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IMPLEMENTATION OF IT SYSTEMS IN MANAGEMENT

Summary
The first part of this paper presents the definition, the essence and the characteristics of IT system. Computer features, which may include perfect IT system, have also been listed. The second part of this paper is devoted to IT systems which assist the management. Here the author mainly presents the aspects related to the reasons for which management IT systems are applied in the enterprises. Software architecture description which assists the management has also been introduced. The author presents functionality of the integrated management IT system and its characteristic features. The last part of this paper deals with the level of current use of information and communication technology in Polish enterprises.

Key words: *IT systems, functionality of management IT systems, integrated IT systems, software architecture, description assisting the management*

Introduction

Fast development of information and communication technologies is constantly affecting the enterprises' function. Today the use of IT systems in the enterprises is a must. Their appropriate implementation into business process allows to optimize many economic decisions taken by managers. Very often there is also a classic model of sharing software in business practice. It means that a computer program for the user is installed on the desktop or central company computer. However, more and more often so-called 'on demand software' is being used. These are ASP services connected with renting computer programs via the Internet. Software user is exempt from the license fee and only bear the costs associated with the software usufruct, in proportion to its use[1]. This is

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[1] Wikipedia, https://pl.wikipedia.org/wiki/Application_Service_Provider, [24.02.2016].

cost-effective and convenient method to implement innovative solutions in the process of enterprise management. According to many researchers, the development of ASP service has significantly affected the inception of SaaS (Software as a Service)[2], this service is also often defined as ' software as a service'. It is said to be newer, better and cheaper solution than ASP[3]. Innovative IT solutions, tailored to the business specificity, undoubtedly contribute to the increase level of quality management and affect its development in positive way. The aim of this paper is to draw attention to the increasing importance of IT systems in the enterprise management as well as their impact on the proper company development. For drawing the article up the analysis of the literature of the subject and chosen computer systems have been used.

1. The definition, the essence and the feature of IT system

The notion of information system' in Polish language has been used since the seventies of the 20th century[4]. This term is differently defined. One of the proposal is the definition, given by W. Domiński, he describes IT system as 'information one[5], where data processing is carried out by computer system'. As IT systems in management the author defines the systems 'which aims are to support the managing process and the economic management of the organizational units at different levels'[6]. In turn, J. Stanik and P. Kwiatkowski treat IT systems as information system within the framework of which the total or partial data processing

[2] J. Marshall, SaaS: *Taking the Worry Out of Service*, Financial Executive, September, no 9, p. 51.
[3]M. Małyszko, SaaS as the method of e-service Polish Agency For Enterprise Development, Warszawa 2008, p. 4.
[4]M. Kuraś, *Information systems vs IT systems – what, apart from the name, differs this two objects?*, Research Bulletin of Cracow University of Economics, no 770, Krakow 2009, p. 259.
[5]IT systems, according to the same author is temporarily and spatially extracted information processing system which is a collection of intentionally related elements such as: data sources, the methods of their collection and processing, information flow, material resources and people realizing this processing as well as destination of information.
[6] E. Niedzielska (ed.), *Introduction to IT*, State Economics Publishing, Warszawa 1993, p. 147.

is carried out with the use of computer techniques[7]. According to T. Wierzbicki the essence of the IT system is type of computers' application in information processes - with such a selection of the devices and software having regard the requirements of the surrounding and possibilities of human teams with specific inputs, using the methods (technology) to obtain the outputs realizing the aim of information process'[8].

The ideal IT system possibly includes the following information functions[9]:

- data interpretation,
- modeling processes,
- indicate the possibility of action,
- suggest variant selection, decision,
- assessment and selection of the best solution.

The above functions should be tailored to the specific needs in the enterprise. Table 1 shows the characteristics of IT system.

Table 10. Characteristics of IT system

Feature	Information system
Domain	data recorded, transmitted, stored, searched, processed,…, provided to customers
Aim of action, created outputs	structures of ultimate data, adapted report
System category	artificial system (artifact)
Components	Artificial system (artifacts), abstract data, methods and systems
Problems solving category	well-structured IT specialists problems formulated according to the needs of data recipients

[7] J. Stanik, P. Kwiatkowski, *Assurance of IT systems quality*, 'Quality assurance concept', materials from VI Conference of ORACLE users and developers, 'IT systems in the Internet age', Zakopane, 24-28 October 2000.
[8] T. Wierzbicki, *IT in management*, PWN, Warszawa 1986, p. 151.
[9] M. Kuraś, *IT systems*…, dz. quote., p. 264.

Feature	Information system
The method of testing, analysis and system creation	hard methods
System owner	head of information systems and production managers
'World-view' (Weltanschauung)	need to perform delegated tasks
Data	data identified according to the model of the old organization
Techniques and 'technology'	TI as computer techniques
Methods	quantitative methods supported by computer technique
Technique and 'technology'	computer technology as a complement to available t.o
Organization	inherited organization where IT system is adjusted
People	People learning new technical solutions
Human role	Human treated as technical element

Source: M. Kuraś, *System informacyjny a system informatyczny - co oprócz nazwy różni te dwa obiekty?*, Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie, no 770, Kraków 2009, p. 269.

The above characteristic proves that IT systems should be treated in technological (software) sense.

As it has been mentioned in the introduction contemporary business reality causes the necessity to implement IT systems into management. Nowadays their use is increasingly gaining of importance.

2. IT systems assisting the management

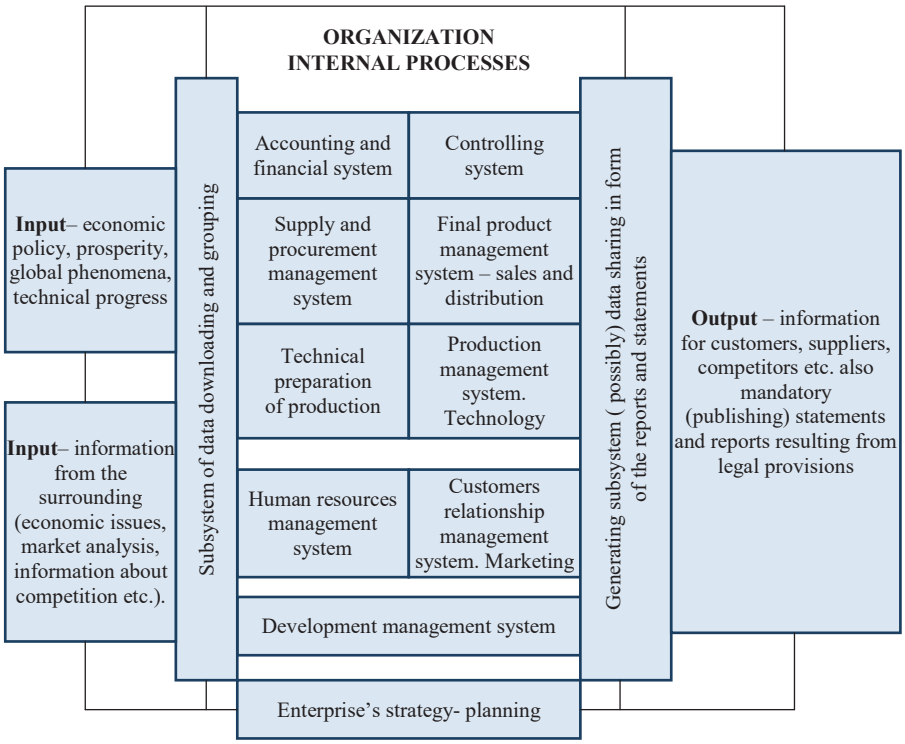
IT systems are currently used in production, commercial, service and advisory areas of the enterprise. The main reason for using IT systems in the management are[10]:

- significant increase of information resources-huge amount of unprocessed and unfiltered information in companies,
- very specialized information resources-nowadays the vast majority of workforce is only able to master the knowledge of the selected and narrow discipline.
- the increasing globalization-the companies transform into international organizations and their staff resources become scattered. The aim of the IT systems is to merge dispersed structures of the enterprise.

Figure 1 shows sample IT system supporting the enterprise in its management.

[10] W. Susłow, *Od organizacji do systemu informatycznego. Modelowanie i analiza systemów informatycznych, w1,* http://moskit.weii.tu.koszalin.pl/~swalover/MiASI_w1.pdf, [24.02.2016].

Figure 1. Sample architecture of IT system assisting the management in medium-sized and large enterprises



Source: A. Kaszuba-Perz, *Zastosowanie informatycznych systemów zarządzania w małych i średnich przedsiębiorstwach jako przejaw technologicznej modernizacji*, Zeszyty Uniwersytetu Rzeszowskiego no 26, Wydawnictwo Uniwersytetu Rzeszowskiego, Rzeszów 2012, p. 262.

Architecture of IT system, presented above, creates integrated management system consisting of apparent systems where links and relationships work in many dimensions.

To all elements of the architecture an integral figure is given by database system using so-called data warehouse as well as system of internal and external communication[11].

[11]Ibidem, p. 261.

Integrated management IT systems are the systems where[12]:

- there is a possibility to run selected system function from the user's workstation,
- there is the same interface for user within entire system,
- data input to the system is done only once, these data are automatically updated and the access to them are available to all system users.

Nowadays there are versatile systems available on the market which can be customized (parameterized) to the needs of certain enterprises. Integrated management IT systems are related to the category of so-called transactional systems which are suitable to recording and processing of current economic situation such as invoices recording, purchasing and inventory documentation[13]. The functions of integrated management IT systems, in most cases, are divided into functional areas which are consistent with the main tasks carried out by the company.

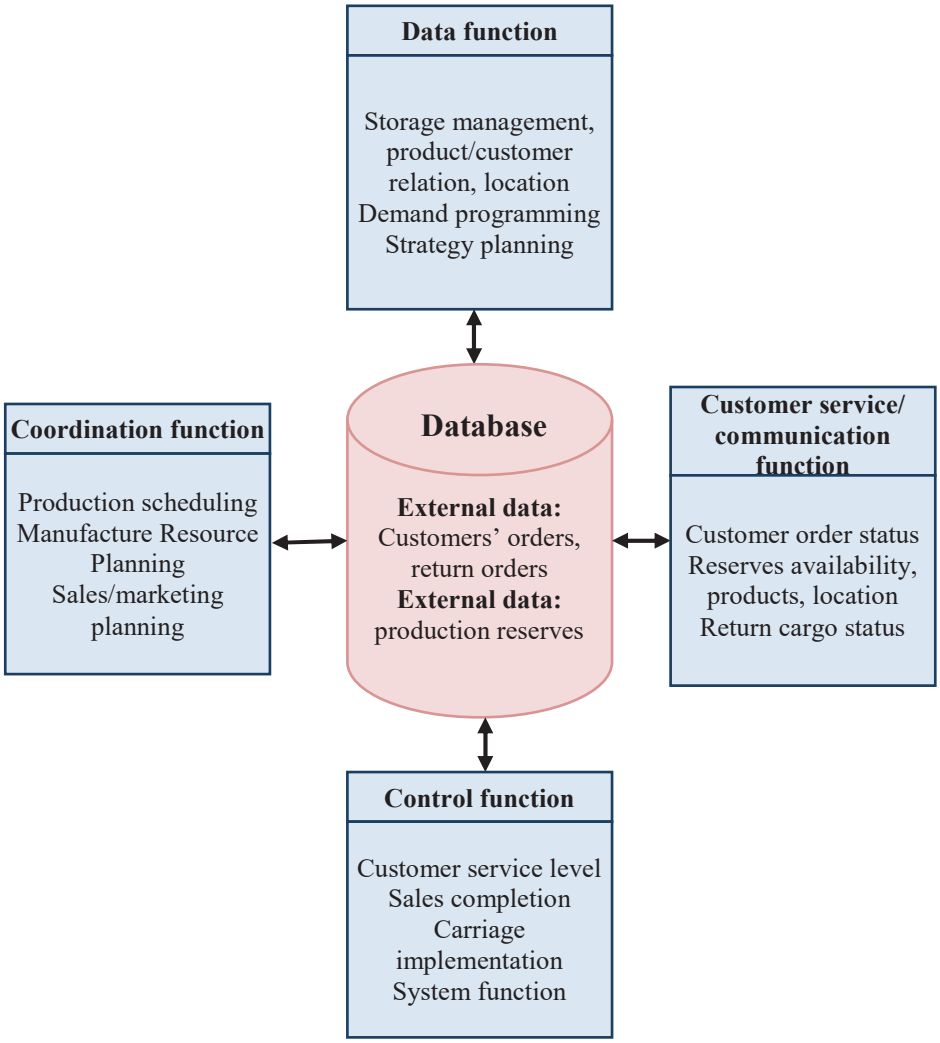
Their general division usually looks as follows[14]:

- area related to finance,
- area for logistics,
- HR and payroll area,
- production area.

Figure 2 shows sample functionality of integrated IT system management.

[12] P. Lech, *Zintegrowane systemy zarządzania ERP/ERP II. Charakterystyka, wykorzystanie w biznesie, wdrażanie,* Difin, Warszawa 2003, pp. 7-8.
[13] Ibidem, p. 8.
[14] Ibidem, pp. 9-10.

Figure 2. Functionality of integrated IT system management



Source: W. Susłow, *Od organizacji do systemu informatycznego. Modelowanie i analiza systemów informatycznych*, w1, http://moskit.weii.tu.koszalin.pl/~swalover/MiASI_w1.pdf, [24.02.2016].

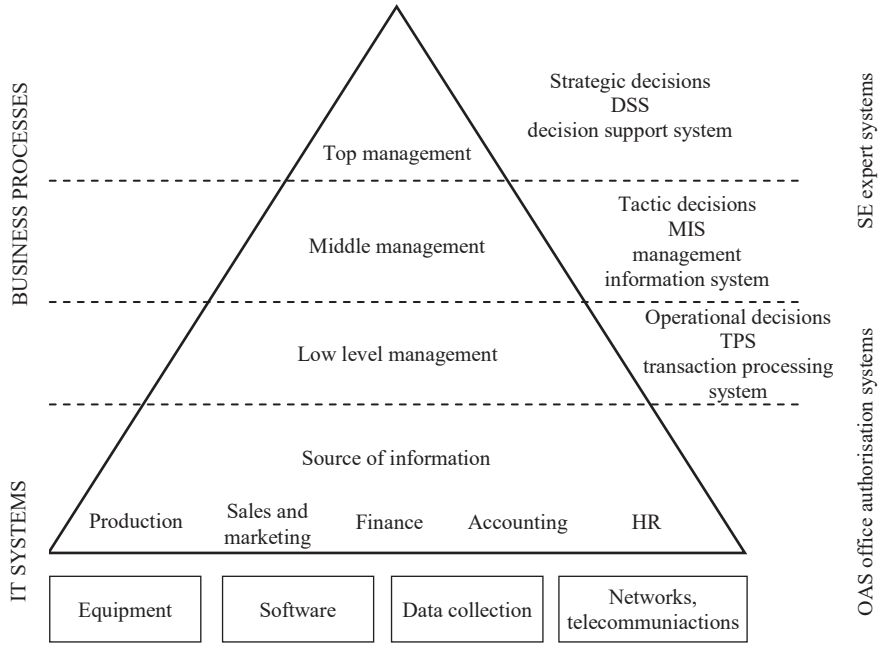
The content of the functional areas mentioned above may substantially vary depending on the system purpose and its size.

The features which should be characteristic to integrated IT system management are[15]:

- integration,
- versatility,
- multi-accessibility,
- openness,
- scalability,
- consistency of users interface,
- modularity.

Figure 3 shows sample architecture of IT system in enterprise including IT systems, business processes and management levels.

Figure 3. Architecture of IT system in enterprise including IT systems, business processes and management levels

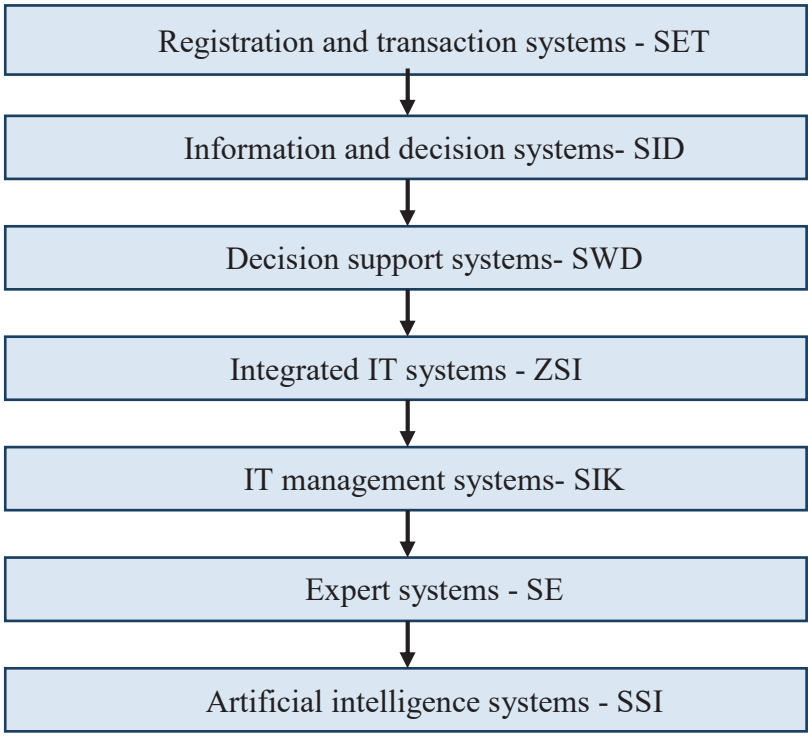


Source: I. Szydłowski, *Wybrane aspekty wdrażanie systemów informatycznych*, Zeszyty Naukowe Zachodniopomorskiej Szkoły Biznesu, Szczecin 2000.

[15] P. Lech, *Zintegrowane systemy…,* dz. quote., p. 11.

IT management systems have been evolving for years. Figure 4 shows the evolution of IT systems supporting the management.

Figure 4. Evolution of IT systems supporting the management



Source: the author's view based on: W. Susłow, *Od organizacji do systemu informatycznego. Modelowanie i analiza systemów informatycznych,* http://moskit.weii.tu.koszalin.pl/~swalover/MiASI_w1.pdf, [24.02.2016].

Tele-Info reports show that among benefits obtained by the entrepreneurs due to application of IT systems supporting the management, are[16]:

- possibility to obtain reports and analysis quickly (90% respondents),
- increase the quality of customer service (82% respondents),

[16] A. Kaszuba-Perz, *Zastosowanie informatycznych systemów zarządzania w małych i średnich przedsiębiorstwach jako przejaw technologicznej modernizacji,* Zeszyty Uniwersytetu Rzeszowskiego no 26, wydawnictwo Uniwersytetu Rzeszowskiego, Rzeszów 2012, p. 263.

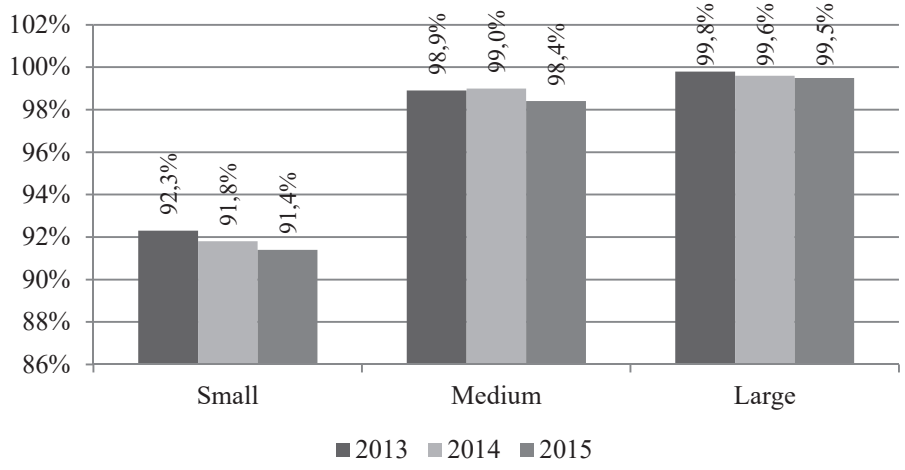
- improvement of the efficiency in the procurement process (60% respondents),
- reducing the cost of staff maintenance (82% respondents),
- reducing financial costs (20% respondents),
- increase of sales incomes (20% respondents),
- reducing production costs (38% respondents).

A wide range of benefits received by the enterprises from the use of IT systems supporting management causes the increase of ICT in companies.

3. The use of ICT in the enterprises

The data, published by Central Statistical Office, related to the use of ICT in enterprises shows that in this field the tendency is growing or staying on a similar level in relation to previous years. Figure 5 shows the participation of the enterprises with the Internet access.

Figure 5. Enterprises with the Internet access according to the categories size



Source: Central Statistical Office, Społeczeństwo informacyjne w Polsce w 2015 roku - opracowanie sygnalne, Warszawa 2015, p. 1.

As Figure 5 shows the highest percentage with the Internet access is among large and medium-sized companies. As for the Internet connections the enterprises mostly used broadband connections (fixed or mobile). However, it can be noticed that mobile broadband connections

made via modem or 3G phone is significantly increasing. The results are shown in figure 2.

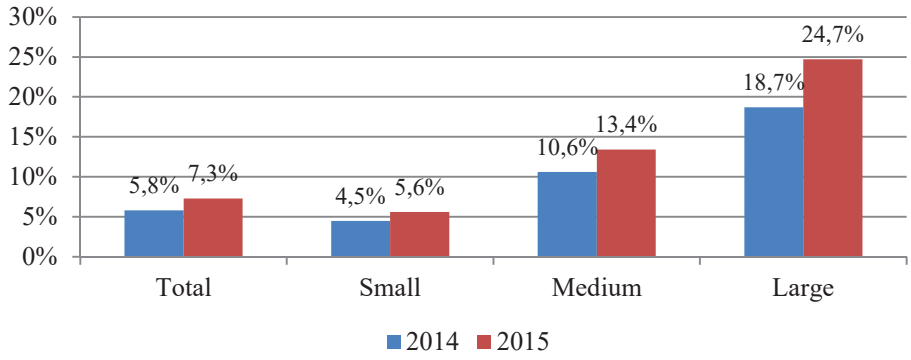
Figure 2. The use of Internet connections in the enterprises

Selected types of Internet connections	2013	2014	2015
	in %		
Mobile broadband connections via modem or 3G phone	44,0	61,0	61,5
Broadband connection(mobile and fixed)	82,6	90,4	91,9

Source: Central Statistical Office, *Społeczeństwo informacyjne w Polsce w 2015 roku - opracowanie sygnalne*, Warszawa 2015, p. 2.

In 2015 a total of 7,3% companies have benefited from the cloud computing[17] services. The highest percentage has been recorded by large enterprises. In relation to 2014 this rate increased by 1,5%. Figure 6 shows the use of cloud computing service in 2014 and 2015 including enterprise's categories size.

Figure 5. Enterprises using cloud computing service in 2014 and 2015 according to categories size



Source: Central Statistical Office, *Społeczeństwo informacyjne w Polsce w 2015 roku - opracowanie sygnalne*, Warszawa 2015, p. 2.

[17]Cloud computing – data-processing model based on the use of the service given by the service provider. Functionality is understood as the service provided by software. It means no need to buy license or necessity to install and administer the software.
Source: Wikipedia, https://pl.wikipedia.org/wiki/Chmura_obliczeniowa, [25.02.2016].

According to IDC (*International Data Corporation*) analysis almost 41% of systems supporting the management, which are in Polish companies, belong to SAP SE[18] solutions. Second place in terms of market share is given to ERP software providers. The leading role on the Polish market is taken by Comarch company from Cracow which controls 12,5% of the market of integrated systems supporting the management.[19].

Conclusions

The above analysis leads to the following conclusions:

- the use of IT systems is caused by the rapid growth of IT resources in enterprises as well as their high specialization and progressive globalization process,
- modern architecture of IT systems is formed by integrated systems,
- integrated management IT system is characterized by: possibility to run selected system function from the user's level, an unitary interface for all system users, single data implementation to the system and the possibility of access to it by all the users,
- universal IT systems customized to the companies' needs are more often available,
- functions carried out by integrated management IT systems are divided into functional areas, convergent with the main tasks of the company,
- in enterprises it is possible to use IT systems and services with no need to buy the license, necessity to install and administer the software,
- the available reports show that enterprises largely benefit from the use of IT system supporting the management,

[18] SAP SE (germ. *Systemanalyse und Programmentwicklung*, eng. *Systems Applications and Products in Data Processing*) – German IT enterprises founded in 1972, based in Walldorf, providers of business software.
ERP. Source: Wikipedia, https://pl.wikipedia.org/wiki/SAP_SE, [25.02.2016].
[19]ITWIZ, http://itwiz.pl/idc-sap-liderem-rynku-erp-polsce-comarch-najwiekszym-polskim -dostawca/, [25.02.2016].

- according to data, published in 2015 by Central Statistical Office, related to the use of ICT in enterprises the tendency in this area is growing or staying on a similar level in relation to 2013 and 2014.

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