

# The Past, Present, and Future of Business Statistics: The Use of Data

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The history of independent Hungarian Statistics (including Economic/Business Statistics) dates back to 1867. Among the first tasks of the Hungarian Statistics, we needed to highlight the importance of surveying and analysing the state of the Hungarian economy. While the statistics of economic branches (sectors) were established in the last decades of the 19th century, the analysis of economy at national level appeared in the first half of the 20th century. Over the decades, with the development of technology and sciences, the changing economic processes have been shaped the system of economic/business statistics. In the past few decades, the changes have been accelerating; the digital world, information boom, and globalization represent nevertheless a much greater challenge for statisticians and users than those of the previous decades. It is getting more and more challenging to use the ocean of information and data. In statistical knowledge, the role of statisticians has gained importance, because in order to produce, publish reliable data, and make proper decisions, we need to know all about the statistical data (meaning of data) and statisticians need to enhance statistical knowledge and statistical culture.

*Keywords:* statistics, economic statistics, roots of statistics, globalization, concept enterprise, diversity, errors

## Introduction

The term of statistics is linked to the name of Gottfried Achenwall (1719-1772), German philosopher, historian, economist, jurist, and statistician. He used the word of statistics for the analysis of the data and information related to state activities (Hungarian Statistical Association [HAS], 2016). The investigations of the past years have nevertheless revealed that the birth of the term of statistics was due to Achenwall's teacher, Martin Schmeizel of Hungarian origin (1679-1747) (Attila, 2015). The concept had been created by Martin Schmeitzel; Gottfried Achenwall was the first who used the word of statistics in his publications.

The Hungarian statistical predecessors worked intensively in the past centuries/decades in order that Hungarian statistics could follow the European trends. The first Hungarian surveys, censuses (micro statistics) but also macro statistics (systems of balances and accounts), were introduced during the decades when similar initiatives took place in the majority of European countries.

## Hungarian Economic Statistics—Questions and Answers

### From the Beginning Till EU Accession

The independent Hungarian statistical service (including Hungarian economic/business statistics as well)

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was born in 1867, at the time of the Austro-Hungarian Compromise. The statistical measurement and analysis of the Hungarian economy had an outstanding role among the first tasks of the Hungarian Statistical Office created in 1871 under the leadership of Károly Keleti.

Similarly to other national statistics, we can distinguish three well-delimited periods in the history of Hungarian statistics. The first period corresponds to the creation of branch statistics—this was the period marked by the name of Károly Keleti in the second half of the 19th century. The Statistical Office carried out in this period of time the first censuses and numerous surveys in economic statistics.

In the second period of the history of Hungarian business, economic statistics (in the first part of the 20th century) were formed the systems of balances. Among them, the system of national accounts already raised the need of coordination and harmonisation between the different branch statistics. At that time, the integration of branch statistics, system thinking, and the integration of different statistics were not on the agenda either. Due to these facts, developments had the negative consequence that balances, the systems of accounts and branch statistics showed different results for the same issue. This is how in relation to industrial production, industrial (branch) statistics, and the system of national accounts revealed different results.

The demand to integrate micro and macro systems emerged seriously in the third period of business statistics (the second half of the 20th century). Statisticians recognized that it was inevitable to create consistency between the systems of national accounts and branch statistics. Although in the 60s and in the 70s, it was already a burning problem, the solution was still way off, and finally, international developments helped to solve the issue.

Except for the French attempts in the 18th century, the development at international level of macro statistics (systems of balances and national accounts) took greater impetus in the first half of the 20th century, to which the economic crisis and the development of economics contributed considerably. It was thanks to the statistical activity of the United Nations established meanwhile that the manual of the first System of National Accounts (SNA) was published in 1953 (KSH, 1993). The fact that the manual had to be updated already in 1968 is a good illustration of our continuously changing world. Hungarian statisticians took also part in the international development actions, which explained that since 1968, the Hungarian Statistical Office (KSH) has been working with two accounting systems of national economy functioning in parallel; the SNA elaborated by the United Nations and the compulsory balance sheets of national economy is based on Marxist political economy—Material Product System (MPS).

Satellite accounts (System of Agricultural Accounts, Tourism Satellite Account, Environmental Accounts, etc.) appeared after the turn of the millennium as a result of the development activity of the European Statistical System. Due to the different objectives, concepts, definitions, methodology of the system of national accounts, and satellite accounts (satellite accounts mainly focusing on sectoral characteristics), it was necessary to elaborate the “bridges” presenting the differences.

#### **From EU Accession to Nowadays**

After 1989, Hungarian statistics faced significant challenges, as the preparation for the accession to the European Union began already in the 90s. The extent to which the Hungarian statistical practice was conform to the statistical requirements, regulations of the European Union was closely monitored. Depending on the statistical fields, the screening generated varied tasks and challenges for Hungarian statisticians. As a result of the preparation, Hungarian statistics joined the European Statistical System (ESS) in 2004.

The statistical work and the series of changes did not end with the accession to the European Union, on the contrary, the issue of renewing the whole ESS emerged quickly. The author would like to highlight, without being exhaustive, only some reasons for it: the explosive development of technology and information technology, information boom, and the effects of globalisation and of course of the economic crisis.

In these circumstances, the Statistical Office of the European Union (Eurostat) launched in 2012 a new project aimed at elaborating a framework regulation of business statistics (Framework Regulation on Integration of Business Statistics [FRIBS]). FRIBS was aimed at integrating, simplifying, and making flexible the functioning of the system of business, economic statistics of the European Union, decreasing respondent burden and improving the consistency of the statistical data and data quality.

FRIBS Eurostat intended to review the content and legal background of the whole system of business, and economic statistics. According to the opinion of users, the legal background of business statistics was also an obstacle to the methodological harmonisation of economic statistics. The system of business statistics was not able to adapt flexibly to the changing conditions; it also could not satisfy the changing needs of users and secure data consistency. It must be stated that, at international level, there had previously been attempts to renew some fields of economic statistics (and certain partial problems had been solved), but the “isolated” developments resulted only in temporary or partial solutions.

According to the roadmap of FRIBS elaborated in 2012, in 2016, statistics should have already been compiled on the basis of the new (FRIBS) concept. The experts working on the project had considerably underestimated the complexity of implementing FRIBS. On the basis of the experiences of the Hungarian EU Presidency, long years of hard work can still be expected from statisticians and users.

The first draft of the regulation proposes to modify and/or repeal 10 legal acts in business statistics<sup>1</sup>. The draft concentrated mainly on statistics being the most important sources and pillars of GDP. However, in the long term, the revision of other statistics will also be inevitable. The draft regulation aims at solving substantial tasks like:

- suppression of parallel data collections;
- exchange of micro data between the areas of the systems of business statistics, and between member states;
- strengthening the role of the business register;
- elaboration of a harmonised statistical data protection system;
- but, the draft must also conform with the “European statistical law” and the principles of the European Statistics Code of Practice.

At the beginning, the definition of the statistical unit (enterprise) was also part of the draft regulation. Luckily, member states achieved to withdraw the definition of the statistical unit from the framework draft (avoiding its perpetuation). The wording of the definition of the “common” statistical unit generated intensive discussions, because to find a “common” definition corresponding to the need of all micro (sectoral) and macro statistical areas is an extremely difficult task, not exempt from many risks.

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<sup>1</sup> Council of the European Union, 10 March 2017, Proposal for a Regulation of the European Parliament and of the Council on European business statistics amending Regulation (EC) No. 184/2005 and repealing 10 legal acts in the field of business statistics ([www.ec.europa.eu/eurostat](http://www.ec.europa.eu/eurostat)).

### **The Concept Enterprise**

With the economic and technical development, globalisation has fundamentally changed the functioning of economic actors; increasingly complex cooperation and economic formations have emerged. In order to produce comparable data at national and international level, it was necessary to define the forms and types of enterprises. Council regulation (EEC) No. 696/93 served this purpose already in 1993. According to the regulation, the member states of the European Union should have provided business statistics data based on this regulation since 1 January 1994.

The Council regulation defined the following categories:

- the enterprise;
- the institutional unit;
- the enterprise group;
- the kind-of-activity unit (KAU);
- the unit of homogeneous production (UHP);
- the local unit;
- the local kin-of-activity unit (local KAU);
- the local unit of homogeneous production (local UHP).

According to the regulation, the units of production must be classified in the above mentioned categories according to accounting, geographical, and activity criteria. In the statistical units listed, the criteria were known to statisticians already previously and they even used the majority of the categories. The concern was the introduction and use of the concept enterprise.

The introduction of the enterprise concept in the 90s was still a long way off. The warning signals appeared after the turn of the millennium, when globalisation had an increasing effect on national and international economic processes. Researchers and analysts of the “old member states” of the European Union realised that it was becoming increasingly difficult to compare the data and detected consistency problems, especially in the case of micro and macro data. By way of excuse for the (new) member states from the East-Central Europe, at that time, they were only slightly affected by globalisation.

The commission and some great member states, recognising the problem, organised consultations, fora for the introduction of the “enterprise” concept. This subject was also the theme of an international conference organised in Budapest in 2003 by the French government and the French Statistical Office. The presentations were made by the experts of Eurostat, the French, German, and Italian statistical offices, who had already experience in the subject. But there were a lot of open questions concerning the issue, even for them. The reason was maybe that the methodology applied did not cause consistency problems in the GDP data at national level, inconsistency appeared rather as a distortion in the structure of GDP. As the effect of globalisation became stronger, the necessity to accelerate the work emerged. But what can be the solution?

### **Introduction of the Enterprise Concept, Creation of the Necessary Conditions**

In order to be able to introduce the enterprise concept, it is necessary to examine the available databases on enterprises and enterprise groups, and map the cooperation and relations between the enterprises.

A method of analysis, examining the legal and operational accounting structure of enterprises and enterprise groups at national and international level, is to be developed. It is necessary to detect inside the groups the relations between the enterprises (legal units), including the practice of implementing statistical data

collections, and the possible ways of doing it. All the enterprises, elements, and activities of the enterprise groups should be assessed; luckily, the necessary information is available in the Euro-Groups Register (EGR). British statisticians have elaborated several procedures for these examinations (analyses), depending on the complexity of the enterprise group structure and the cooperation between the enterprises.

In Hungary, 90-95% of the enterprises are composed of one legal unit and the proportion of enterprises composed of several legal units is only to 5-10 percent. Despite their proportion, the weight in national economy of the enterprises composed of several legal units is considerably higher than 5-10 percent. Consequently, Hungarian statisticians have the task to investigate in detail, map the operation and organisational structure of these enterprises, and elaborate a realistic statistical solution.

It is not by chance that the first investigations related to the mapping, functioning of the enterprises were conducted by French statisticians. It was due to the fact that the headquarters of many multinational enterprises are located in France, and it was there that the traditional processing of the data on the enterprises caused the greatest consistency problems in the structure of the French GDP.

There is no universal statistical solution that could be used in the case of all the member states. Different procedures must be elaborated for the member states where the headquarters of the multinational enterprises are located and for the member states hosting mainly the affiliated companies. While in the first case, it is the so-called “top-down” approach; in the second case, it is the “bottom-up” solution that could lead to good results. The “top-down” solution means that for the processing of the data, the process should start at the headquarters of the multinational enterprise and go in the direction of the affiliates. In the case of the “bottom-up” approach, data processing begins at the level of the affiliates.

The implementation of the task is to a great extent hampered by the (micro) data exchange between member states, which though decreases burden and improves consistency, but raises data protection problems as well. The execution of the task is considerably influenced by the specificities of the statistical systems of member states as well.

Another important question is what kind of data collection system can or should be used in order to reach the goals set. During data collection, we should ask all the legal units of the enterprises and enterprise groups to fill in the questionnaire (bottom-up approach), or we should compile one complex questionnaire and ask the headquarters of the multinational enterprise to fill in the questionnaires concerning all the legal units (affiliates) of the enterprise.

Knowing the Hungarian statistical practice, the author guesses that the “bottom-up” procedure starting at the level of the affiliates could lead to better results, but the questionnaires should also be filled in for each legal unit (affiliate). This entails in return that the legal units belonging to the enterprise and all the elements of the cooperation between affiliates should be mapped, and the information obtained should be included in the national registers. This solution and approach require in turn a paradigm shift in the development, functioning of the registers (Laczka, 2015).

### **The Big Data Phenomenon**

The use and usability of Big Data is one of the most popular topics nowadays. By Big Data, we mean the huge volume of datasets produced daily by intelligent networks, economic actors, private sector, and individual users. Nowadays, new information and data can originate from the use of mobile Internet and communication between computers and the use of different sensors.

According to estimations we face daily new information equalling to two books, but there are other estimations foreseeing that in the following four years, more new information will emerge than the information accumulated during world history. This explains why the use of Big Data is becoming more and more popular among statisticians. The author puts into brackets that the demand for the use of new data sources did not emerge in the last years. There was a similar attempt already around the turn of the millennium, but at that time, it was mentioned as “data mining”. There are also examples of old and well-proven Hungarian practices, too. Hungarian statistics has been using for already 20 years—the databases of aerial photography in the case of the early estimations of the production of the most important crops.

The great advantage of the immense quantity of new information and databases rapidly emerging is that compared to statistical data collections, they are more quickly available and more timely than statistics. Their disadvantage is that the databases are mostly unstructured, it is difficult to access their metadata (if available), data processing, and the knowledge of the methodologies used is difficult tasks, not speaking about other data protection and legal issues.

The use of Big Data is despite the risks a great opportunity for statisticians, but at the same time, a great responsibility as well. Thorough methodological investigations are needed in order to provide correct information and data on the basis of Big Data. The author agrees with the statisticians who are of the opinion that at the current level of knowledge and development the use of Big Data for statistical purposes is rather suitable to complement statistics. Their use requires systematic methodological analyses, more consistency checks than previously (HAS, 2016). The use of Big Data for statistical purposes was also one of the most popular topics during the 61st World Statistics Congress of the ISI (Marrakesh, 16-21 July, 2017). One of the speakers analysed which problems statisticians have succeeded to solve until now for the use of the Big Data databases. The results recommend caution, statisticians should refrain from excessive optimism, hurry, but there are still a lot of open questions.

### **Diversity or Error**

While in the previous parts of the paper, the author called the attention to the challenges, advantages, and risks in statistics deriving from the changing environment, in the present chapter, the author would like to present some examples when the “diversity” of statistics can cause (and frequently causes) problems to the users. There are phenomena that processes for which we have several statistical data at our disposal and statistics result in differing data. In many cases, the different data are not errors/mistakes; they are due to conceptual and methodological differences, or different approaches. If the user and decision-maker are not aware of the differences of the content of the data (metadata), their causes, the objectives, definitions of data collections, they may commit serious errors. From among the examples, the author has chosen two examples in agricultural statistics that are due to the specificities of the agricultural sector. One example concerns the measurement of agricultural labour input (we have three different indicators at our disposal), the other is the accounting of the performance of agriculture in the GDP and satellite accounts.

#### **Three Approaches for the Calculation of Agricultural Labour Input**

Concerning agricultural labour input, the member states of the European Union publish the results of three statistical data collections produced by the European Statistical System on the basis of international standards (EU and ILO). The purpose, and consequently, the concept, definitions, and “coverage” of the three surveys are quite different (see Table 1).

The annual work unit (AWU) is the most comprehensive indicator of labour survey used in agriculture. AWU transforms even some hours of work into full-time work (1,800 annual working hours), and accounts also the work performed as complementary activity. This allows the comparability of agricultural work performed in agricultural holdings and private farms. AWU differentiates between paid and not paid labour input (in the households and private farms). AWU is useful for the analysis of the structure of agricultural work, but is not suitable for the comparison with other sectors of the economy.

The labour force survey is a representative survey to measure employment and unemployment. In the survey, the number of employed persons that covers paid agricultural work and unpaid work (performed in households and private farms) is not taken into consideration. It is a quarterly sample survey (in this case sampling error is possible).

Institutional labour statistics cover enterprises, budgetary institutions employing at least five people, and survey persons employed in enterprises classified in the branches agriculture, hunting, forestry, and fishing. According to the definition of the survey, the work of the persons employed less than 60 hours in a given month is not observed.

Table 1

*Coverage of Labor Input in Agriculture*

Sectors	Labor force survey	Institutional labor force survey	Annual work unit (AWU)
A-B Agriculture, forestry, hunting, fishing			
C-F Industry			
G-I Trade, accommodation, catering, transport			
K Real assets activities			
L Public administration, defence			
M Education			
N Healthcare, social services			
O Other community, personal services			
Households (private holdings)			

Source: Own compilation.

If the user is not aware of the differences between the three indicators, the analysis does not lead to an acceptable result.

**Accounting of Agricultural Output in National Accounts and Satellite Account**

Table 2 presents the indicators and coverage of agricultural output according to national accounts and the economic accounts for agriculture (satellite account) methodology. While the system of national accounts takes into consideration the results of the holdings classified—according to their principal activity—into the branches agriculture, hunting, forestry, and fishing (including the auxiliary activities of the holdings), economic accounts for agriculture cover all (principal and auxiliary activities) in agriculture independently of their branch classification.

If the users are not aware of the accounting methodology of national accounts and satellite account and the differences in “coverage”, the analysis does not lead to acceptable results.

Table 2

*Coverage of Agriculture in the SNA and in the EAA*

Sectors	System of National Accounts (SNA)	Economic Accounts for Agriculture (EAA)
A-B Agriculture, forestry, hunting, fishing		
C-F Industry		
G-I Trade, accommodation, catering, transport		
K Real assets activities		
L Public administration, defence		
M Education		
N Healthcare, social services		
O Other community, personal services		
Households (private holdings)		

Source: Own compilation.

### Conclusions and Proposals

The history of economic statistics, similarly to the history of statistics is the history of changes. During the years and decades, statistics inevitably follows the changes of the phenomena, economic and social processes, and the changes occurring in their environment. At the same time, we cannot neglect technological, IT development either, or the development of sciences and statistics.

It is the responsibility of the statistician to follow and enforce “substantial” changes in all phases of the statistical process (data collection, processing, methodology used, and publication), to elaborate and use the best solutions and practices for their measurement. Without the substantial and methodological follow-up of changes, data cannot give a credible picture on the phenomena, and processes of the economy and society; results may lead to erroneous conclusions or decisions.

The responsibility of the user is also great, as users must be aware of the exact content of the data, the methodologies applied, and the metadata of the data used, but they must also be fully conscious of the eventual statistical errors.

We (statisticians) must not forget either that economic statistics from the integrated system of micro or macro statistics. Nowadays, at the age of information explosion, when we meet a “wealth” of information and data, it is also a difficult task to understand and know the content of the databases—also because of their abundance. Statistical knowledge, statistical culture, and the role of statisticians gain also importance. This means that statisticians should help more than previously users to get acquainted with the data and the possibilities of their use.

Finally, it is worth mentioning the importance and role of statistical education as well. A successful teaching requires up-to-date and good handbooks/manuals to better adapt to the requirements of the epoch. In Hungary, the handbooks and manuals of economic statistics used were published in the middle of the 2000s, and despite their merits, they became obsolete a long time ago. A new and modern manual of economic statistics based more on the results of technological development and following better the changes becoming more frequent would be welcome.

Nowadays, a paradigm shift is needed in theoretical and practical statistics, the use of statistical data, the enhancement of statistical culture, but also in statistical education.

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