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FRONT-OFFICE AND BACK-OFFICE SYSTEMS IN PUBLIC ADMINISTRATION UNITS IN SILESIAN VOIVODESHIP[*]

Summary: The article presents comparative analysis focused on the use of Information Communication Technology in public administration units in Silesian voivodeship and remaining 15 Polish voivodeships. It concentrates on the systems offering to public administration customers public e-services (i.e. front-office systems) and systems accompanying internal processes in public administration units (i.e. back-office systems). It is pointed how these systems can be integrated in order to improve quality of support service for internal processes in public administration units.

Keywords: e-administration, front-office systems, back-office systems, integration of front-office and back-office systems.

Introduction

Nowadays countries, regions and cities need to face the challenge of development and improvement of information societies. For many of them it is a priority issue. Public authorities and public administration are responsible for creating social, political, scientific and cultural basis for development of information society. As a result, they are as well responsible for creating the conditions for information societies to develop [Ziemba, 2013, p. 415].

Therefore, occur strategic documents with a nationwide and regional range with interest in information society [Ziemba, 2012, p. 332]. Undoubtedly, the information society construction is connected with the use of the newest ICT solutions in public administration entities.

According to the definition, e-administration, through carrying out tasks emerging from law regulations, serves the society[1]. Through implementation of new solutions on ICT in public administration happens the improvement of processes, which should directly result in improvement of quality in public services to society [Ziemba, Obłąk, 2014, p. 619].

A number of projects has been implemented in Silesian voivodeship in the field of widely understood information society. The implementation of these projects assumed among others an increase in efficiency of public administration, as well as increase of the quality offered by these service units with the use of information and communication technologies (ICT) [Ziemba, Żelazny, 2013]. Similar actions have been undertaken all over Poland.

Of particular importance for the development of e-administration is to implement back-office systems to streamline internal processes and front-office systems to provide e-services for all stakeholders of public administration, and thus for business (A2B[2], B2A[3]), citizens (A2C[4], C2A[5]), but also the public administration (A2A[6]).

In Polish literature no studies on this issue have been found and, as a result, this article presents its aspects.

The structure of the article is as follows. The first part of the article describes the types of existing systems in public administration and briefly characterizes them. Then author evaluates their use in the Silesian voivodeship and other fifteen voivodeships, with following division: front-office systems, back-office systems, integration of these systems. The last part of the article presents the findings of the study, as well as recommendations for further studies related to the use of ICT in public administration.

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[1] Word „administration" emerges from Latin word *ministrare* – service, serve.
[2] A2B – Administration to Business.
[3] B2A – Business to Administration.
[4] A2C – Citizen to Administration.
[5] C2A – Administration to Citizen.
[6] A2A – Administration to Administration.

1. Front-office and back-office systems in public administration

One can not agree with the view expressed by Ziemba, according to which "development of the information society is not possible without a well function-ing electronic government (e-government)" [Ziemba, 2012, p. 332]. The founda-tion of e-government are systems of electronic customer support (i.e. front-office systems) and systems responsible for supporting internal processes and adminis-trative procedures (i.e. back-office systems). Front-office is the outer sphere, providing customer service and customer contact with unit of public administra-tion. Front-office systems are therefore systems for electronic communication of clients with public administration units. In turn, the back-office is the inner sphere, unavailable directly to the client of the unit. In the back-office systems takes place processing of information provided to public administration, both in traditional and electronic form [Biniek, 2010].

Public administration units use IT systems in different areas of their current work. Among domain systems (back-office) in public administration exist:

- information system – system that provides electronic document management (in the study: EZD system), system to support the circulation of incoming and outgoing mails in the unit, enabling among others generating issues, gene-rating letters, creating letters, generating statistical reports, listing issues,
- performance budget – a system enabling control of execution of the planned and approved budget in a task scheme, performing reports, annual informa-tion, quarterly statements,
- budgeting system – system supporting one of the most important processes in the units, which is budget planning (expenditures and incomes in a task scheme), one of the main advantages of having a budget planning system is the ability to automatically create projects of budget, resolutions on budget, changes to the budget as well as the Multiannual Financial Projections based on the data entered to the system,
- finance and accounting – system allowing to conduct financial accounting of the unit,
- system supporting process management,
- project management system,
- GIS (Geographic Information System) – system for entering, gathering, proc-essing and visualization of spatial data,
- electronic trainings,
- system improving auditing in the unit,
- system supporting quality management,

- system for management control,
- purchasing – system supporting the process of placing orders and purchase of goods in the unit,
- fixed assets – system supporting keeping records of fixed assets, as well as supporting the process of calculating their depreciation,
- storage management – system supporting warehouse services; by keeping the data in the computer system, the unit always has access to up to date information on the economy of materials,
- payrolls – system handling preparation of payrolls and executing payments to employees of the unit,
- Human Resources – system for filing personnel data of the staff, including among others personal information, employment history, qualifications, results and dates of medical examinations, data on training, the results of interim evaluation, records of working time on basis of which payrolls are prepared.

However, in the outer sphere, in front-office systems available on-line to customers it is to notice:

1. ESP (Electronic Registry Box) – a publicly available electronic communication mean for transmitting the electronic document to a public entity using commercially available IT system (definition from the Act on computerization of entities performing public tasks [Ustawa z dnia 17 lutego 2005 r. o informatyzacji działalności podmiotów realizujących zadania publiczne]). The use of electronic communication channel in the current work of public administration, in particular A2A communication allows individuals to reduce costs of public administration, as well as to shorten the processing time for official matters. The use of ESP in the current work of units and increase in number of mails sent and received in electronic form, also contribute indirectly to a change in the system of performing clerical tasks in units from the traditional to EZD (Electronic Documents Management). As defined in the Regulation on office instruction, uniform tangible lists of files and instructions on the organization and scope of activities of company archives [Rozporządzenie z dnia 18 stycznia 2011 r. w sprawie instrukcji kancelaryjnej, jednolitych rzeczowych wykazów akt oraz instrukcji w sprawie organizacji i zakresu działania archiwów zakładowych] EZD system is a computer system for electronic document management enabling clerical activities, documenting progress on handling issues and electronic documents collecting and creating. As K. Schmidt pointed [Schmidt, 2013]: the entity applying traditional system usually will not be interested in receiving the electronic corre-

spondence. Conversely, in case of EZD system there is a need to solve the problem of documents incoming in paper form. In such a case, it can be provided, that the unit will have individual interest in receiving the correspondence uniquely in electronic form.

2. Central platform ePUAP (www.epuap.gov.pl) – electronic platform for public administration services, offering public e-services to customers.
3. Regional platform SEKAP (www.sekap.pl) – the system of electronic communication in public administration, offering public e-services to residents of the Silesian voivodeship.
4. BIP – portal of which main goal is to enable to units entering and publishing data and information specified by the Act on access to public information [Law on Access].
5. Internet portal – another (separate) Internet portal of public administration units.

The implementation of appropriate systems in both – the internal and external sphere is only the beginning of the way to the computerization of public administration, as necessary is as well their integration [Krynicka, 2005]. Front-office and back-office systems may in fact function in units as separate systems (non-integrated), supporting only a particular area of operations or may be part of an integrated system supporting process management in the unit. Integration scheme of front-office and back-office systems is shown in Fig. 1.

Systems integration in units can be performed on several levels, also a larger number of systems owned by units can be integrated. In order to increase the efficiency of applications flow in the unit through the front-office integrates internal and external sphere. In such a case, the requests entering the unit are automatically recorded in internal systems for electronic document management. Apart from the aforementioned integration, units can additionally integrate owned systems, that support internal sphere, between them, e.g. system for electronic document management with tax system. Another example of integration is the multi-level integration, in which takes place integration of front-office system with system for electronic document management, which can be further integrated with the domain system for e.g. local taxes, which in turn may be integrated with mapping system (e.g. visualization of a plot on the map).
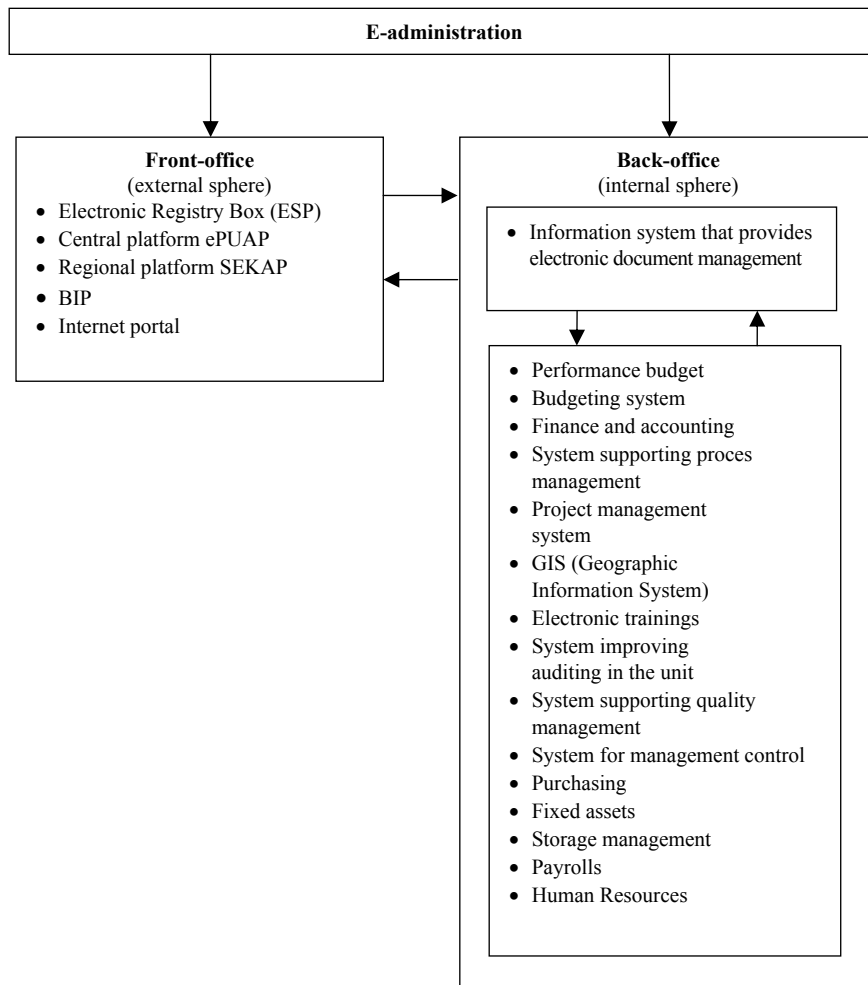
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│                           E-administration                           │
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Fig. 1. E-government components (front-office and back-office systems)

2. Methodology of research on the use of front-office and back-office systems in the units of public administration in the Silesian voivodeship

The aim of the study was to evaluate the use and integration of front-office and back-office systems in units of public administration (local and central government).

The research questions were formulated as follows:

1. What is the level of use of front-office systems in public administration units in Poland and Silesian voivodeship?

2. What is the level of use of back-office systems in public administration units in Poland and Silesian voivodeship?
3. Which front- and back-office systems were integrated in public administration units in Poland and Silesian voivodeship?

To illustrate the level of use and integration of front- and back-office systems by public administration units from the Silesian voivodeship and the remaining 15 voivodeships, a comparative analysis was used.

In the research to achieve the target the CAWI method was used (Computer Assisted Web Interview) – questionnaire made via the Internet. The survey was conducted in the period from 22 December 2013 to 15 April 2014, and in total 409 (the result for the whole country) correctly and fully completed questionnaires were received (the return rate for the study reached 15,08%). The exact description of the research methodology is described in the paper *Critical success factors and the level of use of ICT in public administration* [Ziemba et al., 2015, p. 147].

From the Silesian voivodeship 67 questionnaires were received and this was the largest group of units (16,4%) compared to other regions (Fig. 2). All types of public administration units participated in the study. The largest group in the survey, both across the country (42,1%) and in the Silesian voivodeship were the offices of rural municipalities – 35,8%. The results for the Silesian voivodeship are shown in Fig. 3.
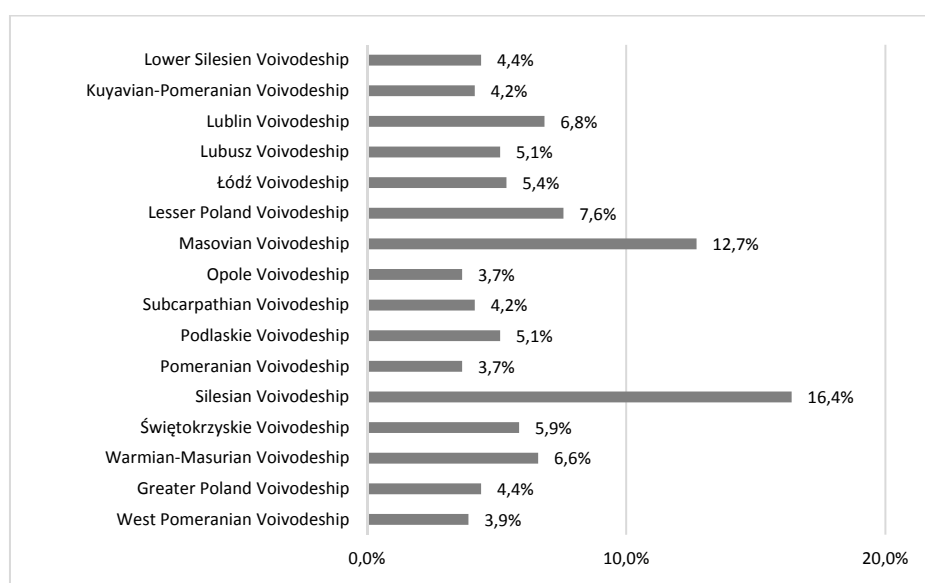

Fig. 2. Public administration units by voivodeship (n = 409)
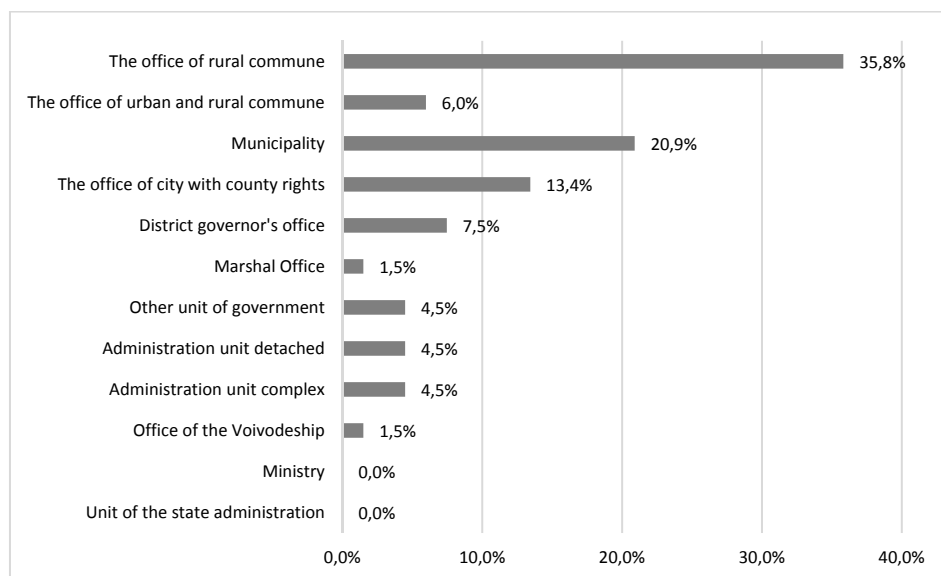
Source: [Ziemba et al., 2015, p. 151].

The types of public administration units involved in the study:

- The office of rural commune — 35,8%
- The office of urban and rural commune — 6,0%
- Municipality — 20,9%
- The office of city with county rights — 13,4%
- District governor's office — 7,5%
- Marshal Office — 1,5%
- Other unit of government — 4,5%
- Administration unit detached — 4,5%
- Administration unit complex — 4,5%
- Office of the Voivodeship — 1,5%
- Ministry — 0,0%
- Unit of the state administration — 0,0%

Fig. 3. The types of public administration units involved in the study in the Silesian voivodeship (n = 67).

Source: Based on data collected in empirical research.

3. Evaluation of the level of front- and back-office systems use in the public administration units in Silesian voivodeship – results from empirical research

3.1. Front-office systems

Most of the surveyed units of the Silesian voivodeship has Electronic Registry Inbox (Polish: ESP), working on platform SEKAP, ePUAP or other, and thus complies with the statutory obligation imposed to allow customers to place applications via the Internet (89,5%). Result obtained in this area can be considered as the result of statistical error as for the remaining 15 Polish voivodeships it reached 87,8%. During the research units indicated the extent to which, in practice, this electronic channel of communication is used by them.

Units form Silesian voivodeship use ESP mainly to receive electronic mails and documents sent through this channel are responses to the issues arriving by the units in this way (76,2%). This result is similar to the result of other voivideships (72,4%). Units of the Silesian voivodeship in 49,2% use ESP in everyday practice to receive and send letters (as one of the available channels of communication, documents sent usually relate to matters of a similar nature), which is a better result by 11,5% compared to other voivodeships.

As many as 56,7% of the Silesian units use ESP in everyday practice to receive and send letters (as one of the available channels of communication, documents posted relate to various issues carried out in the unit). This is a better result by 14,4% comparing to the results of the remaining 15 voivodeships. The survey results for the voivodeship of Silesia are shown in Fig. 4, while the national results are shown in Fig. 5.
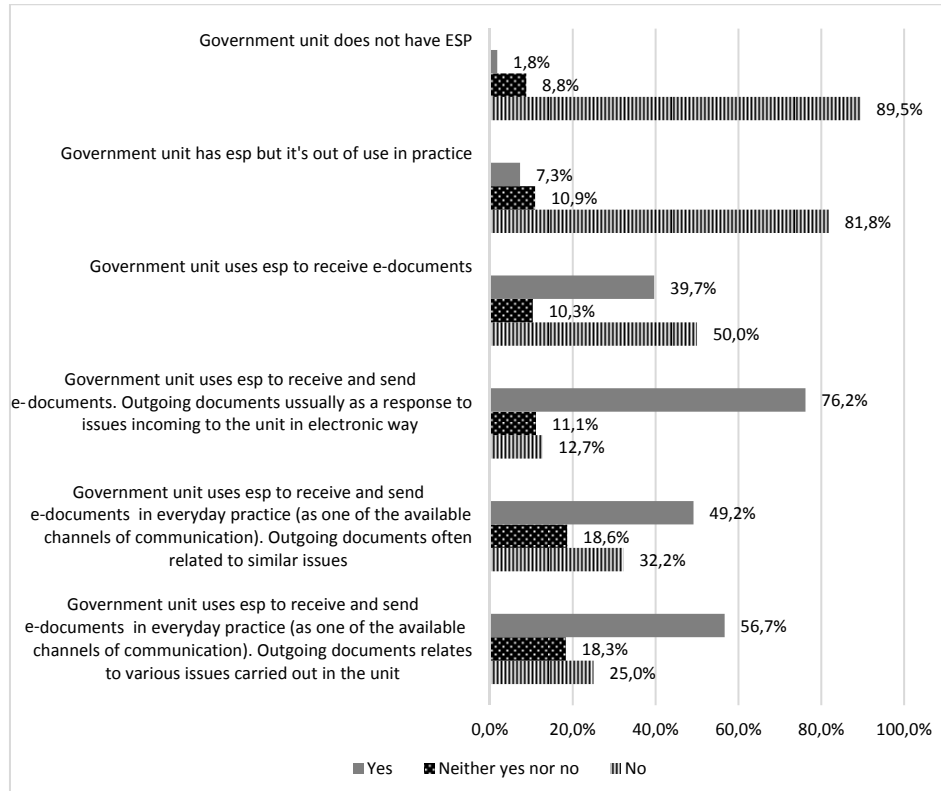

Fig. 4. The level of use of Electronic Registry Boxes (ESP) in public administration units in Silesia

Source: Based on data collected in empirical research.

Fig. 5. The level of use of Electronic Registry Boxes (ESP) in public administration units in Poland

Source: Based on data collected in empirical research.

3.2. Back-office systems

During the research public administration units indicated, which types of domain systems (back-office systems) they use to streamline current work by them. As can be seen from Fig. 6 and 7, the results of research conducted in the Silesian voivodeship do not differ significantly from the results of the remaining voivodeships. In most cases, in as many as 12 out of 18 indicated domain systems, Silesian units had better results, with the differences ranging between 0,1% and 17,7%. Systems, which are increasingly used in the region are: project

management system (+0,1%), system for auditing (+0,7%), Internet portal (+3,8%), performance budget system (+4,5%), system for process management (+5,4%), system for quality management (+6,5%), HR system (+7,4%), electronic training (+7,8%), fixed assets (+10,7%), storage (+11,8%), EZD – understood as a system providing electronic document management (+14,5%) and GIS (+17,7%). In six cases Silesian region had a bit worse results, with the difference ranging between 0,5% and 8,8,% (purchase system – 0,5%, financial-accounting system – 1%, payrolls – 1,6%, management control – 2,9%, BIP – 7,4% and budgeting – 8,8%).

Out of surveyed units of the Silesian voivodeship 35,8% run the EZD system (Electronic Document Management) within the meaning of the Regulation on office instruction (i.e. perform activities related to these issues in ICT system, among others: account assignment, approval, archiving). The result obtained in the Silesian voivodeship is slightly better than the result for the rest of the country (29,8%).

Both in the voivodeship researched (46,3%) and other 15 voivodeships (50%), almost half of the units do not work on the EZD system. Every fifth unit in the country chose the neutral answer. It is not obvious, what can decide about the fact, that in these units the traditional system is the basic one. Indeed, implementation of EZD system as the core system for a unit involves all employees and all of them should have such a knowledge. The results indicate that most of the units run issues still in the traditional way (on paper) or are conducted "double" (i.e. there can be implemented IT system for electronic document management, but it plays only a supporting role). In terms of implementation of EZD as the basic system we can see great potential for improvement (and further studies), both in the Silesian voivodeship and all over the country. On one hand, it can relate to the implementation of appropriate ICT systems to ensure compliance with the laws of electronic circulation of documents, and on the other hand – to organizational changes, lack of awareness or proper training for employees (lack of training). The results are shown in Fig. 8 and 9.
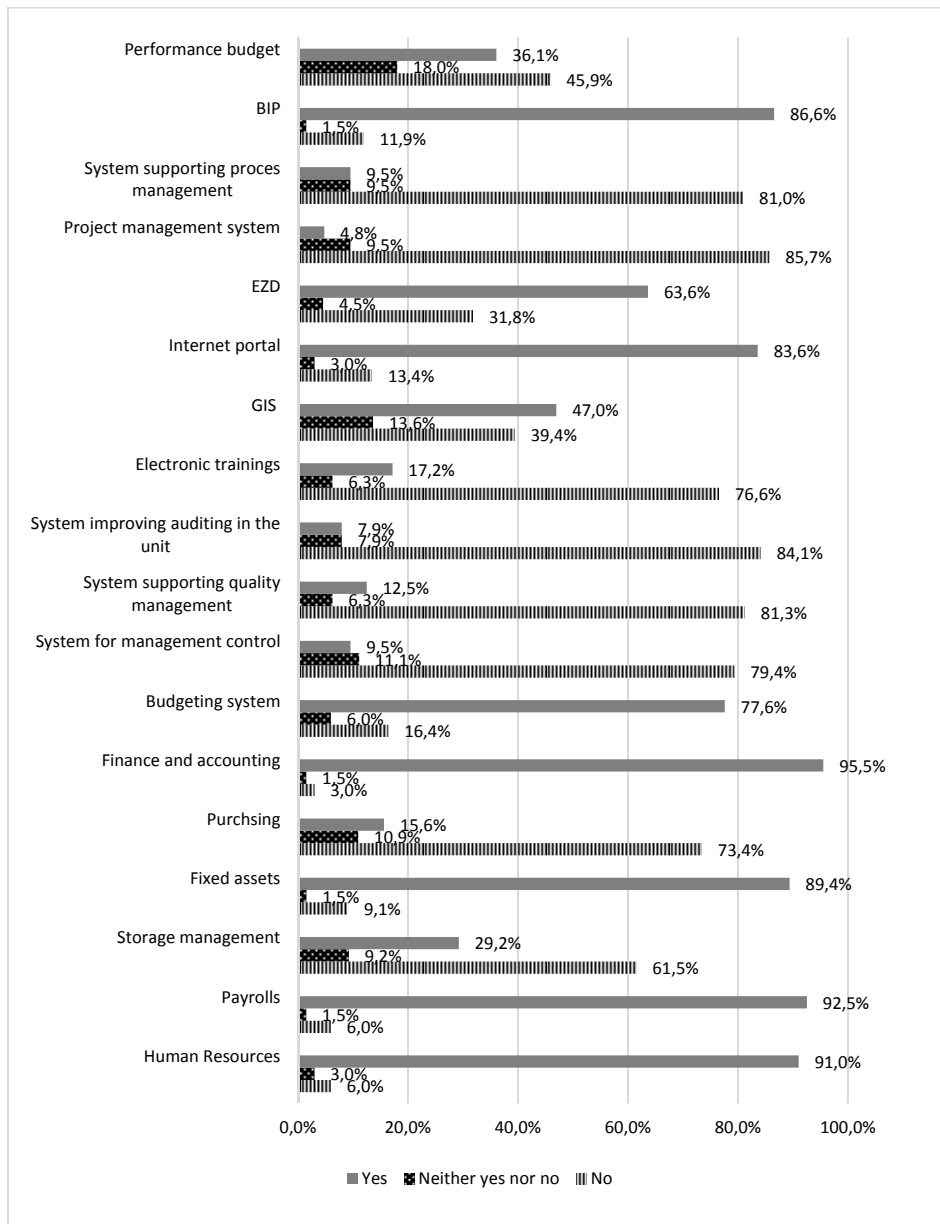
Fig. 6. Level of the use of back-office systems in public administration units in Silesian voivodeship
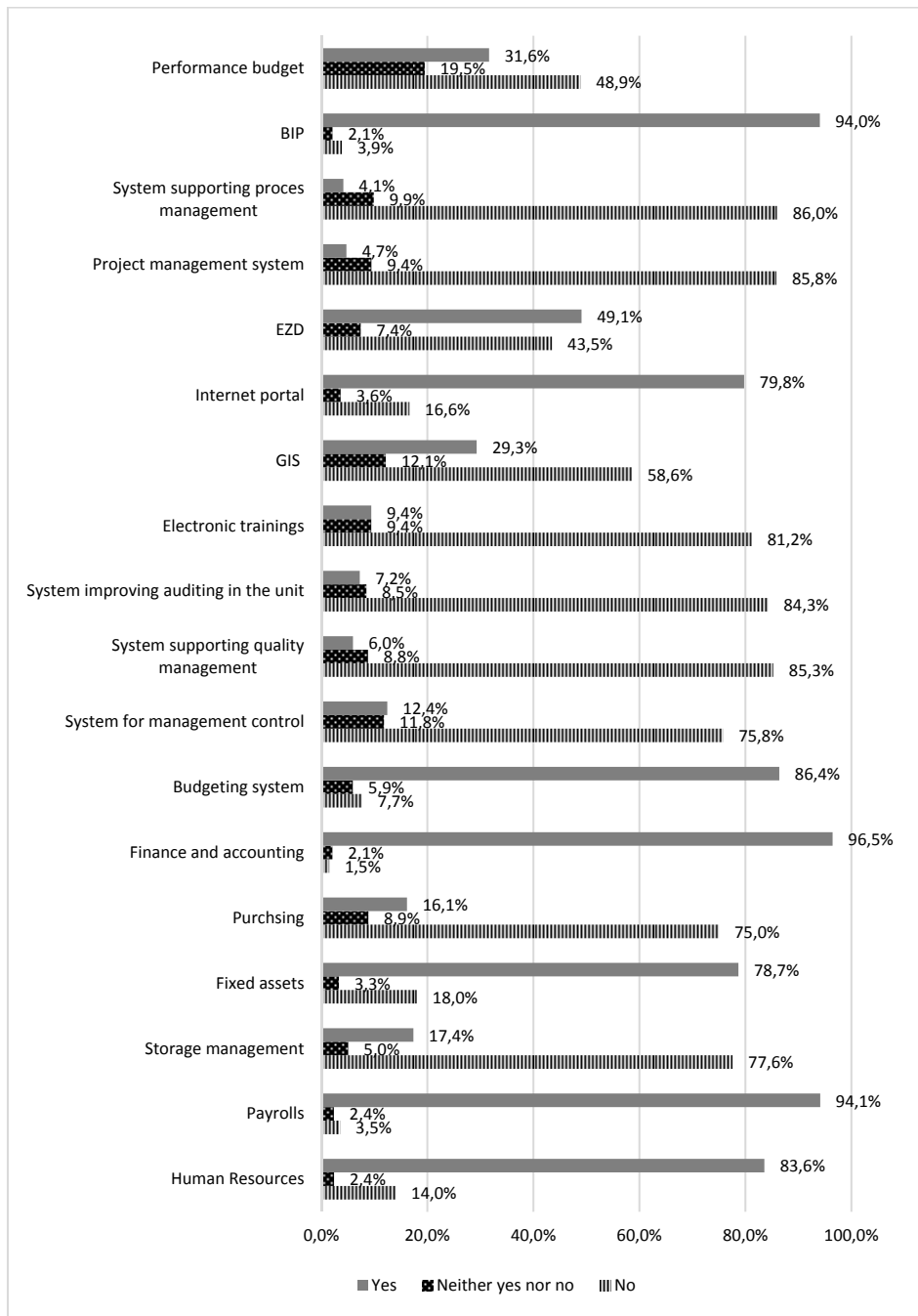
Source: Based on data collected in empirical research.

Fig. 7. Level of the use of back-office systems in public administration units in Poland
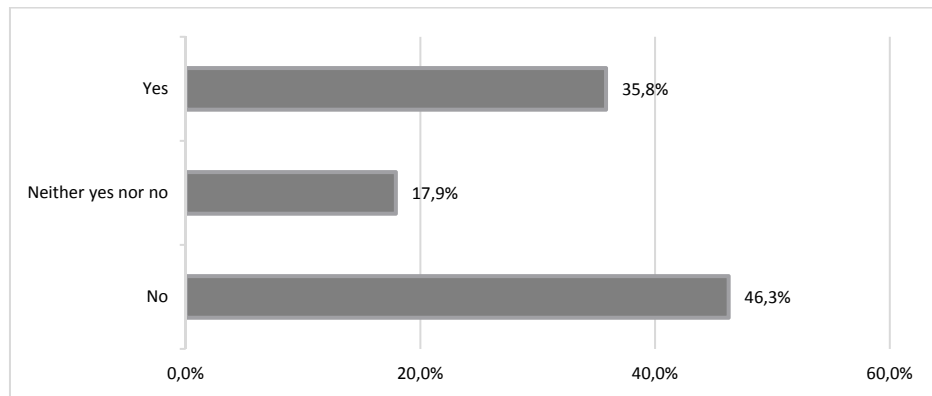
Source: Based on data collected in empirical research.

Fig. 8. Issues management in the public administration units in EZD system (according to the Regulation on office instruction) in Silesian voivodeship

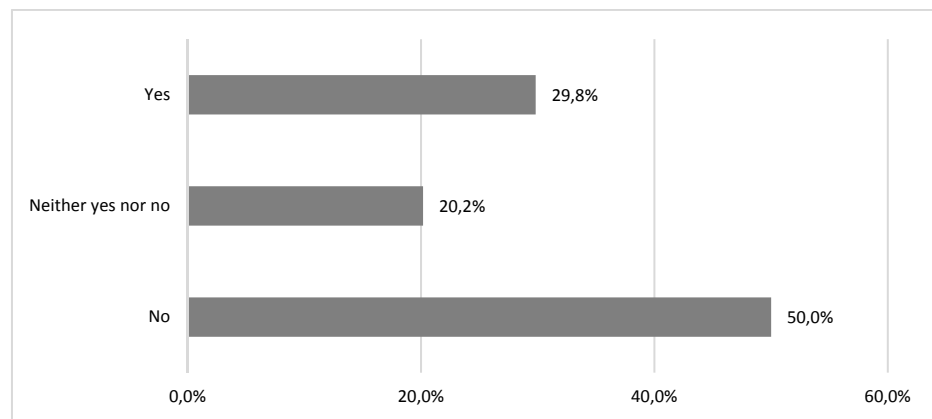Source: Based on data collected in empirical research.

Fig. 9. Issues management in the public administration units in EZD system (according to the Regulation on office instruction) in Poland

Source: Based on data collected in empirical research.

3.3. Front-office and back-office systems integration

Another researched element was the integration of systems owned by public administration units, i.e. integration of ERP[7] systems with platforms offering public e-services (e.g. central platform ePUAP, regional platform SEKAP), as well as integration of domain systems with each other (e.g. system providing electronic document management with domain systems). Execution of the above

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[7] ERP systems (Enterprise Resource Planning) – information systems supporting management of entity.

mentioned system integrations in units eliminates the need to re-enter the same data to several systems (often already available in electronic form when received by ESP), at the same time eliminating the possibility of errors.

In Silesian voivodeship 18,5% of the units have integrated information system, that provides electronic document management with domain systems, which is a significantly better result than the result from other voivodeships – 7,7%. In case of executed integration of central platform offering e-services to the public ePUAP with domain systems, result in the Silesian voivodeship is almost identical (the difference reaches 0,3%) as a result of the remaining 15 voivodeships. Due to the nature of the project implemented in the voivodeship of Silesia, comparison of results in the section of integration of regional platform SEKAP offering public e-services is not justified. Integration of regional platform SEKAP with domain systems in Silesia has been performed by every fifth unit (18,8%). The best situation, both in the country and the region of Silesia, is in the area of integration of domain systems with each other – about 49% of the units have executed this integration in the Silesian voivodeship, while in other voivodeships − 36,4%. Presented results indicate a significant gap in the implementation of front- and back-office systems integrations. The results concerning integration of the systems are shown in Fig. 10 for the Silesian voivodeship and Fig. 11 for the rest of the country.
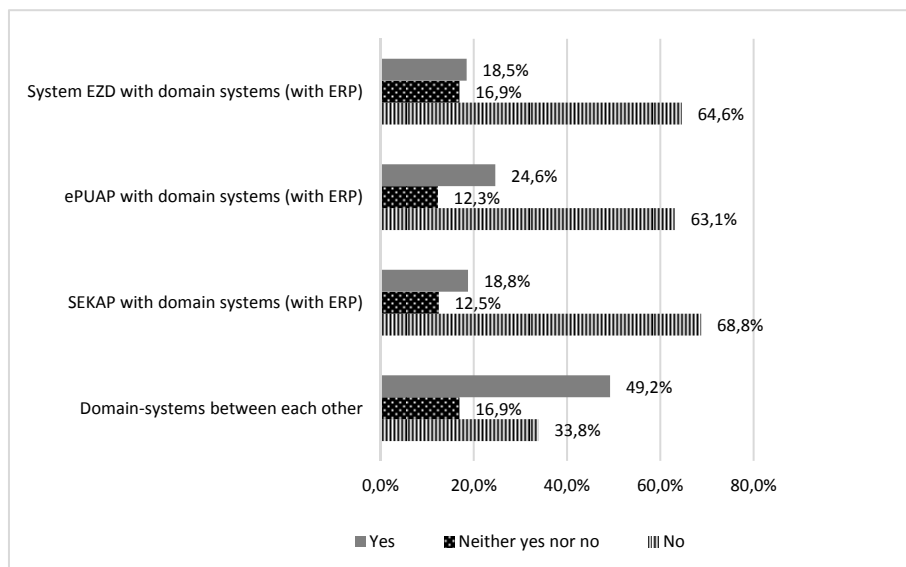

Fig. 10. Types of integration of information systems in public administration units in Silesian voivodeship

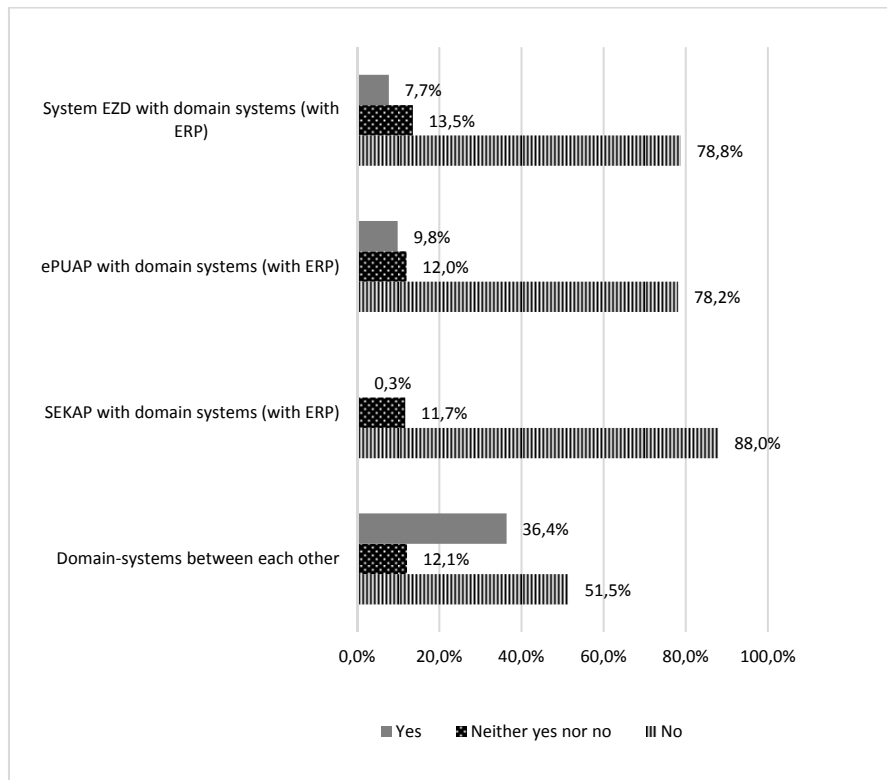Source: Based on data collected in empirical research.

Fig. 11. Types of integration of information systems in public administration units
in Poland

Source: Based on data collected in empirical research.

The Figure 12 shows, that the majority of units of the Silesian voivodeship
has integrated owned EZD system – system that provides electronic document
management (back-office) with their front-office systems, i.e. central platform
ePUAP – 62,5%, other ESP – 60,7%, regional platform SEKAP – 49,2%, Public
Information Bulletin – 27%. Presented result of the region is much better than
the result obtained in the remaining 15 voivodeships: ePUAP – 32,6%, other
ESP – 34,5%, Public Information Bulletin – 19,5%, SEKAP – 4,1%. No execu-
tion of front- and back-office systems integration contributes to a decrease in the
efficiency of services provided to electronic applications arriving through the
platforms offering e-services. Furthermore, it results in the necessity to manually
enter data (already available in electronic form) into the system, which enables
electronic document management. The results of research on the integration
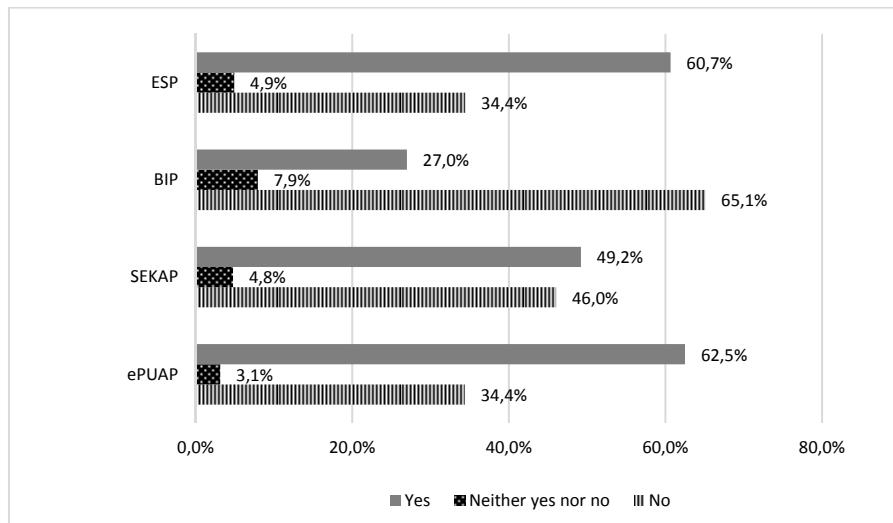of ESP with domain systems are shown in Fig. 12 and Fig. 13.

Fig. 12. Types of EZD system integration (system providing electronic document management) in public administration units in Silesian voivodeship

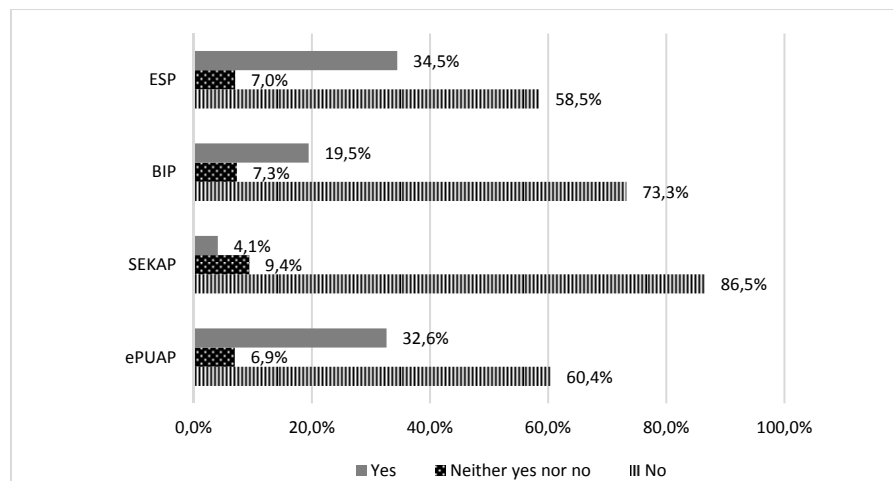Source: Based on data collected in empirical research.

Fig. 13. Types of EZD system integration (system providing electronic document management) in public administration units in Poland

Source: Based on data collected in empirical research.

4. Analysis of the results

Analysis of the results of research evaluating the use of ICT by public administration units in the Silesian voivodeship and other 15 voivodeships allows to draw conclusions. To maintain the compliance of the present study, findings from the research were divided into groups: front-office and back-office systems and systems integration in public administration units.

On the first serve, the conclusions concerning front-office systems are presented.

The majority with as much as about 88% (obtained in the survey results for the voivodeship of Silesia and other voivodeships is very similar) units of public administration complies with the statutory obligation to have ESP. ESP owned by units is mainly used to receive electronic mails and documents, that are sent are mainly responses to letters received electronically. The result of the Silesian voivodeship is by 3,8% better than the result from the other 15 voivodeships.

In the field of back-office systems following conclusions can be drawn. Public administration units most frequently use domain-systems in the following areas: finance and accounting, payrolls, fixed assets, human resources, budgeting. The results of the Silesian voivodeship in the majority of cases were consistent with those of other voivodeships. More than half (63,6%) of the public administration units in the Silesian voivodeship use the system for electronic document management, but in most cases only to support basic system (EZD system in accordance with the office instruction was pointed by only 35,8% of the units). Slightly worse is the case in the other 15 voivodeships, where almost half (49,1%) of the public administration uses the system for electronic document management. Among these units only 29,8% of units use it as a basic system (as defined in office instruction). According to the survey only every third unit of public administration (the results of the Silesian voivodeship and other voivodeships are similar) chose EZD system as the core system (within the meaning of the Regulation on office instruction).

A following conclusion can be formulated in the field of systems integration: by far the greater number of units in the Silesian voivodeship (60,7%), compared to other voivodeships (34,5%), integrated the EZD system (in this case understood as a system for electronic document management) with electronic registry inbox (ESP). Integration allows automatic forwarding of applications submitted in electronic form to the system in which the case is registered and answers are prepared.

Conclusions

On the basis of formulated conclusions recommendations for the improvement of front-and back-office systems and their integration in public administration units are presented.

Units should take steps to increase interest in ESP by customers (communication B2A and C2A) and other units (A2A). This can be done through promotion and training in the field of e-government among external customers of public administration units, as well as employees of these units, both at voivodeship and national level. In Silesia voivodeship the act of promoting the use of electronic services has been identified as one of the main objectives of consulted strategic document *Strategy for the development of the information society in Silesian voivodeship 2020+* [www 1]. The units should use EZD system to a greater extent (within the meaning of Regulation on office instruction) as the basic system. Utilizing owned system only as a support system means, that a unit decides to double performing most of chancellery tasks.

Units in the field of front-office and back-office systems integration should strive to use data, that already has electronic version in as many owned IT systems as possible. By such action units would eliminate the possibility of errors occurrence, as well as shorten the time necessary for particular services. Implementation of systems integration will also enable units to collect data on e.g. the customer's obligations to the unit with terms of payment and transfer of this data via accounts on platforms offering e-services, e.g. SEKAP. Conducted research evaluating the use of front-office and back-office systems in units of public administration and their integration has limitations. Among them, can be pointed: different number of respondents in the voivodeships and relatively smaller number of units of government administration in relation to local government units.

The results obtained enhance to formulate perspectives for future research. In terms of front-office systems, it seems reasonable to deepen research on the level of use of e-services in public administration units. Noteworthy is the ratio of the number of letters incoming and outgoing electronically to all the letters in the units.

On the other hand, in terms of back-office systems, it appears advisable to explore the degree of EZD system utilization (within the meaning of Regulation of office instruction). Units that work on the EZD system as the basic system, did not define in the conducted study the extent to which it is used, which means they did not point the percentage of participation of Single Tangible Inventory Act (JRWA) symbols supported in the system EZD and excluded from it (i.e. run continuously in the traditional system).

According to the provisions of office instruction, it is possible to indicate the EZD system as a basic system for the entire unit with the simultaneous exclusion of 99% of the JRWA symbols from this system and leading them still in the traditional system. Comparing in this case, units which use the EZD system as a basic for 2 symbols from JRWA in relation to the units which use it for e.g. 400 symbols, is not justified and can dilute the whole picture. In case of conducting further research in the field of EZD, it seems reasonable that the survey covers a larger group of units from chosen voivodeship, and then the results are grouped and conclusions are formulated by type of units (counties, cities, towns, municipalities). Use of front- and back-office systems and their integration in units of public administration is to serve successively increasing interest in public e-services. This is supposed to contribute to increasing the efficiency of public administration operations, as well as – in the later stages – to reducing the costs of their operations, by, among others, eliminating paper documents in particular in A2A communication.

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SYSTEMY FRONT-OFFICE I BACK-OFFICE W JEDNOSTKACH ADMINISTRACJI PUBLICZNEJ W WOJEWÓDZTWIE ŚLĄSKIM

Streszczenie: Artykuł przedstawia analizę porównawczą, dotyczącą wykorzystania technologii informacyjno-komunikacyjnych (ICT) w jednostkach administracji publicznej w województwie śląskim i pozostałych piętnastu województwach. Uwagę skoncentrowano na systemach oferujących klientom administracji publicznej e-usługi publiczne (tzw. systemy *front-office*) oraz systemy wspomagające procesy wewnętrzne w jednostkach administracji publicznej (tzw. systemy *back-office*). Wskazano również, w jaki sposób systemy te mogą zostać ze sobą zintegrowane w celu poprawy jakości obsługi procesów wewnątrz jednostek administracji publicznej.

Słowa kluczowe: e-administracja, systemy *front-office*, systemy *back-office*, integracja systemów *front-office* i *back-office*.