Russian Companies in Autumn 2020:
Activities in the COVID-19 Pandemic and Views on the Transition to the Best Available Technologies (BAT)

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Abstract—The paper analyzes and comments on the results of a regular survey of Russian enterprises in the real sector, which was conducted by the Institute of Economic Forecasting of the Russian Academy of Sciences. Information on the impact of the coronavirus pandemic on the activities of domestic enterprises is provided. The opinions of enterprises on the severity of various macroeconomic problems in Russia are reflected. The data on the relations between Russian enterprises and banks are presented. The degree of demand of Russian enterprises in the modernization of production is determined. Information on purchases of domestic and foreign equipment in Russia is considered. The assessments of enterprises regarding the quality of Russian machinery and equipment are given. The data on delays in the supply of raw materials and components are presented. The opinions of enterprises on the implementation of the best available technologies (BAT) in Russia are reflected.

Keywords: economic consequences of the COVID-19 pandemic, enterprise behavior, enterprise survey, enterprise lending, quality of Russian technology, best available technologies

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In the second half of 2020, the COVID-19 pandemic continued to pose serious problems for the Russian economy. Meanwhile, the weakening of quarantine measures, the actions of the Russian authorities to support the population and enterprises, a certain revival in international markets and some relaxation of the national macrofinancial policy by the end of the year made it possible to significantly reduce the severity of the economic crisis in the country.

While Russia’s GDP fell by about 8% in the most acute phase of the crisis in the second quarter of 2020 compared to the same period in 2019, the decline in GDP should not exceed 3.8–4.2% by the end of the year in the opinion of various experts [1–3]. At the same time, according to preliminary estimates of the Federal State Statistics Service, the volume of industrial production for 11 months of 2020 in relation to the same period of 2019, freight turnover of transport, and the volume of paid services to the population decreased by 3.0%, 5.4%, and 17.7%, respectively. Meanwhile, the volume of production in agriculture increased by 1.5%. The volume of investments in fixed assets for nine months of 2020 fell by 4.1% [4].

The complexity and inconstancy of the situation in the Russian economy are clearly visible in the data of the survey of Russian enterprises, which was conducted by the Institute of National Economic Forecasting of the Russian Academy of Sciences in November–December 2020¹. For example, while in April–May 2020 73.60% of the respondents said that their enterprise was affected by the events associated with the coronavirus pandemic, in November–December there were fewer such answers—69.12%. At the same time, there was an increase in the number of enterprises reporting that they were not affected by the pandemic. The share of such answers increased from 4.80% in April–May 2020 to 11.03% in November–December 2020.

Table 1. Answers to the question: “Has your enterprise suffered from the events related to the coronavirus pandemic?” (total of answers = 100%)

| Period                  | Yes  | No  | No, but it may suffer in the future |
|-------------------------|------|-----|-----------------------------------|
| April–May 2020          | 73.60| 4.80| 21.60                             |
| November–December 2020  | 69.12| 11.03| 19.85                            |

¹ The survey involved 139 enterprises (power industry; water supply; ferrous and non-ferrous metallurgy; chemistry; mechanical engineering; building materials industry; forestry, woodworking and pulp and paper industries; light, food, pharmaceutical and printing industries; agriculture; construction; transport; vehicle repairs; health care; trade; public catering) from 58 regions of Russia.
December 2020 (Table 1). In addition, the proportion of enterprises that reported growth or stability of their sales volumes increased by the end of the year, and the proportion of enterprises that experienced a deep decline in sales volumes (over 50%) significantly decreased. In particular, the share of reports about a growth in sales volumes increased from 3.20% in April–May 2020 to 7.91% in November–December 2020. At the same time, the share of answers about a drop in sales volumes by more than 50% decreased from 15.90% in April–May 2020 to 5.76% in November–December 2020 (Table 2). Such shifts in the structure of answers confirm that the situation improved in some areas of the Russian economy in the second half of the year.

One of the factors that influenced the economic situation for the better was the support of enterprises from the federal authorities. The variety of forms of support and their relatively quick launch into action made it possible to cover a fairly wide range of economic activities and enterprises. As a result, the share of enterprises that were able to take advantage of support measures from the federal authorities increased from 9.00% in April–May 2020 to 24.82% in November–December 2020. However, the share of enterprises that did not receive such support changed little—from 70.50% in April–May 2020 to 68.61% in November–December 2020 (Table 3).

In other words, most of the Russian enterprises affected by the crisis associated with the pandemic had to make do on their own. This is probably why Russian enterprises as a whole were very cautious in assessing their market prospects. Only 5.76% of the respondents expected an increase in sales volumes in the next 1–2 months in November–December 2020. Even in April–May 2020, the share of such respondents was higher at 14.20%. Admittedly, the share of enterprises that believed that the sales volume would not fall and would remain approximately at the same level increased noticeably, from 29.90% in April–May 2020 to 46.04% in November–December 2020. However, the share of enterprises that expected a reduction in sales volumes did not decrease by the end of the year. In April–May 2020 it was 27.60%, and in November–December 2020 it was 28.78% (Table 4). Thus, enterprises as a whole do not expect a quick recovery of the Russian economy from the current crisis. However, such cautious views of enterprises on the future were also characteristic of all previous crises that had taken place in the Russian economy. Moreover, enterprises were clearly pessimistic about the near future even in situations when the national economy was actually rather quickly (as in the spring of 2009) overcoming the consequences of the crisis.

At the same time, it should be noted that the crisis phenomena generated by the pandemic had relatively little effect on the views of domestic enterprises about

| Period              | Yes  | No, but it intends to take advantage of this support in the future |
|---------------------|------|---------------------------------------------------------------|
| April–May 2020      | 9.00 | 70.50                                                        |
| November–December 2020 | 24.82 | 68.61                                                        |

Table 3. Answers to the question: “Was your business able to take advantage of the support measures promised by the federal authorities in connection with the coronavirus pandemic?” (total of answers = 100%)
Table 5. Answers to the question: “What problems of a macroeconomic nature are currently creating the greatest difficulties for your enterprise” (total of answers > 100%)

| Period                  | Insufficient effective demand on the part of consumers | High level of competition from other Russian manufacturers | High level of competition from foreign manufacturers | High level inflation | The inability to obtain a short-term (up to 1 year) loan at a reasonable interest rate | The inability to obtain a long-term (over 1 year) loan at a reasonable interest | High price level for transport and energy resources | High level of taxation of enterprises |
|-------------------------|-------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------|---------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------|----------------------------------|
| July–August 2002        | 62.64                                                 | 33.33                                                    | 25.29                                               | 9.20                | 12.07                                                                           | 35.63                                                                           | 56.32                           | 50.57                            |
| February–March 2004     | 55.19                                                 | 28.57                                                    | 20.78                                               | 9.09                | 7.79                                                                            | 24.68                                                                           | 49.35                           | 51.30                            |
| July–August 2005        | 52.15                                                 | 29.03                                                    | 20.97                                               | 13.98               | 12.37                                                                           | 28.49                                                                           | 47.85                           | 47.85                            |
| August–September 2006   | 36.59                                                 | 26.83                                                    | 27.44                                               | 16.46               | 13.41                                                                           | 24.39                                                                           | 46.95                           | 39.63                            |
| 2007                    | 31.11                                                 | 30.56                                                    | 25.56                                               | 14.44               | 10.56                                                                           | 14.44                                                                           | 38.33                           | 41.11                            |
| 2008                    | 31.36                                                 | 30.18                                                    | 28.40                                               | 31.36               | 10.06                                                                           | 18.93                                                                           | 51.48                           | 34.91                            |
| 2010                    | 50.00                                                 | 26.15                                                    | 19.27                                               | 11.47               | 22.48                                                                           | 11.47                                                                           | 50.46                           | 33.94                            |
| October–December 2011   | 56.52                                                 | 25.47                                                    | 16.77                                               | 25.56               | 9.32                                                                            | 14.29                                                                           | 52.80                           | 58.39                            |
| November–December 2012  | 49.11                                                 | 26.04                                                    | 26.63                                               | 10.65               | 11.83                                                                           | 14.79                                                                           | 42.01                           | 39.64                            |
| 2013                    | 51.98                                                 | 25.99                                                    | 22.03                                               | 14.69               | 11.86                                                                           | 12.99                                                                           | 46.33                           | 47.46                            |
| 2014                    | 56.76                                                 | 27.03                                                    | 22.97                                               | 23.65               | 14.86                                                                           | 4.73                                                                            | 47.30                           | 38.51                            |
| 2015                    | 64.64                                                 | 18.78                                                    | 8.84                                                | 30.94               | 19.89                                                                           | 29.28                                                                           | 32.01                           | 33.15                            |
| 2016                    | 68.32                                                 | 22.98                                                    | 10.56                                               | 19.25               | 15.53                                                                           | 25.47                                                                           | 38.51                           | 39.75                            |
| 2017                    | 60.13                                                 | 28.48                                                    | 17.09                                               | 3.80                | 8.86                                                                            | 15.82                                                                           | 39.26                           | 39.87                            |
| 2018                    | 60.99                                                 | 29.08                                                    | 21.28                                               | 11.35               | 12.77                                                                           | 17.73                                                                           | 36.17                           | 43.97                            |
| 2019                    | 65.27                                                 | 31.14                                                    | 22.16                                               | 7.78                | 10.18                                                                           | 14.37                                                                           | 37.13                           | 50.90                            |
| 2020                    | 65.47                                                 | 23.74                                                    | 13.67                                               | 18.71               | 6.47                                                                            | 10.79                                                                           | 34.53                           | 43.88                            |


| Period               | High level of bureaucracy and corruption in government bodies | Lack of normal laws governing economic activity | Inactivity of state power bodies in the economic sphere | Low payment discipline in the market | Lack of quality labor force | Dominance of criminal and semicriminal ways of doing business in the economy | Macroeconomic problems of the country do not create any special difficulties for our company | Other |
|----------------------|-------------------------------------------------------------|-----------------------------------------------|--------------------------------------------------------|-------------------------------------|------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------|-------|
| July–August 2002     | 21.84                                                       | 24.71                                         | 21.84                                                  | 20.69                               | 19.54                        | 10.34                                                                            | 0.00                                            | 6.32  |
| February–March 2004  | 24.68                                                       | 16.88                                         | 18.83                                                  | 13.64                               | 31.17                        | 6.49                                                                             | 0.65                                            | 0.00  |
| July–August 2005     | 24.73                                                       | 20.97                                         | 19.35                                                  | 19.35                               | 26.88                        | 5.38                                                                             | 0.54                                            | 5.91  |
| August–September 2006| 22.56                                                       | 15.24                                         | 17.07                                                  | 12.20                               | 39.02                        | 7.93                                                                             | 1.22                                            | 6.71  |
| 2007                 | 22.22                                                       | 14.44                                         | 23.33                                                  | 10.00                               | 53.89                        | 7.22                                                                             | 0.56                                            | 8.89  |
| 2008                 | 20.71                                                       | 9.47                                          | 20.12                                                  | 8.28                                | 55.62                        | 5.33                                                                             | 0.00                                            | 12.43 |
| 2010                 | 23.85                                                       | 20.18                                         | 17.43                                                  | 16.06                               | 38.99                        | 6.42                                                                             | 0.46                                            | 4.58  |
| October–December 2011| 20.50                                                       | 14.29                                         | 20.50                                                  | 14.91                               | 41.61                        | 3.73                                                                             | 0.00                                            | 9.32  |
| November–December 2012| 23.08                                                      | 17.16                                         | 16.57                                                  | 13.02                               | 43.20                        | 7.69                                                                             | 1.78                                            | 4.73  |
| 2013                 | 18.08                                                       | 20.34                                         | 22.60                                                  | 15.25                               | 39.55                        | 4.52                                                                             | 1.13                                            | 7.34  |
| 2014                 | 16.22                                                       | 12.84                                         | 17.57                                                  | 16.22                               | 36.81                        | 5.41                                                                             | 2.70                                            | 6.08  |
| 2015                 | 14.34                                                       | 14.92                                         | 18.78                                                  | 18.23                               | 24.31                        | 1.66                                                                             | 1.66                                            | 6.08  |
| 2016                 | 13.04                                                       | 17.39                                         | 16.15                                                  | 11.18                               | 22.36                        | 3.11                                                                             | 1.24                                            | 4.97  |
| 2017                 | 13.92                                                       | 18.35                                         | 19.62                                                  | 14.56                               | 27.85                        | 5.70                                                                             | 3.16                                            | 5.06  |
| 2018                 | 12.77                                                       | 15.60                                         | 15.60                                                  | 22.70                               | 32.62                        | 3.55                                                                             | 3.55                                            | 7.09  |
| 2019                 | 13.77                                                       | 14.37                                         | 16.17                                                  | 14.37                               | 39.52                        | 4.19                                                                             | 1.80                                            | 7.19  |
| 2020                 | 11.51                                                       | 17.99                                         | 17.27                                                  | 16.55                               | 40.29                        | 4.32                                                                             | 2.16                                            | 2.16  |
the severity of macroeconomic problems in Russia. As in previous surveys, enterprises most often indicated insufficient effective demand among the most acute problems at the end of 2020 in 65.69% of answers. But this is exactly the same share of answers as in the pre-crisis 2019. Moreover, over the year there was a decrease in the frequency of complaints about problems such as a high level of competition with other Russian manufacturers (31.14% of answers in 2019 and 23.74% of answers in 2020), a high level of competition with foreign manufacturers (22.16% in 2019 and 13.67% in 2020), the inability to obtain a short-term loan (10.18% in 2019 and 6.47% in 2020), and the inability to obtain a long-term loan (14.37% in 2019 and 10.79% in 2020). The frequency of complaints about the high level of taxation also decreased from 50.90% of answers in 2019 to 43.88% of answers in 2020. It is likely that this positive shift is associated with tax incentives that were provided to Russian small and medium enterprises in the second quarter of 2020, as well as a number of large enterprises from the hardest hit industries. In addition, it should be noted that the proportion of complaints about a high level of bureaucracy and corruption in government bodies in 2020 turned out to be the lowest for the entire period of the surveys, 11.51% (Table 5).

A distinctive feature of the economic crisis in 2020 was the relative stability in the financial and banking sector. Unlike the crises of 1998, 2008, and 2014–2015, there were no significant disruptions in the payment system, bursts of inflation, or a sharp increase in interest rates in Russia. As the survey data show, relations between Russian enterprises and banks were also quite stable and generally avoided the negative impact of the crisis. In particular, the overwhelming number of respondents—80.74%—answered that banks fulfilled their obligations in 2020 at the same level. At the same time, the shares of answers about the improve-

| Period                      | It has improved | It has remained at the same level | It has worsened |
|-----------------------------|-----------------|----------------------------------|---------------|
| August–September 2010       | 20.66           | 72.30                            | 7.04          |
| October–December 2011       | 14.19           | 78.71                            | 7.10          |
| November–December 2012      | 13.41           | 78.05                            | 8.54          |
| November–December 2013      | 10.40           | 80.35                            | 9.25          |
| November–December 2014      | 6.38            | 78.17                            | 15.50         |
| November–December 2015      | 3.37            | 76.97                            | 19.66         |
| November–December 2016      | 6.29            | 77.99                            | 15.72         |
| November–December 2017      | 10.26           | 76.28                            | 13.46         |
| November–December 2018      | 13.48           | 78.72                            | 7.80          |
| November–December 2019      | 13.33           | 79.40                            | 7.27          |
| November–December 2020      | 9.63            | 80.74                            | 9.63          |

In addition, it should be noted that the share of answers about the absence of deliberate delays in payments by banks increased again in 2020. As a result, this share reached its maximum level since 2001 at 84.78% (Table 7).

However, the depth of interaction between Russian enterprises and banks still leaves much to be desired. In particular, the total share of enterprises receiving loans from banks for the implementation of investment projects amounted to only 20.29% in 2020. This is significantly less than, for example, in 2011–2012 (Table 8).

Bringing the Russian economy out of the crisis requires efforts in a number of areas. One of these areas is the technological modernization of production [5–9]. As the survey data show, the current eco-

| Period                      | Yes | No | It is difficult to judge |
|-----------------------------|-----|----|-------------------------|
| August–September 2010       | 7.55| 75.42| 16.03                   |
| October–December 2011       | 4.52| 71.61| 23.87                   |
| November–December 2012      | 4.82| 77.11| 18.07                   |
| November–December 2013      | 5.23| 76.74| 18.03                   |
| November–December 2014      | 5.67| 78.72| 15.61                   |
| November–December 2015      | 11.24| 75.28| 13.48                   |
| November–December 2016      | 5.63| 76.25| 18.12                   |
| November–December 2017      | 7.74| 76.13| 16.13                   |
| November–December 2018      | 7.04| 79.58| 13.38                   |
| November–December 2019      | 9.03| 79.52| 11.45                   |
| November–December 2020      | 5.07| 84.78| 10.14                   |
Table 8. Answers to the question: “What is the cooperation of your enterprise with Russian banks at the present time?” (total of answers = 100%)

| Period                  | Cooperation is limited only to settlement and cash services | Settlement and cash services, lending of turnover means | Settlement and cash services, lending of turnover means and lending of investment project for a period of 1–2 years | Settlement and cash services, lending of turnover means and lending of investment project for a period of 3–5 years and more |
|-------------------------|------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| August–September 2010   | 40.38                                                      | 35.68                                                  | 9.86                                                                                             | 14.08                                                                                                             |
| October–December 2011   | 43.71                                                      | 30.46                                                  | 13.91                                                                                             | 11.92                                                                                                             |
| November–December 2012  | 41.57                                                      | 33.13                                                  | 11.45                                                                                             | 13.85                                                                                                             |
| November–December 2013  | 50.57                                                      | 27.84                                                  | 9.09                                                                                              | 12.50                                                                                                             |
| November–December 2014  | 41.50                                                      | 34.01                                                  | 10.88                                                                                             | 13.61                                                                                                             |
| November–December 2015  | 47.75                                                      | 33.15                                                  | 6.18                                                                                              | 12.92                                                                                                             |
| November–December 2016  | 50.94                                                      | 31.45                                                  | 6.92                                                                                              | 10.69                                                                                                             |
| November–December 2017  | 51.61                                                      | 27.75                                                  | 6.45                                                                                              | 14.19                                                                                                             |
| November–December 2018  | 52.48                                                      | 34.04                                                  | 2.13                                                                                              | 11.35                                                                                                             |
| November–December 2019  | 46.38                                                      | 35.54                                                  | 4.22                                                                                              | 13.86                                                                                                             |
| November–December 2020  | 47.10                                                      | 32.61                                                  | 6.52                                                                                              | 13.77                                                                                                             |

Table 9. Answers to the question: “How great is your enterprise’s need for modernization of production and technological innovations at the moment?” (total of answers = 100%)

| Period                  | Special modernization is not required; the renewal will be made as the need arises | Partial modernization is required (renewal of a part of equipment, structures, communications, some technological processes) | A radical modernization is required |
|-------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| March–April 2011        | 21.21                                                                              | 58.08                                                                                                                  | 20.71                             |
| November–December 2012  | 21.08                                                                              | 57.23                                                                                                                  | 21.69                             |
| April–May 2014          | 15.76                                                                              | 55.15                                                                                                                  | 29.09                             |
| November–December 2015  | 26.26                                                                              | 58.10                                                                                                                  | 15.64                             |
| April–May 2017          | 23.97                                                                              | 61.64                                                                                                                  | 14.39                             |
| November–December 2018  | 26.76                                                                              | 57.04                                                                                                                  | 16.20                             |
| November–December 2020  | 25.36                                                                              | 63.04                                                                                                                  | 11.59                             |

The economic crisis has somewhat changed the views of enterprises regarding the need to modernize production. About a quarter of the surveyed enterprises (and this is almost the maximum for the period of the survey) believe that they do not need modernization at the moment; about two-thirds of the respondents think that partial modernization is sufficient, and only 11.59%—less than ever before—believe that they need a radical technological modernization (Table 9). Apparently, such a decrease in the need for modernization efforts is associated with a rather pessimistic view of enterprises on the medium-term prospects of the Russian economy. Why must money be spent on modernization if demand for additional products is either falling or growing very slowly?

However, regardless of the need to modernize production, the enterprises’ own resources, which they can spend on technological innovations, remain generally insufficient. Only 13.43% of the respondents reported that the current volume of investments allowed them to carry out a full modernization. At the same time, another 35.07% of the respondents can carry out partial modernization. Thus, about half of Russian enterprises cannot finance the modernization of production and the introduction of technological innovations as before. This state of affairs established at the end of the 2000s and has barely changed since then (Table 10).

A key element of technological modernization is the purchase of machinery and equipment [10, 11]. Under the conditions when sanctions restrictions are overlapped on a severe economic crisis, it is very important that the competitiveness of domestic technology be gradually growing. On the one hand, this
will make it possible to increase the technological independence of the Russian economy through import substitution. On the other hand, this will give the opportunity of increasing the rate of economic growth due to the advanced development of the national engineering industry.

As for the purchases of machinery and equipment, the frequency of reports on the purchase of new domestic equipment in 2020 again exceeded the frequency of reports on the purchase of new equipment from the far abroad (Table 11). This is generally a pleasant fact, but it is largely due to the recent depreciation of the ruble and the rise in the cost of imports.

Meanwhile, the assessments of Russian enterprises in relation to the quality of domestic equipment unfortunately did not improve in 2020. Only 7.26% of the respondents considered that the quality of Russian machinery and equipment had improved in most cases (Table 12).

Only 11.81% of enterprises reported that there was a lot of domestic equipment on the market that was not inferior in quality to foreign alternatives (Table 13). In addition, the share of answers that the gap in quality between Russian and foreign technology is decreasing turned out to be less than the share of answers about an increase in this gap, 15.20% compared to 28.00% (Table 14).

As part of the survey, a study was also carried out on the situation with the terms of the delivery of raw materials and components to Russian enterprises. The

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**Table 10.** Answers to the question: “Does the current level of production investments of your enterprise provide a solution to the problem of a full modernization of production?”, % (total of answers = 100%)

| Period             | Yes, it provides quite fully | It is able to provide only some partial improvements | It is able to maintain production at the existing technological level and no more | It does not even ensure the preservation of the existing technological level of production |
|--------------------|------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| March–April 2011   | 11.73                        | 34.69                                               | 34.69                                                                       | 18.89                                                                         |
| November–December 2012 | 18.40                    | 28.22                                               | 35.58                                                                       | 17.80                                                                         |
| April–May 2014     | 15.43                        | 30.86                                               | 29.63                                                                       | 24.08                                                                         |
| November–December 2015 | 11.36                    | 32.95                                               | 38.64                                                                       | 17.05                                                                         |
| April–May 2017     | 15.86                        | 24.14                                               | 43.45                                                                       | 16.55                                                                         |
| November–December 2018 | 20.00                    | 29.63                                               | 34.07                                                                       | 16.30                                                                         |
| November–December 2020 | 13.43                    | 35.07                                               | 41.04                                                                       | 10.45                                                                         |

**Table 11.** Answers to the question: “What machinery and equipment has your company purchased during the last 2–3 years?” (total of answers > 100%)

| Period             | Machinery and equipment of Russian production, new | Machinery and equipment produced in the CIS countries, new | Machinery and equipment produced in the far abroad, new | Machinery and equipment produced in the far abroad, used |
|--------------------|---------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------|
| February–March 2010 | 62.89                                             | 15.09                                                     | 15.72                                                | 1.89                                                   | 62.29                                                 | 13.84                                                 |
| October–December 2011 | 64.19                                             | 17.57                                                     | 10.81                                                | 1.35                                                   | 68.92                                                 | 11.49                                                 |
| April–May 2013     | 47.97                                             | 13.51                                                     | 11.49                                                | 0.68                                                   | 70.27                                                 | 11.49                                                 |
| November–December 2014 | 56.72                                             | 17.16                                                     | 13.43                                                | 2.99                                                   | 64.18                                                 | 10.45                                                 |
| April–May 2016     | 50.00                                             | 14.08                                                     | 11.27                                                | 2.82                                                   | 63.38                                                 | 11.27                                                 |
| November–December 2017 | 67.83                                             | 15.38                                                     | 11.89                                                | 2.10                                                   | 53.85                                                 | 9.79                                                  |
| April–May 2019     | 53.68                                             | 20.59                                                     | 12.50                                                | 2.94                                                   | 58.09                                                 | 8.09                                                  |
| November–December 2020 | 53.96                                             | 15.11                                                     | 9.35                                                 | 0.72                                                   | 51.80                                                 | 9.35                                                  |
Almost 80% of the respondents noted that delivery terms were almost never violated or rarely violated (Table 15). Meanwhile, it should be noted that the share of violations in deliveries that occurred through the fault of transport workers is extremely low, being 5.51% of answers (Table 16). These data can be considered as an indirect confirmation of the very efficient operation of the modern Russian transport system. It should also be noted that the overwhelming majority of enterprises believe that delays in deliveries usually do not lead to a significant increase in their costs (Table 17).

As a follow-up to the previous surveys on sustainable development, the state of affairs in the field of environmental modernization of Russian enterprises was investigated and the problem of using the best available technologies (BAT) was raised. The introduction of BAT is provided for by international conventions and agreements that were also ratified in Russia\(^2\) and is an important institutional mechanism aimed both at reducing the negative impact on the environment from industrial enterprises and at modernizing their production facilities.

While the concept of the best available technologies began to take root in Europe and North America in the 1980s\(^3\), a similar concept in Russia—the best available technologies—was first established only in 2002\(^4\), although this concept was present in an implicit form in a number of GOSTs on resource conservation, rationing of material costs and other areas. In fact, the process of transferring production to the BAT began in 2014, when the federal law of July 21, 2014, No. 219-FL was adopted, according to which enterprises are required to introduce economically rational technologies that minimize wastes and emissions.

Due to the fact that the BAT principles have been introduced into Russian practice relatively recently, not all Russian industrial enterprises are familiar with this concept. The results of the survey have revealed that 40% of the surveyed enterprises do not know anything about the task of transition to the BAT (Fig. 1). Meanwhile, the real task of transition to the BAT is faced by 13.85% of enterprises, and almost a quarter of the surveyed enterprises expect such requirements to arise in the future.

About half of the surveyed enterprises (58%) noted a number of expected positive consequences due to the

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\(^2\) Such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the Stockholm Convention on Persistent Organic Pollutants, etc.

\(^3\) The concept of BAT was first introduced in 1984 in the European Economic Community Directive No. 84/360/EEC concerning the abatement of air pollution from industrial plants [13].

\(^4\) In Federal Law, On Environmental Protection, dated January 10, 2002, No. 7-FL.
introduction of the BAT system: the opportunity of zeroing fees for negative environmental impact (32.10%) and a real reduction in the burden on the environment (30.86%) were most frequently mentioned (Fig. 2).

At the same time, an even greater part of the surveyed enterprises (64%) noted the possible negative consequences that they may face in the event of the introduction of the BAT system: one third of enterprises feared that additional costs were not justified in relation to real environmental effects; the second third feared an excessive increase in the cost of production; the third one feared a further increase in the bureaucratic burden (Fig. 3). Some of the respondents apprehended the growth of investment costs in a short time and difficulties in developing their own systems. The respondents also included the enterprises that did not see any negative consequences from the introduction of the BAT, but such enterprises turned out to be a minority.

Table 14. Answers to the question: “How do you assess the size of the gap between the quality of machinery and equipment of Russian and foreign production in recent years?” (total of answers = 100%)

| Period                       | In recent years the gap in quality has been decreasing | The gap remains about at the same level | The gap in quality continues to grow in favor of imported equipment |
|------------------------------|--------------------------------------------------------|----------------------------------------|---------------------------------------------------------------|
| February–March 2010          | 15.72                                                  | 36.48                                  | 47.80                                                          |
| October–December 2011        | 12.95                                                  | 50.36                                  | 36.69                                                          |
| April–May 2013               | 10.74                                                  | 53.69                                  | 35.57                                                          |
| November–December 2014       | 16.80                                                  | 60.00                                  | 23.20                                                          |
| April–May 2016               | 18.18                                                  | 55.94                                  | 25.88                                                          |
| November–December 2017       | 28.47                                                  | 52.78                                  | 18.75                                                          |
| April–May 2019               | 20.15                                                  | 54.48                                  | 25.37                                                          |
| November–December 2020       | 15.20                                                  | 56.80                                  | 28.00                                                          |

Table 15. Answers to the question: “How often are the terms of delivery of raw materials and components for your enterprise violated?” (total of answers > 100%)

| Period                        | Almost never (in 10% of cases) | Rarely (in 10–25% of cases) | Not very often (in 26–50% of cases) | Often (in more than 50% of cases) |
|------------------------------|--------------------------------|------------------------------|-------------------------------------|-----------------------------------|
| November–December 2020       | 31.82                          | 47.73                        | 16.67                               | 3.03                              |

Table 16. Answers to the question: “Whose fault is the delivery terms being violated?” (total of answers > 100%)

| Period                        | Through the fault of suppliers | Through the fault of transport workers | Due to force majeure circumstances (international sanctions, pandemic, changes in legislation, etc.) | Other |
|------------------------------|--------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------|-------|
| November–December 2020       | 47.24                          | 5.51                                   | 44.88                                                                                             | 2.36  |

Table 17. Answers to the question: “To what extent do today’s delays of deliveries increase the costs of your company?” (total of answers = 100%)

| Period                        | They barely increase costs | They increase costs, but not significantly | They increase costs significantly | They increase costs critically |
|------------------------------|----------------------------|----------------------------------------------|----------------------------------|-------------------------------|
| November–December 2020       | 34.92                      | 51.59                                        | 12.70                            | 0.79                          |
It should be noted that all surveyed enterprises, which have been assigned the task of transition to the BAT, as well as some enterprises that expect this task to be set in the future, face difficulties in the process of their implementation. Of the surveyed enterprises, 61.67% saw difficulties in an insufficiently developed regulatory and legal mechanism and bureaucratic difficulties, 25% of enterprises face difficulties in calculating specific indicators of production efficiency according to BAT reference books, and 13.33% of enterprises have difficulties in using industry-specific information and technical reference books on the BAT (Fig. 4).

The Russian BAT system is largely based on the experience of foreign countries in this area, since it involves the harmonization of legislation in the field of environmental protection and public health with the international one, but at the same time it has its own characteristics and significant differences. The most significant difference is that the Russian BAT system lacks a comprehensive approach to environmental impact management: permits are issued not for all types of negative impact, but only for emissions and discharges of pollutants.

In this regard, it is important to understand to what extent Russian enterprises are ready for possible further harmonization of the Russian legislation with the international norms. About half of the surveyed enterprises found it difficult to answer this question. But, despite the difficulties of the enterprises in the process of transition to the BAT systems, almost one third of enterprises still believe that the BAT system should be expanded and its influence must also be extended to the regulation of industrial waste and limits on its disposal (Table 18).

The conclusions from the survey are as follows:

1. The COVID-19 pandemic continues to negatively affect the situation in the Russian economy; however, in general, the severity of the economic crisis in the country had decreased by the end of 2020. At the same time, the share of Russian enterprises that managed to receive anticrisis assistance from the federal authorities had increased significantly by the end of 2020.

2. Russian enterprises still consider that the most significant macroeconomic problems for themselves are insufficient effective demand from consumers, high taxation, lack of quality labor and high prices for energy and transport.

3. Despite the crisis, the relations between Russian enterprises and banks as a whole have not deteriorated.

4. The frequency of purchases of Russian machinery and equipment in 2020 has again outstripped the

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5 In particular, Federal Law No. 219 was formed taking into account the EU and Council Directive 2010/75/EU dated November 24, 2010, On Industrial Emissions (Comprehensive Prevention and Control), and the European Parliament and Council Directive 2008/1/EC dated January 15, 2008, On Integrated Prevention and Control of Pollution.
frequency of purchases of machinery and equipment from the far abroad. However, Russian enterprises still rate the quality of domestic equipment rather low.

5. The situation with the supply of raw materials and components to Russian enterprises looks quite good. In general, delivery terms are not often violated.

6. A significant part of enterprises are not familiar with the task of transition to the BAT principles and do not have a clear opinion about their further development in Russia.

7. Many Russian enterprises express concern about the possible negative consequences of the introduction of the BAT systems.

8. Nevertheless, many surveyed enterprises have a positive attitude to the implementation of the BAT systems and consider it important to further harmonize the Russian legislation in this area with the international legal norms.

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