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**THE APPLICATION OF THE MS EXCEL PROGRAM AND  
THE COMPUTERIZED BUSINESS INTELLIGENCE ANALYTICS  
PLATFORMS IN THE MANAGEMENT OF ENTERPRISES**

**ZASTOSOWANIE PROGRAMU MS EXCEL ORAZ  
ZINFORMATYZOWANYCH PLATFORM ANALITYCZNYCH BUSINESS  
INTELLIGENCE W PROCESIE ZARZĄDZANIA PRZEDSIĘBIORSTWEM**

**MS EXCEL ПРИКЛАДНАЯ ПРОГРАММА И АНАЛИТИЧЕСКАЯ  
КОМПЬЮТЕРИЗИРОВАННАЯ ПЛАТФОРМА БИЗНЕС-АНАЛИТИКИ В  
ПРОЦЕССЕ УПРАВЛЕНИЯ ПРЕДПРИЯТИЯМИ**

**Abstract**

*Rapid progress is being made in the field of IT applications in the analysis of the economic and financial situation of enterprises and in the processes supporting management of organizations. In terms of the fastest growing areas of information and communication technology which are the prerequisites for the progress of online electronic banking, it is necessary to disseminate the standards of financial operations have been carried out. The cloud as well as the use of large data sets in the so-called. Big Data platforms. The current Big Data technology solutions are not just large databases, data warehouses allow for multifaceted analysis of huge volumes of quantitative data for periodic managerial reporting. Business decision-making processes should be based on the analysis of reliable and up-to-date market and business data. The information necessary for the decision-making processes has been collected, stored, ordered and pre-summed up in the form of Business Intelligence analytics reports in corporations. Business Intelligence analyzes give managers the ability to analyze the large data sets in real time, which significantly contributes to improving business management efficiency. At present, business analytics uses either the advanced analytical formulas of Ms Excel or computerized platforms that include ready-made Business Intelligence reporting formulas.*

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**Keywords:** *electronic banking, internet banking, data transfer security, banking services security, Big Data, Business Intelligence, Internet, Poland.*

### **Streszczenie**

*Obecnie dokonuje się szybki postęp w zakresie zastosowań informatyki w analizach sytuacji ekonomiczno-finansowej przedsiębiorstw oraz w procesach wspomagania zarządzania organizacjami. W zakresie najszybciej rozwijających się dziedzin technologii teleinformatycznej, które warunkują kolejne etapy postępu w zakresie internetowej bankowości elektronicznej, należy upowszechnianie standardów przeprowadzania operacji finansowych realizowanych w tzw. chmurze jak również z zastosowaniem korzystania z dużych zbiorów danych ulokowanych w tzw. platformach Big Data. Obecne rozwiązania technologiczne Big Data to już nie tylko duże bazy danych, hurtownie danych pozwalające na wieloaspektowe analizy ogromnych zbiorów danych ilościowych dokonywanych na potrzeby raportów składanych okresowo kadrze menedżerskiej. Prowadzone w podmiotach gospodarczych procesy decyzyjne powinny być oparte na analizie wiarygodnych i aktualnych danych rynkowych i dotyczących prowadzonej działalności. Informacje niezbędne dla procesów podejmowania decyzji menedżerskich są w korporacjach na bieżąco pozyskiwane, gromadzone, porządkowane i przedstawiane w formie raportów analitycznych Business Intelligence. Analizy przeprowadzane w formule Business Intelligence dają kadrze zarządzającej nowe możliwości analizy dużych zbiorów danych w czasie rzeczywistym, co znacząco przyczynia się do podnoszenia efektywności zarządzania przedsiębiorstwem. Obecnie w analityce biznesowej wykorzystywane są zaawansowane formuły analityczne programu Ms Excel lub z informatyzowane platformy zawierające gotowe formuły raportowania w zakresie Business Intelligence.*

**Słowa kluczowe:** *bankowość elektroniczna, bankowość internetowa, bezpieczeństwo transferu danych, bezpieczeństwo usług bankowych, Big Data, Business Intelligence, Internet, Polska.*

### **Аннотация**

*В настоящее время он добился значительного прогресса в области применения информационных технологий в анализе экономических и финансовых процессов компаний и поддержки управления организациями. С точки зрения наиболее быстро растущих областей ИТ-технологии, которые определяют этапы прогресса в области электронного банковского сайта, является распространение стандартов для финансирования операций в так называемых. облако, а также с использованием больших массивов данных, расположенных в так называемом. Большие платформы данных. Современные технологические решения больших данных не только большие базы данных, хранилища данных, что позволяет для многогранного анализа массивных наборов данных, выполненных с целью количественных докладов, представленных периодически управленческих кадров. Проводимые в хозяйствующих субъектов процессов принятия решений должны основываться на достоверной и своевременной анализа рыночных данных,*

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*касающихся их деятельности. Информация, необходимая для управленческих процессов принятия решений в корпорации получает на сегодняшний день собрана, организована и представлена в виде аналитических отчетов Business Intelligence. Анализ, выполненный в формуле Business Intelligence дает руководителям возможность нового анализа больших массивов данных в реальном масштабе времени, что в значительной мере способствует повышению эффективности управления бизнесом. В настоящее время бизнес-аналитика использует передовые аналитические формулы MS Excel или компьютеризированную платформу, содержащие готовую формулу для отчетности в области Business Intelligence.*

**Ключевые слова:** банковское дело, интернет-банкинг, безопасность, передача данных, безопасность, банковские услуги, Big Data, Business Intelligence, Интернет, Польша.

## **Introduction**

At present, the dominant view is that in all areas of effective functioning and management of business entities, it is essential to acquire, process, collect, archive and make available to other entities various types of information, including open, classified information and personal data of citizens. The key issue in this exchange and provision of information is the security of data archiving and transferring in computerised systems of enterprises, financial sector institutions, the public sector and on the Internet. [M. Hill ed., 2014, p. 48].

In the area of systems supporting the process of enterprise management, the key issue is effectiveness, efficiency of the used solutions, including funding and time spent on analytical processes. Due to this, the key problem emerging in situations of conducted business analyses is their time-consuming nature. Gathering the necessary information concerning different areas of the company, putting the data into the IT system, arranging and classifying according to defined criteria, and carrying out specific analyses on the basis of them requires a great deal of time spent by analysts and managers.

In the context of streamlining enterprise management, the key issue in the processing of collected market data and business data is to generate analytical reports

that include, for example, tables and graphs made in Ms Excel with substantive information on the applications and suggestions from conducted business analyses for the managers. In the situation when the management of the company needs cyclical analyses, the current verification of their results with the changing economic environment and market conditions, corrections for previously generated reports and operational plans, all these processes require many manhours of analytical departments and managers. However, IT technology helps to reduce the costs of these analytical processes and it is its new application, i.e. it may be used for the needs of analytical and decision-making processes in companies. For several years, the analytical techniques of conducting business analyses according to the Business Intelligence formula have been intensively increasing, significantly increasing the efficiency and reducing the amount of manpower devoted to analytical processes [M. S. Gendron, 2014, p. 93].

Creating and developing a competitive advantage requires effective knowledge management and effective decision-making. Business decision-making processes should be based on an analysis of reliable, up-to-date market data and on ongoing business data. Information necessary for the management decision-making processes is

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collected, stored, ordered and presented in the form of analytical reports of Business Intelligence. Business Intelligence is typically defined as a business analytics process that transforms multicriteria into the knowledge necessary for effective and efficient business management. Analytical Business Intelligence is a process of ordering and processing data stored in a company's IT system and presenting processed information in the form of enhanced portals that enable real-time multicriteria analysis of the enterprise situation. [P. Radziszewski 2016, p. 115].

Business Intelligence Analytical Processing gives managers the opportunity to analyze large data sets in real time and therefore, the use of IT technology for analytical and decision-making is becoming more and more useful to the entrepreneur.

IT companies providing specialized business software that has been used in analytical and decision-making processes for several years also offer programs for Business Intelligence in the SME sector, enabling them to generate Business Intelligence reports. In recent years, concepts have been developed for the expansion of information technology platforms, where Business Intelligence analytics reports are combined with cloud computing and based on huge data sets stored in Big Data databases [ M. Olszak, 2014, p. 67].

Currently, Business Intelligence Platforms that are offered are built on a variety of software platforms. More commonly used solutions in this area which do not require specialized software, is the construction of Business Intelligence analytical platforms based on advanced features and formulas of Microsoft Excel.

## **1. Big Data platform as a tool for performing multicriteria analyses of large data sets**

The high degree of dynamics of the development of Internet banking is determined mainly by the above-mentioned positive aspects of conducting financial transactions carried out electronically, including transactions via the Internet. In recent years, we have seen in Poland the process of developing Internet banking and the growing interest of bank customers in the use of this form of settlement and payments [D. Prokopowicz, A. Dmowski, J. Sarnowski, 2008, p. 174]. In this regard, Internet banking is a particularly important determinant of the ongoing implementation of new IT solutions in banking systems and thus the evolution of transaction platforms for financial operations. The most dynamically developing fields of information and communication technology- which condition the next stages of progress in the field

of Internet banking- are the dissemination of standards for conducting financial operations carried out in the so-called "cloud" as well as the use of large data sets located in the so-called Big Data platforms [G. Szpor, ed., 2013, p. 83].

According to Dariusz Wojtas, Project Manager dealing with applications offered by IMPAQ Sp. z o.o. for commercial banks, the development of Big Data technology is determined by the process of monitoring on-line financial transactions and collecting large sets of information related to customers and products. The main determinant of Big Data's development is not just the accumulation of terabytes of data from the Internet and customers that are provided with specific financial products, information, advisory, communication and other services,

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such as those included in the social networking offerings. [J. Grzegorek, A. P. Wierzbicki, 2011, p. 37]. The effective use of Big Data technology is the question of the quality of isolation from informational data bases the information that is necessary and appropriately processed. According to this concept, Big Data is emerging from data warehouses which have been developed since the 1990s and in which current data collection and analyses have been started on the basis of multi-criteria questions. [J. Warren, N. Marz, 2016, p. 53].

In recent years, corporations and financial institutions have combined these technological solutions with remote access via the Internet and verified the market data

contained in the global network resources. At present, entities based on creating a portfolio of products or services provided to a large number of customers are interested in the use of Big Data in identifying, characterizing and analyzing customer profiles [K. J. Mórąwski, 2015, p. 51]. Accurately defining the range of customer profiles and their ongoing update on the basis of ongoing market analyses and available Internet resources will increasingly determine the company market success and become one of the competitive drivers. Financial institutions belong to those entities that have already realized the great marketing potential and strategic technology of Big Data.

## **2. Internet electronic banking as a determinant of the development of business analytics on computerized Business Intelligence platforms**

The progressive increase in the computerisation of economic entities' activities allows for a significant increase in the efficiency of the implemented production, business and technological processes but also in the area of management and reporting which is particularly important for decision-making. Synergy of these evolutionary processes has led to the development of new business IT applications. At the end of the last century, the IT medium sets a new direction for the processes of acquiring, processing, transmitting and gathering information essential for the efficient functioning of business entities. This new medium of information technology that has changed the business models of many companies has turned out to be the Internet.

On the platform of this global medium there appeared cloud computing, the collection of data sets in the Big Data bases [H. Lee, I. Sohn, 2016, p. 127] and the integration of business processes of geographically separated entities which are integrated with Internet information systems and electronic banking. The importance of direct remote contact of product suppliers

with consumers and the exchange of information between prospective customers, i.e. the data collected on the social networks by the suppliers of products and services, is growing.

In recent years, another important factor has been the development of the analytical and economic decision-making processes of economic operators which make the use of the above mentioned factors more complete and more integrated. Another important factor that can potentially significantly increase the efficiency of business operations is the computerized business intelligence platforms for performing analyses in Business Intelligence. However, before the emergence of Business Intelligence platforms, other determinants of global network development shaped the development of business applications and the use of information and communication capabilities that are provided by the Internet to business entities [C. M. Olszak, E. Ziemba, eds., 2012, p. 62].

At present, the dominant opinion is that the main determinants of business use of information and communication resources of the global network in enterprises and public

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institutions were the development of internet marketing techniques, electronic banking and the related security issues of electronic data transfer. The development of e-banking has determined the need for continuous improvement of information and communication technology and the regulation of the security of electronic data transfer and the protection of non-public data [S. Gwoździewicz, 2014, p. 75]. The introduction of modern IT solutions to the entities of the financial system in Poland was also marked by the entry of Poland into the market structures of the European Union in the early 1990s, and the consequent requirement to carry out processes of adaptation and unification of teleinformatic technologies and technical standards of systems in the financial institutions operating in the financial sector. These processes were also important determinants of the globalization of the financial system operating in Poland at that time [S. Gwoździewicz, D. Prokopowicz, *Globalization ...*, 2016, p. 68].

In the context of the discussed issue, the impact of the development of electronic settlements and the security of transfer data on the Internet is also important. In financial institutions cooperating with enterprises, a new field of data security management and Internet-based financial transactions are being developed, i.e. IT security

### **3. Enhanced Ms Excel analytical formulas or Business Intelligence software for business analytics**

The analysis of software used in institutions and companies shows that Excel is used in a variety of applications but most users work on this application, assuming that it is just a simple spreadsheet, i.e. without using its advanced features and formulas. In addition, only a relatively small proportion of users of this program knows that the range of advanced features of Ms Excel is constantly expanding in its new versions. Also, due to the successful expansion of Ms Excel, this application has now gained

management. In the situation of a rapidly growing number of banking users of electronic banking systems, the importance of improving the functioning of IT systems in terms of transaction security, risk analysis and the cost of creating systemic solutions to maintain high security levels and protection of classified data is still growing. The issue of improving system security solutions is particularly relevant in the context of the constant emergence of hacker attacks on online banking systems [D. Prokopowicz, S. Gwoździewicz, *The right to protection ...*, 2016, p. 397.].

However, in recent years, not only the development of electronic banking has marked the direction of business applications of information resources and communication capabilities of the Internet. Particularly important factor determining the current processes of implementation of new IT solutions to banking systems [D. Prokopowicz, A. Dmowski, 2010, p. 337] is the development of IT technology in the so-called cloud computing, including the storage of large data sets in the so-called Big Data platforms and the development of business intelligence techniques in Business Intelligence.

enough functionality in the context of business analytics applications to become part of the Microsoft software package called Microsoft Business Intelligence. The attribute of the software that consists of compatible segments, i.e. programs for specific functionality, is the ability to export data between individual components of the package. Similarly, in the field of the compatibility of the programs that are included in the Microsoft Business Intelligence package. Due to the ability to integrate, concentrate and process data from multiple

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sources, Excel is used as a tool for creating interactive management dashboards [B. Wehbe, J. Decker, M. Alexander, 2015, p. 142.]. In this application, i.e. the personalized management dashboards, Ms Excel can be useful for people in leadership positions in different departments of enterprises becoming a kind of managerial computerized "command center" for a given organizational unit.

The remarkable advantage of Ms Excel over other spreadsheets is that it is determined by its high level of built-in advanced features and formulas. Excel Formulas and Functions are used for generating reports, complex calculators, complex models, and advanced statistical analyzes. As a result, it is possible to perform a full statistical analysis of the previously conducted studies on specific areas of economic activity or market environment in the MS Excel program. Excel's formulas and functions are used by professionals in the field of data analysis in various fields of finance, banking and capital markets. Regardless of whether the data analysis, which is a segment of a broader business analysis, concerns exchange quotations, scientific studies or advanced statistical analyzes, Ms Excel can be helpful in this area of research. On the other hand, for a data analyst to be an Excel expert in its full range of analytical capabilities, it takes a great deal of time to get to know all the formulas and practical applications of this program, since the latest versions of this application have several hundred different functions and formulas [M. Alexander, R. Kusleik, 2016, p. 73.].

The professional use of Ms Excel in business analytics, such as creation of Business Intelligence, requires knowledge of tools such as generating pivot tables and applications: Power Pivot, Power View and Power Map. Another feature of Ms Excel is the ability to retrieve data from various databases, such as SQL databases. Data processing capabilities in the Ms Excel pro-

gram can be expanded by adding an additional Data Mining application. The results of the analysis can be published on the web using the Share-Point extension.

Specific additional modules and extensions are added to Ms Excel for the following features:

- a) generating advanced reporting mechanisms in the PowerPivot program,
- b) automation of data integration in the Power Query application,
- c) creating reports presenting geospatial information using the Power Map module,
- d) design and construction of executive management dashboards using Power View,
- e) adding a relational database module, e.g. using SQL Server® and multi-dimensional analytical processing,
- f) adding other MS Excel compatible modules that allow data processing to meet other needs to take a deeper look at data and move analyzes to a higher level using data mining tools.

Extended Ms Excel allows you to build a professional analytical management dashboard. An important limitation in the use of Ms Excel is the product policy of the manufacturer, i.e. Microsoft, which aims at refining the compatibility issues of individual applications so that it is impossible to extend Ms Excel by applications produced by other manufacturers.

Analysis of the functionality of software used in companies shows that the Ms Excel spreadsheet, even if it is expanded with additional modules and thus adapted to the business intelligence platform, is not the only Business Intelligence dedicated software. Some companies, corporations, capital groups, or medium-sized businesses that carry out differentiated business operations are looking for advanced Business Intelligence solutions, so the analytical capabilities of Ms Excel may not be sufficient. In addition, even if the calculation capabilities are supplemented by additional statistical analysis formulas, the lack of compatibility

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with other applications provided by competing IT companies may prove to be a significant limitation on the functionality of an individualized Business Intelligence platform.

One of the areas of business activity that Business Intelligence uses is the sale of the offered products or services. Companies can produce large collections of data describing the sale. When the assortment is diversified, targeting heterogeneous distribution channels and geographically differentiated targeted audiences, using sales networks increasingly supported by the Internet, then the pressure to carry out thorough, multicriterial studies of on-the-spot sales with the concept of business analytics becomes more and more necessary in the context of efficient company management. In such situations, conducting sales analyzes without applying Business Intelligence may prove to be complex and troublesome in the context of efficient business management [M. S. Gendron, 2014, p. 93].

The application of the Business Intelligence software will then be of great help in carrying out a multidisciplinary analysis of large data sets describing the sale. During this type of analysis, managers send specific, preconfigured inquiries, and during an analytical process conducted in accordance with the Business Intelligence message they receive responses to previously asked questions. These inquiries may concern not only the whole of the entity concerned, as they may also relate to a separate business or a particular department in the company, division, group company or other organizational unit [J. Jurek, 2016, p. 85]. Business Intelligence applications typically

facilitate the analysis of large data sets and, in the context of sales research, should help identify sales determinants, their relationships and volatility over time, and geographically, and take into account other factors that differentiate the markets and target segments of consumers buying the offered product or service range of the manufacturer or supplier.

If the use of the Ms Excel software would be insufficient in the context of conducting complex Business Intelligence analyzes, then alternatives may be those offered by national IT companies. [C. M. Olszak, 2014, p. 73]. Of course, it cannot be ruled out that foreign IT companies also offer high-quality business intelligence platforms that can be an alternative to Microsoft's products. However, in every country, the business sector may be characterized by a specific nature of the production, organizational, capital, technology, structure, etc., so it cannot be ruled out that the Business Intelligence analytical modules are more fully aligned with the specifics of the national business and sector companies. An example of such a domestic provider of Business Intelligence software in Poland is the Comarch IT company. The company now offers software called Comarch ERP Optima Business Intelligence [*Analyses concerning Business Intelligence Analysis* ..., 2017].

#### **4. Comarch ERP Optima Business Intelligence Analysis as an example of a computerized business analytics platform**

According to the information provided

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by the manufacturer of this software dedicated to various companies, also from the MSP sector, Comarch ERP Optima Business Intelligence Analysis examines the user's intuitive tool which does not require expert knowledge on computer science.

According to the manufacturer's specifications Comarch ERP Software Optima Business Intelligence has also other features typical for applications that build Business Intelligence analytical platforms, including [D. Power, 2013, p. 91]:

- a) modularity of component applications, from which a business analytics platform can be customized for a particular company,
- b) the division of key software functionalities into separate but fully compatible applications - modules, including analytical data collection studies, download modules, classification and archiving of collected information and modules creating reports.

Besides, the platform of business analytics-Comarch Business Optics Business Intelligence has a reporting module and a Comarch ERP Optima module for archiving of data necessary for the analysis of information. Apart from that, one of the most important modules of the software package dedicated to business intelligence analysis is the statistical analysis module. The above-mentioned business analytics platform offered by Comarch has its own module of statistical analysis.

According to the manufacturer's claims, Comarch ERP Optima Business Intelligence is currently a comprehensive business analytics solution on the domestic market of analytical applications that responds to business expectations in terms of

gaining fast access to essential, aggregated, and multi-criterion-processed information. Comarch ERP Optima BI software allows business and corporate managers as well as SMEs to use built-in reporting and analysis patterns and, on the other, to develop and configure customized analyzes that are tailored to the specific needs of a particular company. [BI analyses, 2017].

The important point is that the Comarch ERP Optima Business Intelligence Analysis software has 147 ready-to-use types of classified reports by category such as Sales, Purchasing, Payments, Accounting, VAT registers, Fixed assets, Payroll, Warehouse, Service, CRM. It is also important for the user that the software allows you to manually modify the available report templates, such as monthly sales, quarterly reports, etc. [Reporting and Analysis, 2017].

The reports from the conducted research business analyzes are distinguished primarily by their graphic character of the presentation of the analysis results. The graphical nature is that the reports act as multimedia presentations in which the individual aspects of the results of the analysis of the company's economic and financial situation are presented in the form of tables and graphs. The best types of charts used in the Comarch ERP Optima software presentation module are Business Intelligence Analyzes are graphs: bar, linear, circular and conical graphs.

In view of the above, the generated portals and analyzes can be configured and customized according to different criteria to meet the current business analytical needs of the entity.

## **5. New trends in the development of Business Intelligence platforms**

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Business entities in Poland, including the commercial sector as well as the public sector institutions, need to be able to adapt to the changing reality of the socio-economic environment and technological progress in the field of modern security solutions in archiving, processing and sharing of information [M. Muchacki, 2014, p. 75]. Archiving and processing of unnecessary information about specific business areas and conducting business analyzes for reporting purposes requires the large man-hours of analysts and managers employed in a given organization. Generated reports presenting the economic and financial situation of the company include, for example, tables and graphs in the MS Excel program with substantive information confirming the results of multicriterially conducted analyzes, conclusions and suggestions of recommended actions for implementation in the enterprise. In view of the above, the reduction of operating costs of these analytical processes is accompanied by the use of IT technology in its new applications, i.e. carrying out business analyzes according to the Business Intelligence formula [M. S. Gendron, 2014, p. 83].

In recent years, corporate executives have recognized the positive aspects of using business analytics solutions based on Business Intelligence in combination with the capabilities of Big Data technology and data processing in cloud computing. At the beginning of this century, the development of analytical methods operating on cloud computing platforms, Big Data bases and aggregated and multi-criterion real-time large data sets started [V. Mayer-Schonberger, 2015, p. 92]. Data analysis in cloud computing enables real-time remote access to real-time business information, processing and reporting of virtually any storage space through mobile devices or smartphones. On a large scale, the big collections of market information and activities of an organization that are continuously

extended enable analysis to be carried out, taking into account the multidimensional processing of information updated on a regular basis [L. Libuda, 2016, p. 52]. On the other hand, continuously improved solutions of Business Intelligence analytical techniques significantly increase the efficiency of business analytical processes and reduce the number of manhours devoted to the development of management reports.

Permanently emerging new computer technology solutions support the organization's management process. Business Intelligence is an example of how new IT applications can be used to manage an enterprise. Taking into account the historical development of BI, some researchers of this problem point to some of the unsatisfactory expectations that have been made for compiling computer programs containing BI analytical platforms. The key determinant of these unfulfilled expectations associated with BI is not information technology, only a man, i.e. usually a manager or business analyst.

Business Intelligence Platforms have not yet embraced the artificial intelligence system, so no computer will replace a manager or business analyst in business process design and performance reporting systems [P. Radziszewski, 2016, p. 79]. The progress in information technology and the Internet in business analytics processes have led to new directions for integration with the development of database platforms and the processing of large data sets in the cloud computing with remote access capabilities through developing mobile technical solutions, tablets or smartphones. In recent years, the concept of building information platforms has been advanced, in which the generation of business intelligence analytics is combined with cloud computing, computerized risk management platforms, and based on huge collections of data gathered in Big Data databases [C. M. Olszak, 2014, p. 57].

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## **Conclusions**

The company's effective development is determined by making good decisions in the management process. The successful growth of computerization of business activities allows for significant improvement of the efficiency of implemented production, business and technology processes, but also in the field of management and reporting which is particularly important for decision-making. Nowadays, it is assumed that, by making full use of the Internet information capabilities of business entities, cloud data processing techniques are being developed, data collection in the Big Data baa and increasing synergies between the various determinants of online enterprises on the global network [S . Antkiewicz, 2008, p. 47]. In addition, the integration of business processes geographically remote but integrated with online IT systems and electronic banking is growing. In recent years, another important factor has been developing support for analytical and decision-making processes of business entities, ie computerized platforms for conducting business analyzes in the form of Business Intelligence [J. Surma, 2016, p. 59].

The analyzes show that analytical and decision-making processes in business entities should be based on ongoing analysis of market, micro- and macroeconomic data, including those related to the organization's activities. The effectiveness of these analytical and decision processes is brought about by the application of Business Intelligence. The information needed to manage the organization is increasingly being acquired, collected, classified and presented in the form of analytical reports developed on the basis of Business Intelligence. One of the key determinants of Business Intelligence development was the reduction of operational costs of the carried out analyzes. The main drawback of the conducted

analytical processes in enterprises is their time-consuming. In addition, the scope of this time-consuming, for example, the amount of manhours of work for analysts and managers, can be further increased with the growing amount of information collected on the Internet. Experts on the global network estimate that twice as many Internet resources are doubling every two years. On the other hand, global non-operating Internet companies such as Google and Facebook in their Big Data databases collect data on Internet users so widely that they are not able to accurately predict what the information will be used in 5 years. The Internet is not a static medium with its dynamically changing and incrementally increasing online libraries and other knowledge bases.

Among the experts in the formalization of business analytics is the idea that business actors who actively use the Internet in their business opportunities should use the information resources of the global network efficiently, taking into account the dynamics of data volatility in Internet. The scope of this process, i.e. the use of information and technological capabilities of the Internet by economic entities, is constantly growing and it is impossible to determine the limits of this development. More and more businesses, financial and public institutions define the Internet, in the context of business, as a medium that cannot be ignored. More and more companies are recognizing the need to update and process information on the Internet online and to use the opportunities and improve online marketing techniques. More and more organizations use the information and technology capabilities of the global network in the scope of analytical processes implemented in the Busi-

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ness Intelligence formula, and the managers take decisions on them in management processes [P. Radziszewski, 2016, p. 68].

In conclusion, the ongoing digitization of companies, offices and financial institutions is currently taking place in line with the needs of Internet users and the increasing use of the global information network resources by companies and institutions. It is now widely held that the protection of classified data is the field of human life which should be ensured by the companies active on the Internet. According to the provisions of the Constitution, the protection

of the transfer of classified data is one of the fundamental rights of every citizen, economic entity and public institution. Continuous technological progress, constantly changing technical parameters of electronic banking information systems, the development of Big Data technology, the analytical methodology based on the Business Intelligence formula, and the changing offerings of Internet service providers may cause non-compliance of the standards with the fast-changing realities of the digital era [Gałach, Jędruszczak, Nowakowski, 2013].

### **Bibliography:**

1. M. Alexander, R. Kusleika, *Excel 2016 PL Formulas*, Helion, Warsaw 2016.
2. *Analyzes vs. Business Intelligence Analyses - which module will be better for my business?* (in:) "ALPOL company blog on IT solutions", Website "Blog.alpol.net.pl", March 2017, (<http://blog.alpol.net.pl/2012/06/analizy-vs-analizy-business-intelligence-%E2%80%93-ktory-modul-bedzie-lepszy-dla-mojej-firmy>).
3. *BI analyzes* (in:) Website: "cdnpartner.pl", March 2017, (<https://cdnpartner.pl/oferta/rozwiązania-comarch/comarch-erp-optima/analizy-bi>).
4. S. Antkiewicz, *Financial innovations*, CeDeWu, Warsaw 2008.
5. A. Gałach, A. Jędruszczak, B. Nowakowski, *Protection of personal data, classified information and telecommunication systems in the public sector*, C.H. Beck, Warsaw 2013.
6. M. S. Gendron, *Business Intelligence and the Cloud. Strategic Implementation Guide*, John Wiley & Sons Inc, 2014.
7. M.Hill, ed., *Cyber security as the basis of a secure state and society in the 21st century*, Difin, Warsaw 2014.
8. J. Grzegorek, A. P. Wierzbicki, *Multiple Criteria Evaluation and Ranking of Social Penetration of Information Society Technologies*, The paper presented at the Conference: 9th International Conference on Decision Support for Telecommunications and Information Society, Warsaw, October 2011.
9. S. Gwoździewicz, *The European Union Towards the Threats in Cyberspace* [in] International Scientific Journal "Verejna Sprava a Spolocnost", 15 yearbook, Koszyce, Slovakia, No 2/2014: 70-79.
10. S. Gwoździewicz, D. Prokopowicz, *Globalization and the process of the system and normative adaptation of the financial system in Poland to the European Union standards(w:) Globalization, the State and the Individual*, "International Scientific Journal", Free University of Varna "Chernorizets Hrabar", Chayka, Varna, Bułgaria 9007, Varna 2016, nr 1(9) 2016: 63-75.
11. J.Jurek, *Implementation of IT management systems*, PWN, Warsaw 2016.
12. H.Lee, I.Sohn, *Big Data in the industry. How to use data analyses for cost optimization of the processes?*, PWN, Warsaw 2016.
13. Ł.Libuda, *Era Big Data – smart risk management* (in:) "Bank. Miesięcznik Finansowy", no. 6 (278), June 2016.
14. V.Mayer-Schonberger, *Big Data. Revolution changing our thinking, work and life*, MT Biznes, Warsaw 2015.

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15. K. J. Móravski, *Information management as an effective way for frauds* (in:) "BANK. Miesięcznik Finansowy", Topic of the number: Bank safety, April 2015, no. 4 (265).
16. M.Muchacki, *IT and Internet. Contexts of contemporary TI consumer*, Impuls, Warsaw 2014.
17. C. M. Olszak, *Business Intelligence in cloud*, (w:) "Polish Journal of Management Studies", (10) 2014.
18. C. M.Olszak, E.Ziomba, red., *Business intelligence systems as the subject of economic research* (in:) „Zeszyty Naukowe Wydziałowe Uniwersytetu Ekonomicznego w Katowicach”, Studia Ekonomiczne, no. 113, University of Economics in Katowice, Katowice 2012.
19. D. Power, *Decision Support, Analytics, and Business Intelligence*, Wydawnictwo Business Expert Press 2013.
20. D.Prokopowicz, A.Dmowski, J.Sarnowski, *Finance and banking. Theory and practice*, Wydawnictwo Centrum Doradztwa i Informacji Difin sp. z o.o., Warsaw 2008.
21. D.Prokopowicz, A.Dmowski, *Financial markets*, Wydawnictwo Centrum Doradztwa i Informacji Difin sp. z o.o., Warsaw 2010.
22. D.Prokopowicz, S. Gwoździewicz, "The Right to Protection of Information and Personal Data in the Cyberspace in the Age of the Internet Banking Development (in:) D. Gałuszka, G. Ptaszek, D. Żuchowska-Skiba (ed.), "Technological and social aspects of the 21st century ", LIBRON Filip Lohner,ISBN 978-83-65705-09-9, Cracow 2016.
23. P. Radziszewski, *Business Intelligence. Trends, deliverance or problem for companies?*, Biblioteka Nowoczesnego Menedżera, Wydawnictwo Poltext, Warszawa2016.
24. *Reporting and analyzes* (in:) Comarch website, March 2017, (<http://www.comarch.pl/erp/comarch-optima/raportowanie-i-analzy>).
25. J. Surma, *Business Intelligence.Systems supporting business decisions*, PWN, Warsaw 2016.
26. G.Szpor, red., *Internet Cloud computing*, C.H. Beck, Warsaw 2013.
27. J.Warren, N.Marz, *Big Data. Good practices in building scalable systems for real-time data processing*, Helion, Warsaw 2016.
28. B.Weihbe, J.Decker, M.Alexander, *Business Intelligence Analyses. Advanced Excel*, Helion, Warsaw 2015.

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