
IT System Functioning in the Polish Police as a System Supporting Management Processes

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Abstract:

Purpose: The aim of the article is to analyze the information systems used in the Polish police in the context of the possibility of using them in supporting of management processes.

Design/Methodology/Approach: The research used the method of functional comparative analysis. The functions of the IT systems used in the Polish police were examined and mapped onto main functions of management information systems indicated in the literature.

Findings: The article identifies the main functions of information management systems, and then compares the three main IT systems currently used in the Polish police with the functions they should have based on the literature. The systems used in the Polish police support the management staff only in selected areas. These systems still need the implementation of many functions, in particular those supporting the prediction of future phenomena, forecasting trends, as well as functions supporting the planning of professional development of employees.

Practical Implications: The conclusions from the research should serve as a recommendation for the direction of the development of information systems used in the Polish police.

Originality/Value: The presented research is unique in terms of analyzing the possibilities of using the systems used in the Polish police for human resource management, increasing work efficiency and effectiveness and for supporting the management staff.

Keywords: Management information systems, management IT systems, police information systems.

JEL Classification: L 86, M 15.

Paper Type: Research Paper.

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1. Introduction

In any modern organization (the police should certainly be such), effective actions depend primarily on the information they have, i.e., professionally processed news and data that relate to the area of interest of the organization and are of value to it in the decision-making process (Kisielnicki and Sroka, 2005). The police should base their activities on a well-functioning information collection and processing system so that management is effective and that the police can adapt to changes in the environment. It should be remembered that the adaptation processes of police organizational units to functioning as a modernly managed organization must always take place at various levels and in various areas of achieving goals (Letkiewicz and Majer, 2020). There is no doubt that to accelerate these processes, adaptation of new management supporting tools, such as information management systems (which are the subject of this article) will be decisive.

Such systems should provide to the police an increase in knowledge thanks to the collection of new data, which should come from various areas of the environment and should concern all spheres of police activity and to be able to effectively respond to new challenges. The police must act quickly and efficiently, but this depends on obtaining the right information early.

The most important characteristics of fast-acting organizations are (Kozmiński, 1997), customer orientation (the police provide services to the public), thinness and aggressiveness (optimal employment and high mobilization of all personnel), flexible structures (organized around processes and not for functions or hierarchies), responsibility (authorized employees make important decisions at every organizational level and no one is relieved of the implementation tasks), information is widely available (officers have access to it whenever they need it and are suitably qualified and equipped), the time of developing new solutions is very ambitious and constantly mobilizing, the organizational environment stimulates and rewards activity and continuous improvement.

The police will always need up-to-date, timely information that takes into account the needs of all decision-making levels in the organization. This means that the police information system should cover all areas of its activity, all levels of management and decision-making levels, and information needs should be precisely defined by the organization's operational strategy. All organizations, and in particular those responsible for security, should create their own model ensuring quick access to information and its proper distribution (Letkiewicz and Majer, 2020).

2. The Role of Information Management Systems – Literature Review

In the case of the police the information management system should be based on an extensive information infrastructure (in combination with IT solutions) connecting

the internal and external network (s) with the public, with its supervisory authorities and other services. The internal network should be organized on the basis of an information map that is constantly changing due to changes in the internal environment and advances in information technology. The map should contain information nodes (consisting of groups of officers) in which information activities are performed (including document processing, data retrieval and communication) and information flow lines between nodes determined in accordance with the requirements of the so-called inverted information pyramid (at the top of which is the most valuable information, answering the questions "who, where, when, how" and further below in the pyramid, important details about the event, and at the bottom of the pyramid general information, background of the events, etc.). This means that where the power is concentrated, less detailed and more condensed information with a broad cross-section is needed, giving an overview of the entirety of the organization's operation and its relations with the environment, facilitating integrated management (Ingalls, 1976).

In addition, IT information systems for law enforcement should be supported by artificial intelligence (AI) systems, the tools of which can bring incredible benefits in terms of extracting knowledge (data mining) from databases, inference and finding the causes or source of certain phenomena and events. The use of artificial intelligence is not intended to replace a human being in the decision-making process (Jarrahi, 2018; Duan *et al.*, 2019; Marecki and Mączka, 2015) which would be particularly dangerous in the case of decisions made in the police, but is another tool for the managerial staff, by means of which their decisions can be made on the basis of more reliable analysis of the problem and information (Raaijmakers, 2019).

Information has multiple functions in an organization. It depends on the goals they serve, the management level, the management's involvement in shaping the future of the organization, the degree of its activity and competences, the complexity of the operating conditions, the organization's innovativeness, etc., (Flynn, 1992; Szczepańska-Woszczyna and Dacko-Pikiewicz, 2014). From the point of view of the needs of management, three types of information can be distinguished. The first to help in decisions making. The second, which should ensure adequate communication between employees and their groups, and the third, which are to meet the other needs of their users (members of the organization). On the other hand, from the point of view of employees' needs, they can be divided into information about the entire organization (orientation information), information about the conditions and results of their own work and position in the organization (information designing and correcting behavior).

The above-mentioned division of information types is also followed by various types of information management systems. The systems support various areas of the management process. There are information management systems that support: effectiveness and efficiency, accounting, investment analysis, supply chain management (materials requirements planning and purchasing), human resource

management systems (employee record management, promotions and recruitment, training, evaluation, compensation, and benefits management), consumer privacy systems (trust management) (Sousa and Oz, 2014).

Based on these areas, the main division of information management systems can be identified: Executive Information Systems (EIS) - supporting executives of the organization. The systems of this group provide senior management with the flow of information from internal and external sources to meet strategic decision-making needs. They have historical data as well as more and more often use the possibilities of artificial intelligence to predict future trends. Decision Support Systems (DSS) – are systems dedicated to senior managers, which serve to better visualize the collected data and support and facilitate the analysis of this data in order to better make decisions in each step of decision process.

Another group are Management Information Systems (MIS) which are used to support the entire organization (at all levels) in accessing information based on the databases owned by the organization. They are used to provide information in all decision-making processes at all levels. Transaction processing systems (TPS) are systems for collecting and storing data in IT systems, which data are then used by the systems described above (Hasan, 2018).

Access of the management staff and employees to the above-mentioned types of information, as well as to various types and functions of management information systems, is extremely important for the efficient management of people, tasks, and professional development for such a large institution as the Polish police, especially with the constant increase in employment in the police. Reliable information about the organization and its possible difficulties or successes and prospects inspire trust in superiors, create a good psychosocial atmosphere, shape attitudes of commitment and strengthen the manager's authority, as well as eliminate the feeling of threat and uncertainty (Gros, 1993).

When analyzing the internal factors of the organization determining its success, it should be remembered that the employees of the organization are primarily interested in information related to the threat of liquidation or reduction of jobs, actions taken in the field of health protection, social or pension policy, future salaries, existing difficulties in the implementation of tasks, causes and possible remedial measures being prepared (Fathian *et al.*, 2019).

For the management staff, information that determines decision-making will be particularly important, especially information related to programming the future and creating the future vision of the organization. Managers must solve increasingly difficult tasks and react quickly and flexibly to changing conditions in the environment, while interacting with more and more demanding stakeholders inside the organization (Szczepańska-Woszczyzna *et al.*, 2015). For this reason, information should be collected and processed in an orderly manner.

The information management system should be tailored to the needs and cover all areas of the organization's activities, all levels of management and decision-making levels, as well as provide comprehensive and up-to-date information, so that the organization can react quickly to changing internal and external conditions. Information provided by the system should be in a form that can be used directly (without processing), and the path of information flow should be as short as possible and consistent with the organizational structure of the enterprise. Additionally, the system should be secured against unauthorized access as well as against undesirable influence of informal information and should be constantly improved (Penc, 2007).

It is also obvious that IT in modern management is becoming a key element. Management is nothing more than making decisions and their implementation, and without information management systems (decision support systems and even CRM systems) it is impossible to improve their effectiveness (Lis and Szczepańska-Woszczyzna, 2015). The management staff who will not be able to use advanced IT methods and tools (e.g., for computer modeling, prediction of future phenomena and trends) will soon become organizationally dysfunctional (Letkiewicz, 2012).

The police information system should contain two main subsystems: the social information system and the strategic information system. The first - the social information system - should collect data on the response of the recipients of services provided by the police, which is a critical element in the success or failure of the achievement of its strategic goals. On the other hand, the second subsystem - the strategic information system - should support the management in setting goals, formulating a vision, and designing and implementing the adopted strategies (Hill and Jones, 1992).

3. Materials and Methods

The object of the study was to analyze the information systems used in the Polish police in the context of the possibility of using them in supporting of management processes. The research used the method of functional comparative analysis. The authors of the study analyzed the three main information systems currently used in the Polish police in the context of their functions comparing them with the functions that the information management systems should have based on the literature cited in the previous subsection.

The authors stated the research questions concerning the type of information that the system provides and the functions of the analyzed police systems which can support management processes. The criteria of evaluation are the functions of information management systems indicated in the literature. The results of the comparison are presented in a tabular summary along with a description of the functions that fit into those supporting management processes.

The three main systems that were analyzed: ERCDS (Polish: *Elektroniczny Rejestr Czynności Dochodzeniowo-Śledczych* – which means: electronic register of investigative activities), KSIP (Polish: *Krajowy System Informacyjny Policji* – which means: National Police Information System) and SWD (Polish: *System Wspomagania Dowodzenia* – which means: Command Support System). None of the aforementioned systems was created strictly for the management of an institution, however, to a certain extent, these systems fulfil such functions, and it was in this scope that they were tested.

The ERCDS system was created for the purpose of automated electronic processing of information and personal data collected by the police in the course of criminal, penal, fiscal and juvenile investigations. The most important elements registered in the ERCDS include: the register of investigations, the book of material evidence, the register of specialist examinations of court experts, register of suspects, register of technical and forensic activities, register of positive results of checks obtained from domestic or foreign databases of biological traces or dactyloscopy, list of court experts and sworn translators, index of suspects, index of notifying and victims Stavrinou and Zombanakis, 1998). The main task of the system is to register the investigations and activities of policemen during investigations, to supervise the course of investigations, to prepare reports, to retrieve basic information about investigations (Zarządzenie Nr 31, 2020).

The KSIP system contains information about suspects of committing crimes prosecuted by public prosecution, persons wanted, missing, or persons trying to hide their identity, as well as about lost or stolen property. The system is focused on information about the crime itself and the method of action of the perpetrator (*modus operandi*), it allows you to generate statistics on crimes, perpetrators, common features of perpetrators, etc. and conducting analyses in terms of the dynamics of initiating investigations and detecting criminals (Zarządzenie Nr 70, 2019).

The SWD system is a system supporting activities undertaken on the basis of reports received by the duty officers of the police units and received by other policemen and on the basis of arrangements made by individual police services and information obtained in connection with handling reports from emergency notification centers. This system supports the ongoing recording of notifications about incidents, interventions and other actions taken by the police. The system is designed to support the commanding staff in the coordination of police activities by optimizing the use of the available personnel and logistics potential (Zarządzenie Nr 12, 2020).

4. Results

The first area studied was the diversification of access rights and the type of information that the system provides depending on the position held (in analogy to EIS and DSS systems). The analysis showed that all the tested systems have selected

functions that allow the management (commanders, heads of departments) to access summaries, statistics, and summary reports. Similarly, to EIS systems, police information systems have access to historical data that can be analyzed by management.

However, the analysed systems do not have access to external data, such as, for example: Internet news, social media, press articles, which would refer to the public perception of police activities. The reaction of the "outside world" to the actions of the police could allow for better strategic decision-making by management. The analysed systems also do not have the possibility of using mathematical and statistical methods as well as artificial intelligence methods to predict trends in "business processes" (need to increase employment, material needs, etc.) and do not have the functionality to support the management in drawing conclusions. The amount of data contained in these systems is very large. Lack of support in inferring, predicting trends and interpreting these data forces the management to judge subjectively and make subjective decisions, which may not always be optimal.

Another research area was the providing information necessary to execute current tasks and make decisions in everyday work at every level of employment, based on databases belonging to the institution (in analogy to MIS systems). It can be stated that the analysed systems together (complementing each other) fully fill this area for lower-level employees. Both investigative and operational policemen obtain from the examined systems all the information needed to carry out current official tasks (in the context of management - case history, list of investigative activities, ordered expert opinions, etc.). This function is fulfilled least by the KSIP system, which was created to store information about the crime itself and the perpetrators, and not to organize the work of a policeman.

Another area of research included the analysis of the functions of the examined systems that can support the management in increasing the efficiency and effectiveness of employees' work. From the point of view of this area of management, the most important is the possibility of examining the workload of individual employees (policemen), analysing the stages of their implementation of individual tasks (activities), assessment of the estimated time of completion of an investigation, etc. Among the examined systems, the ERCDS and SWD systems have indirect functions in this area. The ERCDS system allows the supervisor (head of department) to monitor the investigative work that the subordinate carries out in a given investigation. Depending on the type of the investigation (the classification of the crime and its complexity), the number of activities necessary to perform them differs from one another.

The ERCDS system allows the supervisor to view the number of investigations handled by subordinate police officers. The disadvantage of the system is that the supervisor cannot collectively display the number of activities performed by employees, to do so, the supervisor must display the details of each case

(investigation) conducted by the employee and independently calculate the number of activities per employee. Selected cases (even for one type of crime) may require performing a different number of steps. The number of performed and planned activities is a more reliable factor of the workload and development of subordinate police officers.

Additionally, the system does not have any mechanisms to assess how much time, commitment and technical resources are required to carry out the activities planned by the policeman. The supervisor must use his own experiences and subjectively judge the time it takes for the employee to complete the investigation. Allocates further investigations to the employee based on self-assessment. The system does not have visualization tools (graphs, charts) of employee workload, which makes it much more difficult for the supervisor to interpret and assess the workload of employees.

The authors of this paper note that the implementation of basic tools to visualize the workload of employees in the context of ongoing and planned investigative activities would significantly improve the possibilities of using the system for management the burden on policemen. Additionally, the implementation into the examined system of modern mathematical and statistical methods, particularly the methods of artificial intelligence, would allow for predicting the duration of planned investigative activities on the basis of historical data and would facilitate the process of planning the workload of employees.

The SWD system also has a few elements that can be classified as functions supporting the process of managing the efficiency of police officers' work. The duty officer has access to the visualization of the distribution of units in the field (visualization on the map) and can make decisions which unit to send to the incident. It also has a view of the statistics on the handling time of a given event by the unit. The system does not assist the duty officer in calculating the distance of the units to the event, nor does it predict how long the nearest unit will be busy handling the current event. The duty officer must establish this through radio or telephone contact with the unit. The system has historical data of similar cases that could be used to predict the event handling time.

It highlights the fact that the examined systems were created as registers of activities, events, crimes, evidence, etc., and not strictly tools supporting management processes. These systems do not predict phenomena, do not calculate trends, do not predict needs, work productivity, etc., although it could do it on the basis of historical. Inference is based only on the experience of superiors. The conducted analysis shows that the ERCDS system is the closest to the functions corresponding to the management information systems supporting the management staff, however, still too many processes are based only on the experience of the management staff. The appropriate development of the examined system, and in particular the implementation of statistical methods and artificial intelligence

methods, may make this system really support the management in making strategic decisions and have a positive impact on the continuous increase of the efficiency and effectiveness of police work.

From the point of view of an employee, none of the examined systems supports him in the area of work performance management or motivation. The system should indicate to the employee, for example, his performance (that it is better or worse than average), indicate development goals, compare it to performance in similar periods from the work history, etc. None of the examined systems implements this. The employee can view the history of his investigations, he can see the time of their implementation, but the system does not have any analytical tools, thanks to which the employee could optimize the duration of investigative activities.

Training is an important element of managing the potential of employees. Unfortunately, none of the examined systems supports management in planning employee training and professional development. This is a serious drawback. The lack of system support causes huge difficulties in making decisions about people who should be sent to training. The authors of this paper note the greatest shortcomings in the examined systems in this respect. There is no reference to an employee's expertise in the system. Storing such information in the IT system would allow for a better selection of policemen for cases, as well as for the appropriate selection of people who should be sent to additional training.

In terms of the functions of the system supporting the management of human resources and technical means (which is particularly important in the formation of the police), only the SWD system fulfils them. The unit managing officer has an overview of the tasks and activities undertaken by police officers and the events that have happened (in coordination with other emergency services), thanks to which he can manage the movement of policemen and resources. However, none of the examined systems allows the manager to plan the workload and work schedule.

The table below presents a summary of the performed analysis (Table 1).

Table 1. *Summary of the analysis of the functions of police information systems as information management systems*

Does the system function as an information management system in the area of:	System		
	ERCDS	KSIP	SWD
Restricting the right of access depending on the job position and type of information presented	Yes	Yes	Yes
Access to external data (ex. Internet news, social media, press articles, referring to the public perception of police activities)	No	No	No
Mathematical and statistical methods (or artificial intelligence) to predict trends in "business processes"	No	No	No
Providing information necessary to execute current tasks and make decisions in everyday work at every level of	Yes	No	Yes

employment			
Supporting work efficiency control	Yes	No	Yes
Work performance management and motivation	No	No	No
Planning employee training and professional development.	No	No	No
Scheduling (human and technical resources)	No	No	Yes
Office automation (access to currently valid forms and documents)	Yes	Yes	No

Source: Own study.

5. Conclusion

IT management systems support managers in all industries and professions. The police, as a special institution that cares about the safety of citizens, should support itself with such systems in order to constantly improve and coordinate activities, and to increase its effectiveness. However, for this purpose, it is necessary to change the approach of management and change their orientation from "today" to "tomorrow" - opening up to new methods and technologies of managerial work supported by modern IT systems. The full organizational success will be possible after the inclusion in the process of improvement activities of all police officers at each workplace (Justyński *et al.*, 2021).

Motivation and possible change in the attitudes of officers and management may result, *inter alia*, from increasing the quality and efficiency of work thanks to the use of modern information management systems, which should be supported by an officer at each work position (Hys, 2015).

In this paper, the authors analyzed the IT systems used by the Polish police in relation to the functions that should be fulfilled by IT systems supporting management processes at every level of work. The conducted analysis showed that in the context of supporting management processes, the analyzed police systems fully conform only to the model of MIS systems - supporting the work of the lowest-level employees in the implementation of their current basic tasks. The examined systems also support the management staff, but not fully.

“Managers” have to subjectively assess the effects and predict trends on the basis of historical and statistical data, because the systems do not have any tools to predict environmental phenomena and predict trends, and thus, decisions made by management may be inconsistent and highly dependent on experience and interpretation data by the given “manager” (superior, commander, commandant). In this area the authors see the greatest need for the development of these systems. The systems also do not support management in terms of planning employee professional development, as well as do not provide the employee himself with virtually any functions enabling self-assessment of the efficiency and effectiveness of his work.

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