CENTER FOR ECONOMIC ANALYSIS UNDER THE GOVERNMENT OF RUSSIAN FEDERATION (CEA)

Joint EU – OECD Workshop on International Development of Business and Consumer Tendency Surveys

Report
20-21 November 2003, Brussels

BUSINESS TENDENCY SURVEY IN THE ANALYSIS OF RUSSIAN ECONOMY METODOLOGY ASPECTS AND PROSPECTS OF USE

V.Bezrukov
G.Ostapkovitch
F.Glisin
L.Kitrar

The methodology strategy of the Centre for Economic Analysis (CEA) under the RF Government in monitoring business environment aims at establishing a comprehensive harmonised system of Business Tendency Surveys (BTS) in various sectors of the economy.

Today, the key areas have been established for the development of methodology basis for the BTS and analysis of their results:

- Update of the system of business environment indicators;
- Improvement of sampling methods for the survey units;
- Development of new areas for business tendency analysis;
- Improvement of approaches to distribution of the results;
- Experimental (pilot) work related to enhancement of the survey sectors, particularities of regional monitoring, updating programs of sample data sets and time series of survey indicators in the context of the introduction of the new classificatory of business activities in Russian statistics.

In this context, improvement of qualitative analysis is considered as one of the key methodology aspects. Currently, the following works are underway:

- Identification of structural and temporal relations between the indicators as part of *vertical integration* of survey results;
- Development of a structure of groups of survey units with uniform quality in the surveyed sectors of economy;
- Statistic processing of time series of indicators (identification of seasonal and cyclic components);
- Identification of integral indicators whose cyclic development is ahead of, level, or in delay, compared to the general economic development rate.

As for the *vertical integration* of the results of each individual BTS, here in means a one or two-figure aggregation of average characteristics of respondent's distribution on each of the indicators.

Typically, this phase of information "compression" with a significant number of analysis indicators means that they are consolidated in groups coherent as high as possible. This lets us identify integral (composite) indicators for each of the surveys that justly substitute a certain number of indicators and provide a higher level of aggregation for the survey results. Using these composite indicators we can identify the most typical relations in our system of indicators, which makes it easier to analyze and interpret survey results at a stage when time series are not long enough yet to be used in appropriate economic methods of aggregation.

Vertical integration of information means that the following procedure is used for each individual survey. First, we identify an indicator that is typical for a certain business activity and can be used as an aggregation or interpretation for a certain set of indicators. For instance, a general assessment of economic situation can be used as such external indicator for an industry questionnaire, with key business indicators of the enterprise being included in the questionnaire as internal indicators that need to be consolidated.

Here, various survey indicators are into a composite indicator by means of factor analysis. However, when there is no external indicator for such characteristics of business environment as business activity, availability of resources and market stability of business agents, then the algorithm of major components method is used.

In both of the above cases, a correlation matrix is built based on the coefficients of inter-conjugacy of qualitative characteristics (normally, Kramer or Chuprov coefficients for order statistics are used). This matrix contains information on coherence of the sampling indicators, including the external indicator, if any. This matrix is used to select the indicators that either form the essential factor loads of the vector or have a significant pair correlation.

Through logical interpretation and stability of correlation links in a survey series, given indicators can be aggregated in one value and further in one time series.

The major components method was applied to identify relationship between business tendency survey indicators for industrial sector based on the following assumption:

- Qualitative indicators form groups; each of these groups shows a particular characteristic of business environment in the industry, such as business activity, availability of resources and market stability of enterprises.

It should be noted that it was not the survey subjects that we classified here, but the characteristics (indicators), i.e., the groups of indicators where the pattern of change was similar as we moved from one survey subject to another.

The major components method was applied to identify the level of business activity, availability of resources and market stability of industrial enterprises based on the results of quarterly BTS over the period of 1998-2002. The following system of qualitative indicators was established: number of employees, tendency (x_1); main product output, tendency (x_2); total demand, tendency (x_3); raw material stock, level (x_4); raw material stock, tendency (x_5); finished product stock, level (x_6); finished product stock, tendency (x_7); availability of manufacturing capacities with regard to the forecast demand for the products in the next 6 months, level (x_8); evaluation of the order portfolio, level (x_9); evaluation of product competitiveness, level (x_{10}); prices for raw materials, tendency (x_{11}); sales prices for product, tendency (x_{12}); availability of enterprise's own finance, tendency (x_{13}); accounts receivable overdue, tendency (x_{14}); accounts payable overdue, tendency (x_{15}); profit, tendency (x_{16}); assessment of general economic situation (x_{17}), changes in general economic situation at the enterprise (x_{18}).

The correlation matrix with information on the system of selected characteristics was built using Chuprov coefficient. It has been found that the most part of the total dispersion over the reviewed period is described by three factors. For the first of these significant factors, the total demand and main product output tendencies constituted the critical subset of characteristics. Also, inside this component, tendency and level of order portfolio for finished products appeared and, less often, indicators of profit and general economic situation. Because of this, we called this component "business activity".

Level and tendency of raw material stock, availability of enterprise's own finance, and availability of assets appeared to be the most significant indicators concerning the factor load for the second factor. These indicators characterize availability of resources at industrial enterprises. For this reason, we call the second component "availability of resources".

The critical subset for the third component shows the greatest factor loads for tendency and level of competitiveness, general economic situation, finished product stock and profit. All these indicators characterize market stability of industrial enterprises.

Based on the relationship between the quality indicators identified using the major component method, the surveyed enterprises were then consolidated in various groups with uniform quality.

They were grouped according to the found aggregate characteristics, which greatly compress the source information. If several major components were to be used for the same grouping it was considered advisable to apply cluster analysis methods. This has made it possible to identify uniform sets of survey units in multidimensional space of indicators (characteristics) by measuring "distance" between each and every unit of the survey set.

The types of industrial enterprises have been defined depending on the following identified characteristics of business environment: business activity, availability of resources and stability in the market. Based on the results of the major components algorithm, the following qualitative indicators were applied for definition of types of industrial enterprises depending on their business activity: $\{X^1_{1L}\}$ total demand (tendencies); $\{X^1_{2L}\}$ main product output (tendencies); $\{X^1_{3L}\}$ order portfolio (levels); where L = 1, 2 and 3, which means, respectively, tendencies of "growth", "no change", "decrease", or levels of "higher than normal", "normal", "lower than normal". The following qualitative indicators were applied for definition of types of industrial enterprises depending on availability of resources: $\{X^2_{1L}\}$ raw material stock (tendencies); $\{X^2_{2L}\}$ availability of manufacturing capacities with regard to the forecast demand for the products in the next 6 months (levels); $\{X^2_{3L}\}$ availability of enterprise's own finance (tendencies). Definition of types of industrial enterprises depending on enterprise's market stability (the F3 component) was based on the following qualitative indicators: $\{X^3_{1L}\}$ change in the general economic situation (tendencies); $\{X^3_{2L}\}$ assessment of general economic situation; $\{X^3_{3L}\}$ enterprise's profit (tendencies); $\{X^3_{4L}\}$ – competitiveness of enterprise's products; L=1, 2 and 3.

It should be noted that the calculations appeared to be much less clear because of the great number of three-dimensional indicators, which caused a certain "noise". Hence, the quality of the results and possibilities of their interpretation deteriorated.

The data have not been standardized since only identically measured indicators (meaning the order level) were applied for the classification.

Since the set of enterprises had to be subdivided into a certain number of uniform classes, such as “high”, “medium” or “low” business activity (or availability of resources, or stability in the market), we decided to apply the k-average method iteration procedure.

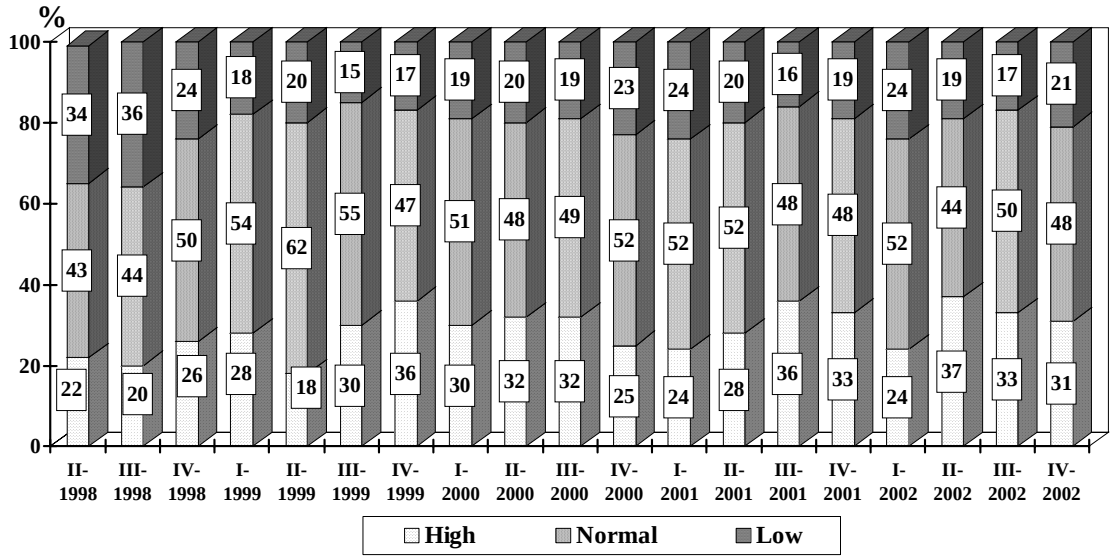
The calculations in each of the classification types came up with three groups of industrial enterprises. The Business Activity analysis of the enterprises that belong to Group 1 over the review period made it possible to identify them as the most pro-active enterprises, for which both the manufacturing capacities and demand for their products have expanded, with “normal” order portfolio level. Group 2 contains enterprises with medium business activity, unchanged demand for their products, stable product output and order portfolio at an “appropriate” level. The least active enterprises with contracting production and demand, and narrow order portfolio, were included in Group 3.

The Availability of Resources analysis established Group 1 for the enterprises with the best resource supply, high level of raw material stock, increase in the level of enterprise’s own finance available and “sufficient” level of manufacturing capacities with regard to the forecast demand for the products in the next 6 months. Group 2 – enterprises with medium availability of resources – covers enterprises with stable own finance resources and “normal” level of raw material stock and manufacturing capacities. Group 3 contains enterprises with the least level of resources available, low raw material stock and low manufacturing capacities, and also contracting finance resources of the enterprise.

The Stability in the Market analysis established Group 1 for the enterprises with simultaneous rise in profit and improvement of the general economic situation. To ensure high stability of the enterprise in the market, “normal” level of competitiveness and “satisfactory” economic situation appeared to be “sufficient”. Group 2 comprises enterprises with medium market stability, stable profits and general economic situation within “normal” level. Also, “normal” competitiveness appeared to be enough to be included in Group 2. Group 3 covers enterprises with the lowest market stability, contracting profits and general economic situation and “low” competitiveness.

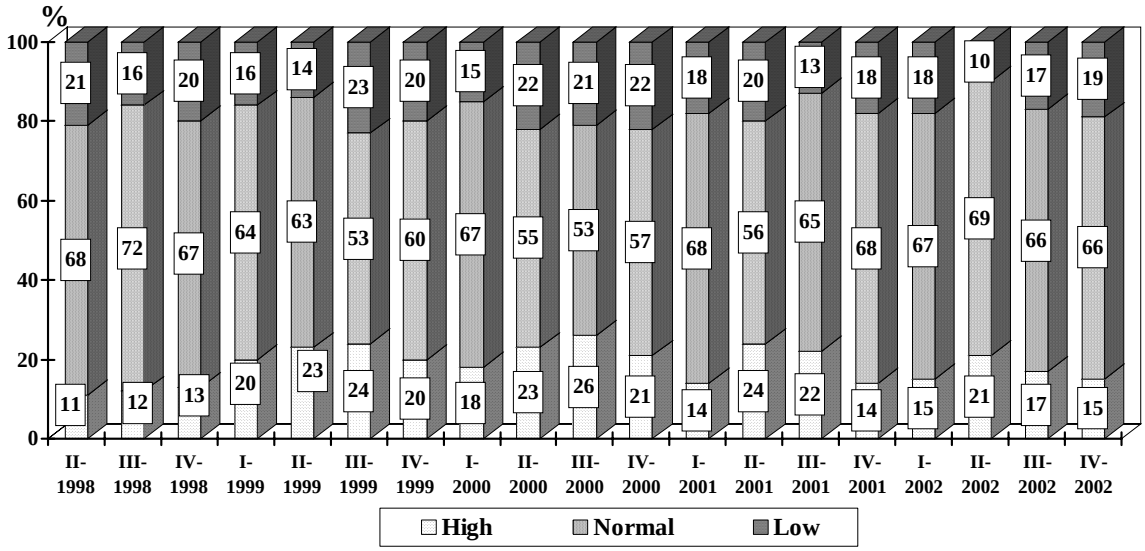
Graphs 1 through 3 show the sampled results of the identified types of enterprises based in the quarterly BTS in industrial sector over the period from February 1998 to April 2002.

Graph 1



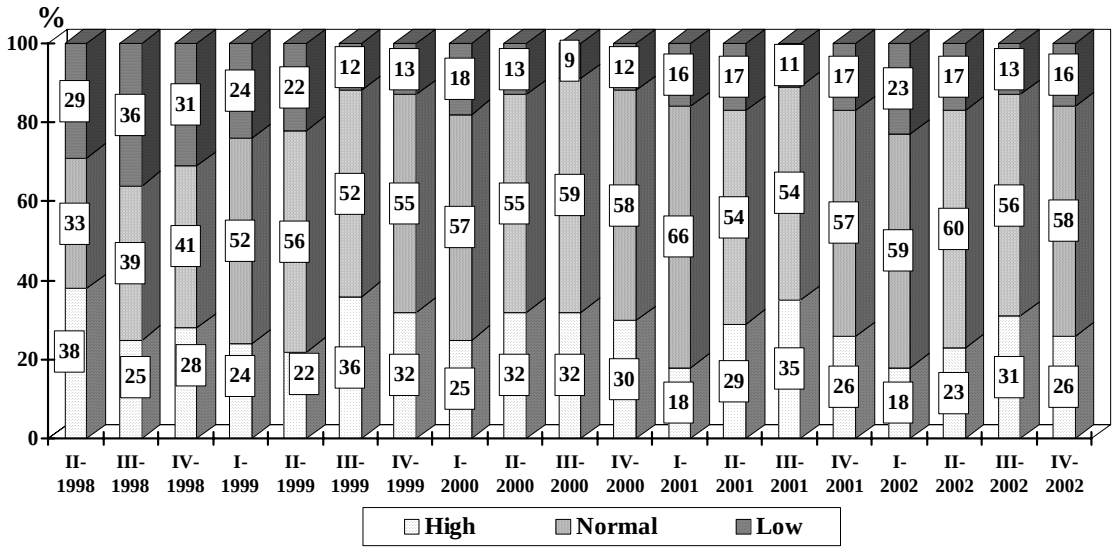
* Indicators used for the classification represent respondent’s evaluations of the tendencies in main product output, total demand for the products, finished product stock and order portfolio level.

Graph 2



* Indicators used for the classification represent respondent's evaluations of the tendencies in the availability of manufacturing capacities, availability of enterprise's own financial resources and raw material stock.

Graph 3



* Indicators used for the classification represent respondent's evaluations of the tendencies in profits, level of competitiveness, tendencies in the level of general economic situation at the enterprise.

Similar procedure for identification of the most characteristic relations in the indicator system and subsequent allocation of types according to appropriate qualitative uniform characteristics also appeared to be efficient for analyses in banking and insurance sectors, where time series of indicators are yet too short.

As the amount of time series grows, it is becoming possible to test in practice if the identified nominated composite indicators, and also the indicators selected as components, are good at capturing the existing and future changes in the respective quantitative indicators determined from the official statistics. Therefore, the purpose of this phase is to study the forecasting potential of composite indicators and their integration with official statistics. Such a testing could be based on selection of a

reference statistics series the most closely linked to the composite indicator and capable of reflecting the development of a given process. For the industrial survey, we have chosen an industrial production index, which is calculated by CEA using a more sophisticated and updated methodology than the one used in the RF Statistical Committee (GosComStat).

As for the components of composite indicators for the production sector of the economy with a cyclic profile that is delayed, level with, or ahead of the reference series, as yet, CEA determines these components basing on time series of qualitative survey indicators. Time series of quantitative statistical indicators were used in OECD and CEA joint project for development of a cyclic indicators system for Russia. However, with regard to the joint processing of the whole set of time series of quantitative and qualitative indicators obtained from 1992 it appears quite difficult to get a reliable quantitative statistics on the inflation-adjusted nominal value, which decreases precision and consistency of this information with regard to its timing.

At the first phase of the calculations, time series of qualitative indicators are processed to exclude seasonal fluctuations and abnormal survey data and to identify periods of decline, upsurge and peak in the cyclic component of the time series. The seasonal adjustment is necessary because seasonal fluctuations are inherent to many business tendency indicators. The respondents are asked to avoid the impact of seasonal changes whenever possible, however, the seasonal component still can appear in the time series. Today, CEA applies TRAMO/SEATS procedure to check for a possible impact of seasonal changes and to eliminate it. TRAMO/SEATS is a module of DEMETRA tool for statistical processing of time series, Version 2.0. This procedure is considered more appropriate for decomposition of short time series. In particular, the calculations based on industrial business tendency survey show that the seasonal component usually has a strong impact on such indicators as prices (actual and forecast tendency); forecast economic situation; product output (actual and forecast tendency); demand (actual tendency); and finished product stock (level and actual tendency).

Then, chronological turning points are determined for the seasonal-adjusted series of qualitative indicators and the long-term trend-adjusted reference quantitative indicator. Trend evaluation is applied (as a modification of USA National Bureau for Economic Research (NBER) Phase-Average-Trend method) in the growth cycle approach, using the OECD cyclic indicator system method.

Based on the identified turning points in the cyclic development of the reference quantitative indicator time series and the qualitative indicator time series, chronological peaks and troughs, phase and cycle duration are measured, by the number of months between two neighboring peaks (or troughs). Table 1 shows these parameters for the industrial production index, for which a cyclic correspondence has been established with selected time series of business environment in the industry over the maximum period from January 1993 to August 2003.

Table 1

Characteristics of growth cycles of reference series

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	8/1996	11/1997		15		6.4
Contraction		11/1997	9/1998	10		-15.8
Cycle No 1	8/1996		9/1998		25	
Expansion	9/1998	10/2000		25		15.7
Contraction		10/2000	1/2003	27		-5.6
Cycle No 2	9/1998		1/2003		52	
Average:						
Expansion				20.0		11.1
Contraction				18.5		-10.7
Cycle					19.3	

Potential indicators whose cyclic development is ahead of, level with, or in delay, compared to the reference series were selected using the criteria suggested by OECD, in particular, graphical comparison of peaks and troughs and determination of some statistical characteristics. Table 2 shows the statistical characteristics that have been used for the monthly industrial survey indicators with the greatest correlation coefficient and significant lead.

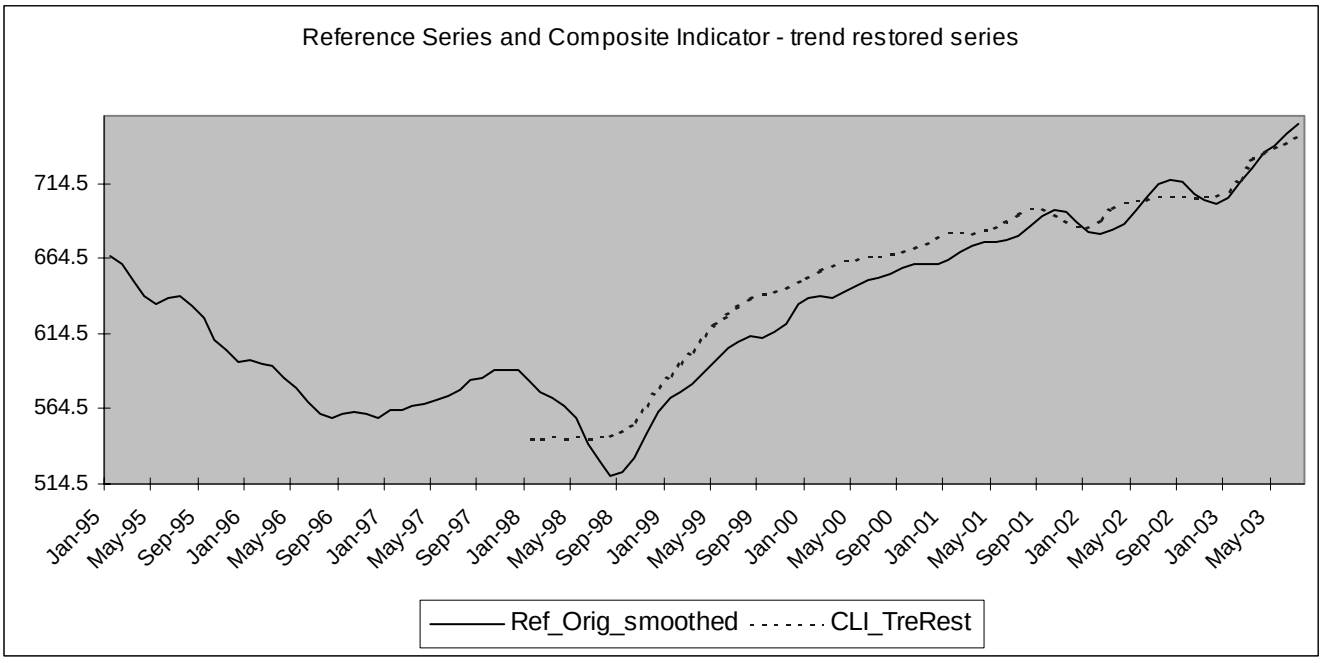
Table 2

	MCD / QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation	
		Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Demand,tendency	3	26	4	11	26	4	8	13.3	5	0.868
Number of employed,tendency	3	8	-1	2	8	-1	0	4.9	1	0.874
Prices,tendency	2	22	7	12	22	7	11	10.0	9	0.710
Production,tendency	3	8	0	4	8	0	2	6.2	4	0.716
Level of economic situation	2	4	-1	1	4	-1	0	2.8	3	0.788

The purpose of the next stage was to select a linear combination of indicators of business environment in the industrial sector that would prove the best in forecasting the industrial production index tendencies.

For today, a composite indicator that includes demand (actual tendency); employment (actual tendency); output (actual tendency) and evaluation of the economic situation has shown a high correlation dependency with the reference statistical series over 1.5 year period.

Graph 1



In the context of further expansion of survey sectors, methodology recommendations are being developed to establish a harmonized business tendency survey system for the sectors where the ongoing processes require a speedy update of the information base.

The CEA's methodology was employed in the pilot surveys (performed jointly with the RF Committee for Statistics, GKS) in transport sector, hotel business, leasing services, IT services and

public catering sector. The good news is that it has been decided to introduce these surveys as part of the state statistics procedures starting from 2004.

An important aspect of CEA survey activities is to study a correspondence between our statistical indicators and those of other countries and information from international agencies. To this end, it is suggested to follow standards and requirements recommended by international agencies at every stage related to quantitative and qualitative statistical information.

In this context, the introduction of Russian Classificatory of Economic Activities, which has been developed on NACE basis, becomes highly important. The new procedure, which envisages preparation of statistical data accordingly to the identified types of economic activities, will mean restructuring of the whole business tendency survey system. In particular, the sample sets of survey units, questionnaires and procedures of data collection and aggregation will need to be restructured by each specific type of activity and by the sectors of economy on the whole.

Also, there is an issue of consistency of the business environment monitoring results in various sectors of economy (especially, the ones obtained within the framework of the National Classificatory of Industries, OKONKh) with the new business tendency surveys carried out in accordance with OKVED Classificatory. This will require additional work to develop a special iteration algorithm for reconciliation of business indicators time series.

Through this, we will be able to:

- Obtain business tendency survey data both for the sectors and individual types of economic activities at the federal and regional levels, in accordance with OKVED (NACE) requirements;
- Ensure that Russian short-term indicators of business environment are available in he European Statistical Committee, European Commission and OECD for analysis and publication in appropriate international statistical media; and
- Provide assistance to other CIS countries in developing standards for business tendency information to ensure its consistency across CIS countries.

Today, the opinions of business agents regarding the development of the “new economy” in Russia become and important issue, which should be studied within the framework of governmental activities. Such a study mean analysis of the economy’s scale, specific areas, factors that impede and foster economic development, economy’s competitiveness and development of traditional manufacturing industries. Today, many Russian companies are being restructured, and the post-crisis devaluation-based potential of many large and medium-size companies has been exhausted. This has triggered a great demand for consulting services as a powerful instrument for restructuring of business that enhances its manageability and competitiveness. In this context, CEA considers it feasible to expand its spectrum of statistical monitoring of business environment by developing a short-term indicator system and performing business tendency surveys for the fast-growing consulting services sector. This will cover strategic planning and managerial development, development and updating of information technologies, IT-strategies, implementation various management information systems and evaluation of business and HR management.

In conclusion we would like to emphasize that CEA’s top priority is to ensure that the results of monitoring in various sectors of Russian economy are consistent with those in other countries and comply with the recommendations of the UN Commission for Statistics, European Commission, OECD. To achieve this, we will need to evaluate business activities by types in accordance with the European Classificatory System (NACE) and harmonize both the survey indicator system and the methodology used for processing and analysis.