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BUSINESS ANALYTICS OF ENTERPRISES IN TERMS OF STRATEGY

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Abstract: The paper is devoted to the problem of strategic business analytics. The aim of the study is to show business analytics supporting the construction and development of the company development strategy. In order to achieve the assumed goal there has been applied the method of critical analysis of the domestic and foreign literature in the field of business analytics of enterprises domestically and worldwide. In the paper, there have been identified the factors for the use of business analytics. Three priority factors which are the arguments for the application of business analytics in management processes and enterprise development strategies are: speed/ease of deployment (68% of indications), ease of use for business users (65% of indications) and self-service and data discovery tools (61% of indications). Moreover, managers of enterprises with the best economic and financial results, achieving return on assets (ROA) of more than 10%, almost agreeably (90% of indications) claim that analytical tools are necessary for the proper implementation of the strategy and the achievement of increasingly higher economic and financial results. The value of the paper consists in showing a new trend in the development of business analytics, which is to support the process of strategic management and analytical competition.

Key words: business analytics, business intelligence, strategic management, decision support, analytical competition

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Introduction

In identifying the sources of effectiveness of strategic management, great importance is attributed to the information concerning both the functioning of the enterprise and the environment. Relevant information, being collected, transformed and analyzed is the basis for defining or verifying the vision of development and mission of the enterprise, formulating different strategic options concerning the opportunities for their implementation; it is the basis for selecting the overall strategy of the company, strategies for strategic entities and functional strategies (Stabryła, 2007). Moreover, it is the basis for continuous and complex monitoring of the environment and the inside of the company in order to capture changes and

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assess them in terms of the actions taken by the enterprise. In contemporary conditions of the operation of enterprises, optimism of management staff should be firmly rooted in economic realities, and the decisions taken must be supported by robust analysis and simulations of different scenarios of development (Kohavi et al., 2002; Malara, 2007). The architecture of the strategy management, which consists of the processes such as: translating the strategy, management of strategic initiatives, adjusting organizational units to the strategy, informing on the strategy, reviewing the strategy as well as updating the strategy, requires an efficient and flexible apparatus of business analysis (Kaplan and Norton, 2010) as well as (Borowiecki and Romanowska, 2001).

The main objective of the paper is to identify, assess and systemize the factors determining the application of business analytics in strategic management of enterprises. The main objective required the achievement of the following specific objectives: to systematize business analytics in decision support processes, to systematize the concept of business intelligence and analytics, to determine the factors for the use of business analytics, to specify the relations between economic and financial results of enterprises and the significance of business analytics in development strategies of enterprises as well as to identify the range of the use of business analytics by managers of enterprises operating in the area of the Silesian Voivodeship. While making an attempt to achieve the main objective and specific objectives there have been formulated the following research hypotheses: business analytics is a determinant for building an effective development strategy of the company, identification of the key factors of the implementation of business analytics is a tool of improvement in creating an effective development strategy; the implementation and improvement in business analytics determines the competitive advantage of the enterprise. The quantitative studies have been presented on the basis of the opinions of managers of foreign companies (the results by Salesforce) as well as the enterprises operating in the area of the Silesian Voivodeship (own research).

Around Business Analytics in Decision Support Processes

Analytics means a broad use of data, statistical and quantitative analysis, explanatory and predictive models and management based on facts when taking decisions and actions. Widespread computerization of business processes and mass digitization of everyday life result in massive growth in the volume of data, so called big data (Nowicki and Jelonek, 2014). The rapid increase in computational capacity of processors and plummeting costs of data storage have brought about that more and more companies reach for these data and attempt to use them to build competitive advantage. Analytics provides an opportunity for separating important facts from information noise and creating a new quality of products and solutions based on big data (Jelonek and Turek, 2015). As T.H. Davenport and J.G. Hariss underline, human and organizational aspects of analytical competition give real power to distinguish oneself (Davenport, 2007; Emblemsvag, 2005).

Furthermore, at the time when enterprises operating in many different industries offer similar products and use a similar technology, separate business processes are one of the last remaining points of differentiation of their activities. It should be pinpointed that many of the previous principles of competition, such as geographical advantage or protective provisions, have been undermined by globalization. In the complex reality of the global economy, there remain three fundamentals of competition: effective and efficient implementation, wise decision-making and the ability to 'squeeze' the maximum value from business processes; all of this can be achieved by the proper use of analytics (Davenport and Harris, 2007) and (Kozielski, 2013; Trkman et al., 2010). Analytics is one of the elements of business intelligence, i.e. a set of technologies and processes which use the data to understand and analyze business results (AL-Shubiri, 2012), (Mansar and Reijers, 2007). Business intelligence includes both accesses to data and reporting as well as analytics (Ranjan, 2008). Analytics consists of (in the following order): statistical analysis, forecasting, predictive models and optimization. The listed aspects of analytics correspond with the following questions (in the following order): why is this happening? what will happen if this trends are continued?, what will happen next? what best can happen (Table 1)?

Table 1. Business intelligence and analytics *(Davenport and Harris, 2010)*

Optimization	What best can happen?	Analytics
Predictive models	What will happen next?	
Forecasts/extrapolation	What will happen if these trends are continued?	
Statistical analysis	Why is this happening?	
Alert	What actions are necessary?	Access to information and reporting
Questions/investigation	What exactly does the problem consist of?	
Ad hoc reports	How much/many, how often, where?	
Standard reports	What has happened?	

Nowadays, in analytical works, there is used a range of analytical software along with complex business intelligence packages (SAS, Cognos, BusinessObjects), applications for industry forecasts (Fair Isaac) and reporting and analytical modules of large systems of enterprises (SAP and Oracle). It should be underlined that good analytical competences require good skills of information management in order to integrate, extract, transform and have access to data from business operations. Analytics is not equivalent to analytical IT; human and organizational aspects of analytical competition are the basis for distinction of analytics in relation to analytical IT.

Business Analytics in Development Strategies of Enterprises (Selected Results of the Empirical Research)

Salesforce conducted the research among 2000 leading companies from eight countries: the United States of America, Canada, Brazil, France, Germany, Great

Britain, Australia and Japan. The aim of the research was to show entrepreneurs the patterns and inspirations to achieve success; to show how information can support decision-making processes. Particular attention was paid to the research in the field of the role and function of analytics in business development strategies. The conducted research indicates that business analytics is absolutely essential to implement the strategy properly and achieve better and better results (Table 2).

Table 2. Decision factors for choosing analytics tools
(compiled by the author on the basis of Columbus, 2015)

	Specification of factors	% of indications
1	Speed/ease of deployment	68
2	Ease of use for business users	65
3	Self-service and data discovery tools	61
4	Mobile capabilities to explore and share data	56
5	Cloud deployment	54

The introduction of business analytics is supported by the factors such as: speed/ease of deployment (68%), ease of use for business users (65%) and self-service and data discovery tools; these are three priority factors. The fourth and fifth position is respectively taken by: mobile capabilities to explore and share data (56%) and cloud deployment (54%) (Olszak, 2014).
Managers' opinions on the use of analytics in the decision-making processes shall be differentiated depending on the achieved economic and financial results. Hence, the surveyed companies have been arranged into three groups:
- the ones with the highest economic and financial results in their industry (high-performers),
- the ones with moderate economic and financial results (moderate performers) and
- the ones achieving economic and financial results below the average in the industry (underperformers).

The results of the empirical research for this period are illustrated in Figure 1, 2 and 3.
The presented empirical research indicates that 90% of managers from the group of enterprises with the best economic and financial results claim that analytical tools are absolutely necessary for the proper implementation of the strategy and the achievement of better and better results. In the group of enterprises with average results, 76% of managers claim that analytics is crucial and very important for the implementation of business strategy. The lowest (about 42%) interest in analytics is shown by enterprises with the results below the average.

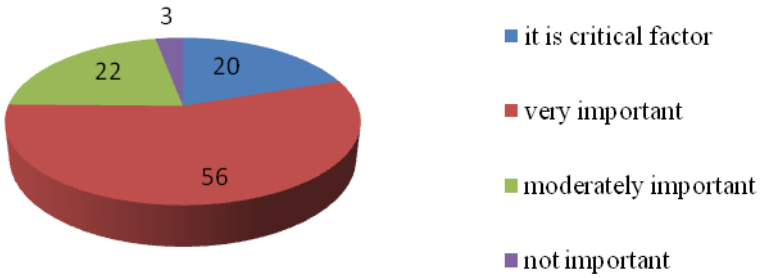

Figure 1. The significance of business analytics for the implementation of business development strategy in the opinion of managers (the results of empirical research): a) opinions of managers with the highest economic and financial results in their industry (high-performers) *(own study based on Columbus, 2015)*

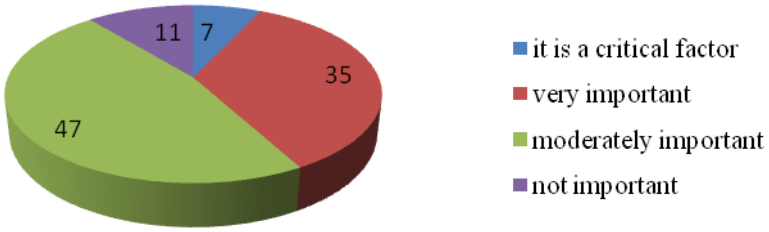

Figure 2. The significance of business analytics for the implementation of business development strategy in the opinion of managers (the results of empirical research): opinions of managers with moderate economic and financial results in their industry (moderate performers) *(own study based on Columbus, 2015)*

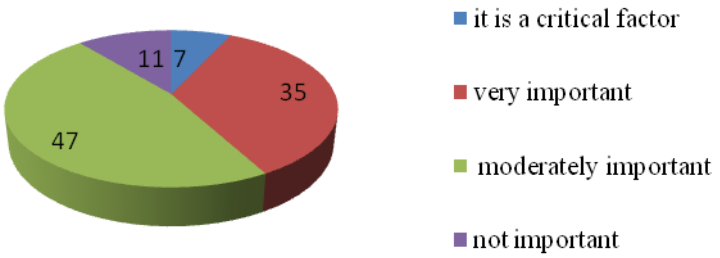

Figure 3. The significance of business analytics for the implementation of business development strategy in the opinion of managers (the results of empirical research): opinions of managers achieving economic and financial results below the average in the industry (underperformers) *(own study based on Columbus, 2015)*

It should be pinpointed that enterprises with the best results far more often and wider make use of the solutions of business intelligence. The enterprises from the

group rely on 10 or more fields of data, i.e. three times more than the others, and on as many as 17 types of data; this is almost twice more than the other enterprises. Moreover, managers in the companies achieving the best results five times more often admit that they obtain information essential for timely decision-making; the same group of managers uses the tools reporting via mobile device 3.5 times more often. The use of business analytics also influences the organizational culture of enterprises. The most effective managers support the adaptation of business intelligence tools in the enterprises from the group of high-performers in 41%, moderate performers – in 26% and, underperformers - only in 21% (Table 3).

Table 3. The range of the use of business intelligence tools and analytics by employees
(compiled by the author on the basis of Columbus, 2015)

	Specification	% of indications
1	Getting all the necessary data into one view is manual	53
2	Too much data is left unanalyzed	53
3	Spend too much time updating spreadsheets	52
4	Analysis is performed by business analysts not end users	50
5	Turnaround time to get answers is too long	49
6	Data customized to the end user	48
7	No on-demand/mobile interface to access insights	47
8	Business users struggle with trusting data outcomes	47
9	No self-service interface to easily build reports	47
10	Critical business questions go unanswered	47

An important aspect of managers' actions in this field is also building cooperation around analytics; in the enterprises from the group of high-performers, managers 15.5 times more often than the ones from the group of underperformers admit that they cooperate with their colleagues on the basis of the information obtained from analytical tools. In the decision-making processes, there is used a large number of data sources. While referring to the opinions of managers surveyed by Salesforce, it should be stated that there will be the boom for managers and within the nearest 5 years the number of data sources which the companies will wish to analyze will increase by more than 80%. This situation necessitates automation in analytics. Managers emphasize that the lack of automation leads to problems and challenges (Table 4).

The consequence of the lack of automation in analytics, among others, is: manual collection of data, omission of many data and too long waiting time for a response.

Among 70 enterprises of the Silesian Voivodeship, there was carried out the research among managers referring to the use of business analytics. The research period included three years, i.e. 2014-2016. The level of ROA for the surveyed companies was calculated as the average of three years listed above respectively for each group of the surveyed entities; the questionnaire with managers was carried out in 2016.

Table 4. Factors for the improvement of business analytics
(compiled by the author on the basis of Columbus, 2015)

Group of enterprises	The use of business intelligence tools by employees	The use of analytical tools by employees
	% of indications	
high-performers	41	64
moderate performers	26	12
underperformers	21	4

The companies were divided into three groups: the first one – the enterprises with return on assets (ROA) amounting to more than 10% in years 2014-2016; the second one – the companies with ROA ranging 5 to 9%, and the third one – the enterprises with ROA of less than 4%. The conducted research indicates that the essence of business analytics in the strategy implementation is perceived only by the enterprises from the first group. 61% of those questioned indicates the key role of analytics in management of their activity (Figure 4).

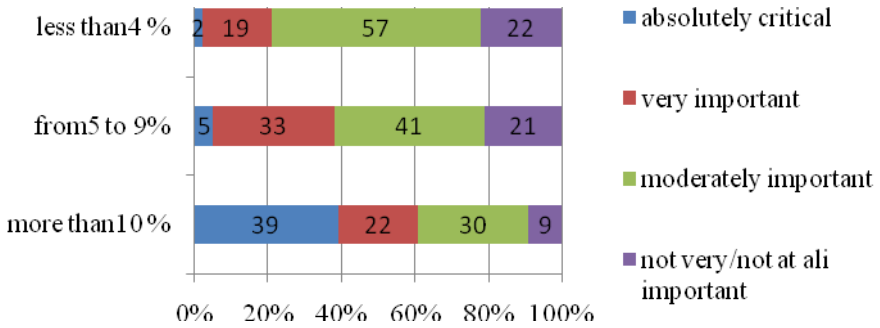

Figure 4. The significance of business analytics among managers of enterprises of the Silesian Voivodship

In the group of enterprises with the level of ROA ranging from 5 to 9%, the assessment of the significance of business analytics in development strategies is significantly lower; its critical and very high importance is indicated by the total of 38% of the respondents. The enterprises with the level of ROA of less than 4% only in 21% perceive the significance of business analytics; the majority indicates its moderate or not considerable significance. When concluding this aspect of the research it should be stated that analytics is crucial for enterprises with ROA of more than 10%. In the context of low recognition of business analytics among the surveyed enterprises, there were formulated the questions concerning the barriers on its limited knowledge and use (Table 5).
The most frequently indicated reasons for a low level of business analytics in the company were: the lack of strategy for data analytics and low innovativeness of the top management of enterprises.

Table 5. Barriers to the effective use of business analytics in development strategies by managers of the surveyed voivodship (the research for June 2015)

No	Barriers	% of indications
1	No specialists	23
2	High costs	57
3	Low innovativeness of the top management	74
4	No strategy for data analytics	90

This fact is also underlined by B. Sojkin in his research who claims that management staff of enterprises shows the lack of ability to formulate and identify information needs as well as to determine the way of satisfying them. Moreover, the conviction about great significance of information in management, declared by managers, is not expressed in specific actions aimed at embracing external and internal conditions of the operation of enterprises by the information system (Sojkin, 2009; Bose, 2009).

The recognition of the perception of business analytics by managers along with the recognition of the barriers to its effective application in management and business activity strategies is the basis for the analysis of the present situation in this field and development of the procedure of improvements for enterprises. In addition, it may constitute the basis for building the distinctive competence of the company; this means that the enterprise treats this aspect of its activity as the one distinguishing it from competitors and determining its market success. In enterprises without such a strategic insight of the analyst it is only a tool applied when solving various business problems.

It should be pinpointed that the robust strategy for data analytics should be accompanied by the operationalization of the results of analytical processes, for example in the form of current modification of products along with the changing needs of users or patterns of use, or in the form of personalization of customer service on a large scale.

Conclusions

Business analytics, amounting to the technology of collection, analysis and processing of data, from a strategic tool, turned into a strategic weapon. The enterprises searching for breakthrough innovations usually focus their attention on one field, the one which promises the greatest competitive advantage. However, a new type of companies raises the stakes of the game. The organizations such as: Amazon, Harrah's, Capital One and Boston Red Sox, gained dominance in their fields due to the use of data analysis tools in many different business areas. At the time when companies from many sectors offer similar products and use comparable technologies, business processes are the last bastions of diversity. The companies that compete using analytical abilities make an attempt to 'squeeze' the maximum value of these processes. The employees that have been hired due to

their skills of data analysis or trained in order to be able to appreciate their significance, have been equipped with the best possible set of data and the best analytical tools. Consequently, they take optimal decisions the problem of business analytics in the processes supporting strategic management and analytical competition, presented in the paper, is only a part of extensive issues in this field. However, it explicitly highlights a unique instrument to support business processes. The course of action of analytical competitors is oriented to building the strategy and business competences, in a permanent link with the turbulent environment of enterprises in order to learn where they can achieve the advantage. It is expected that enterprises will still improve their analytical competences while concentrating both on human resources and technology; which sets forth further directions of research. By means of the business analytics of the company they recognize the most profitable customers, accelerate product innovations, optimize prices and supply chains and also use the factors actually affecting financial results (Shumeli, 2017). SAP, Salesforce.com and Tibco systems have implemented new analytical capabilities in their systems recently. IBM has spent $4 million on their technologies, among which there is analytics. Time will tell if this is just an interim trend or actually something that is changing the face of business, supporting decision-making processes and affecting the competitiveness of enterprises (www.decyzje-IT.pl).

References

AL-Shubiri F., 2012, *Measuring the Impact of Business Intelligence on performance: an empirical study*, "Polish Journal of Management Studies", 11(2).

Borowiecki R., Romanowska M., 2001, *System informacji strategicznej. Wywiad gospodarczy a konkurencyjność przedsiębiorstwa*, Warszawa: Difin.

Bose R., 2009, *Advanced analytics: opportunities and challengers*, "Industrial Management & Data Systems", 109(2).

Columbus L., 2015, *Salesforce Research Defines the 2015 State Of Analytics*, "Forbes", Nov.1, Available at: http://forbes https://www.forbes.com/sites/louiscolumbus/2015/11/01/salesforce-research-defines-the-2015-state-of-analytics/#1dbf004f7cfa.

Davenport T.H., Harris J.G., 2007, *Competing on Analytics*, Boston: Harvard Business School Press.

Davenport T.H., Harris J.G., 2010, *Inteligencja analityczna w biznesie: nowa nauka zwyciężania,* Warszawa: MT Biznes.

Emblemsvag J., 2005, *Business analytics: getting behind the numbers*, "International Journal of Productivity and Performance Management", 54(1).

Jelonek D., Turek T., 2015, *Technologie informacyjne w kreowaniu przedsiębiorczości*, Częstochowa: Sekcja Wydawnictw Wydziału Zarządzania Politechniki Częstochowskiej.

Kaplan R.S., Norton D.P., 2010, *Wdrażanie strategii dla osiągnięcia przewagi konkurencyjnej*, Warszawa: Wydawnictwo Profesjonalne PWN.

Kohavi R., Rothleder N., Simoudis E., 2002, *Emerging trends in business analytics*, "Communications of the ACM", 45(8).

Kozielski R., 2013, *Biznes nowych możliwości. Czterolistna koniczyna – nowy paradygmat biznesu*, Warszawa: Oficyna Wolters Kluwer Business.
Malara Z., 2007, *Przedsiębiorstwo w globalnej gospodarce. Wyzwania współczesności*, Warszawa: Wydawnictwo Naukowe PWN.
Mansar L., Reijers H.A., 2007, *Best practices in business process redesign: use and impact*, "Business Process Management Journal", 13(2).
Nowicki A., Jelonek D., 2013, *Technologie informacyjne w kreowaniu przedsiębiorczości*, Częstochowa: Sekcja Wydawnictw Wydziału Zarządzania Politechniki Częstochowskiej.
Olszak C.M., 2014, *Business Intelligence in Cloud*, "Polish Journal of Management Studies", 10(2).
Ranjan J., 2008, *Business justification with business intelligence*, "VINE: The Journal of Information and Knowledge Management Systems", 38(4).
Sojkin B., 2009, *Informacyjne podstawy decyzji marketingowych*, Warszawa: Polskie Wydawnictwo Ekonomiczne.
Shumeli G., Bruce P.C., Nitin I.Y., Patel R., Lichtendahl Jr.P.K., 2017, *Data Mining for Business Analytics: Concepts, Techniques, and Applications*, [In] R. Wiley.
Stabryła A., 2007, *Zarządzanie strategiczne w teorii i praktyce firmy*, Warszawa: Wydawnictwo Naukowe PWN.
Trkman P, McCormack, Valadares de Oliveira M.P, Ladeira M.B, 2010, *The impact of business analytics on supply chain performance*, "Decision Support Systems", 49(3).
www.decyzje-IT.pl, Access on: 21.12.2016.

STRATEGICZNIE O ANALITYCE BIZNESOWEJ PRZEDSIĘBIORSTW

Streszczenie: Artykuł poświęcono problematyce strategicznej analityce biznesowej. Celem opracowania jest ukazanie roli analityki biznesowej wspomagającej budowę i realizację strategii rozwoju przedsiębiorstwa. Aby osiągnąć założony cel zastosowano metodę krytycznej analizy literatury krajowej i zagranicznej z zakresu analityki biznesowej oraz przedstawiono badania empiryczne z zakresu stosowania analityki biznesowej przedsiębiorstw na świecie i w kraju. W artykule zidentyfikowano czynniki przemawiające za stosowaniem analityki biznesowej. Trzy priorytetowe czynniki, które przemawiają za stosowaniem analityki biznesowej w procesach zarządzania i strategiach rozwoju przedsiębiorstw to: szybkość i łatwość wdrożenia (68% wskazań), łatwość obsługi przez użytkowników biznesowych (65% wskazań), samoobsługa i wykrywanie danych (61% wskazań). Co więcej, menedżerowie przedsiębiorstw o najlepszych wynikach ekonomiczno-finansowych, osiągających stopę zwrotu kapitału całkowitego (ROA) wyższą niż 10%, prawie zgodnie (90% wskazań) twierdzą, że narzędzia analityczne są niezbędne do właściwej realizacji strategii i osiągania coraz wyższych wyników ekonomiczno-finansowych Wartość artykułu polega na ukazaniu nowej tendencji w rozwoju analityki biznesowej, jaką jest wspomaganie procesu zarządzania strategicznego i konkurencji analitycznej.
Słowa kluczowe: analityka biznesowa, business intelligence, zarządzanie strategiczne, wspomaganie decyzji, konkurencja analityczna

从战略角度看企业的业务分析

摘要:本文致力于战略业务分析的问题。这项研究的目的是显示业务分析支持公司发展战略的建设和发展。为了使假设目标实现已经应用于企业的业务分析国内和全球领域的国内外文献的批判性分析的方法。在本文中，已经确定了使用商业分析的因素。三个优先要素，这对管理流程和企业发展战略，业务分析应用程序的参数是:速度/易于部署(适应症的68%)，易用性为企业用户(适应症的65%)和自助服务和数据发现工具(占指标的61%)。此外，企业以最佳的经济效益和财务成果，实现对超过10%的资产收益率(ROA)的回报，几乎愉快(90%主治)的管理人员声称的分析工具是必要的策略和成就的正确实施较高的经济和财务业绩。本文的价值在于显示在业务分析的发展，这是它支持的战略管理和分析竞争的过程中的一个新趋势。

关键词:业务分析，商业智能，战略管理，决策支持，分析竞争