------|------|-------|-------|-------|-------|------|
| Declining priority of cooperation with start-ups   | 5.50 | 2.37 | 7.40 | 1.68 | -2.35 | 0.028 | -3.57 | -0.23 | 0.96 |
| Stimulation of companies' interest in start-ups that have not previously been of interest to them        | 5.80 | 1.69 | 4.13 | 1.73 | 2.39  | 0.026 | 0.22  | 3.11  | 0.97 |
| Increase the ability of start-ups to adapt their activities to the evolving needs of the technology user | 6.40 | 1.71 | 4.60 | 1.64 | 2.64  | 0.015 | 0.39  | 3.21  | 1.08 |

All results are summarised graphically in Fig. 5.

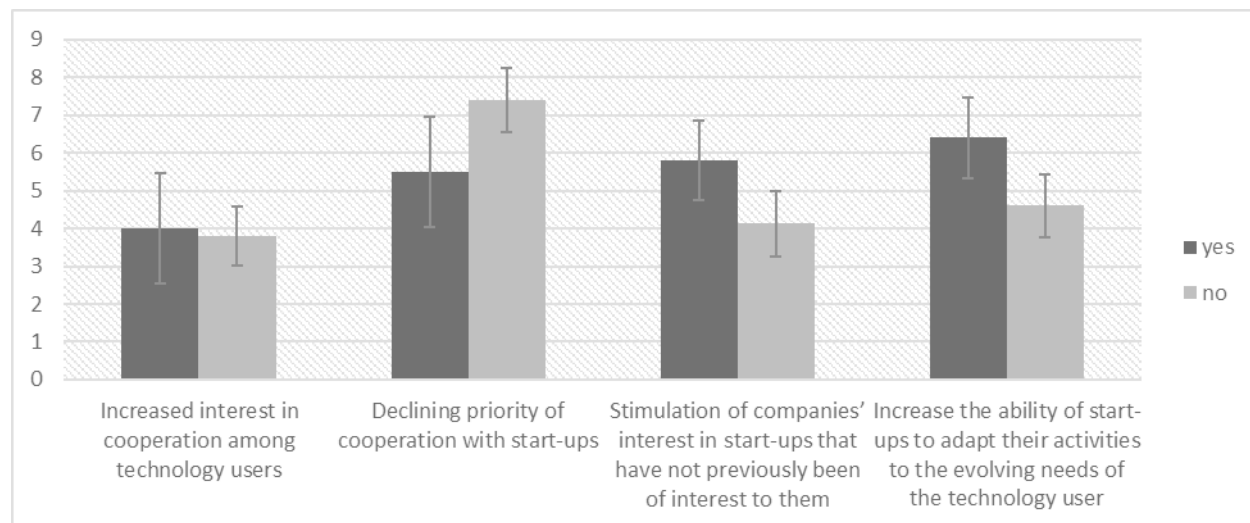


Fig. 5. Assessment of the pandemic impact on start-up-corporate collaboration versus the company's possession of strategies / procedures for working with start-ups.

## 5. Discussion and conclusions

The authors of the present research evaluated the impact of the Covid-19 pandemic on the corporation-start-up co-operation under their accelerator programmes. The research focused on a group of 25 corporations. The study findings were verified in terms of the following variables: the size of the corporation (headcount), the length of time of cooperation between the corporation and young innovative companies and strategies used by corporations, procedures of cooperation with start-ups. The study findings allow to draw the following conclusions:

1. The vast majority of corporations indicated that Covid-19 did not contribute to increased interest in start-ups. Moreover, it was also noted, though to a slightly smaller extent, that the priority of working with start-ups had declined. These results suggest that in the dynamic situation caused by the COVID-19 pandemic, representatives of corporations focus on other, probably more immediate aspects of their business rather than on developing or establishing cooperation with start-ups. Probably such activities are connected with risk mitigation, securing their core business.
2. The COVID-19 pandemic and its negative impact have also not proved to be an incentive for corporations to try to develop activities in new markets by establishing contacts with start-ups that were not previously in the area of corporate interest. Only a single corporate representative indicated that such an attitude was in line with their company's activities. The answers indicating no opinion on the matter prevailed. It is also possible that at the time of the survey respondents had not yet formed an opinion on this issue and, if the survey was to be repeated at a later stage of the pandemic (the post-Covid stage), their opinions could become polarised. The answers given by respondents with regard to the rapid adaptation of the start-up offer to the changes driven by COVID-19 showed that in this case corporations also have not formed an opinion. The majority of their

answers indicated the lack of opinion on the subject. Taking into account the above conclusions, it can be assumed that the market turbulence associated with the COVID-19 pandemic had a negative impact on corporate involvement in acceleration activities. The results obtained in the form of the lack of unanimous opinions of corporate representatives on the above questions is probably due to the still small lapse of time that has passed since the outbreak of the global pandemic.

3. The size of the corporation in terms of the headcount level was found to be associated with a lower priority for cooperation to co-operate with start-ups. Corporations with a higher headcount were less likely to reduce this priority or, in isolated cases, even increase it. It is likely that the size of such entities went hand in hand with their resources and an option to invest them in potentially risky cooperation with start-ups also during the turbulent pandemic period.
4. The companies having with longer experience in cooperating with start-ups declared that in the period of the pandemic they are more interested in cooperating with start-ups and are more willing to engage in contacts with such entities, which previously were not in the sphere of interest of the corporation. This result indicates the importance of having prior experience gathered in an earlier period, which, when turbulence such as the COVID-19 pandemic occurred, allowed them to use it to develop their corporate-start-up cooperation activities, or at least maintain it at the same level. This is also confirmed by the findings presented in Section 4.5, which clearly show that corporations with strategies or procedures for cooperating with start-ups - which are likely to have been developed in the course of the corporation's previous activities with start-ups and are thus at least indirectly the result of its experience - were more willing to engage in new activities and lowered the priority of cooperation compared to corporations without such strategies / procedures. Importantly enough, the experience factor was found to be more important than the company size factor, indicating that also smaller corporations, which had been active in cooperating with start-ups in earlier, more stable periods, could benefit from their experience during the pandemic.

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