

Lieutenant Alena Chrastilová, M.A.

Ph.D. student of the Police Academy of the Czech Republic in Prague
Department of Economic Crime, SKPV Police of the Czech Republic (SKPV -
criminal police services and investigations), Prague III

Dr. Zdeněk Kovařík, CSc.

Police Academy of the Czech Republic in Prague
Department of Science and Research

Optimisation of activities of the Czech Police related to dealing with crimes committed using mobile phones

The article submitted follows the article published under the title: *Verification aimed to correctness of identified areas in investigation of crime committed while using mobile phones, based on exploratory factor analysis*.¹ It provides records allowing verification of the research presumption related to the influence of “police staff motivation to self-education in digital technologies” on four subject areas related to the detection of crimes committed using mobile phones.

Mobile phones are nowadays fully included in human life. This device enters into wider aspects of society by increasing the number of devices, increasing the volume of data stored on them and by the digitization of routine activities. With the development described, there is a natural increase of frequency of cases where mobile phones (as well as other technologies based on digital data processing) play their role in security practice; respectively in criminal proceedings, since they are usable in the vast majority of forms of crime from the banal to the most serious ones.

The utilisation of mobile phones does not only concern cases of common crime investigation, but it can also have a significant impact, for example, on dealing with corruption, serious economic crime, extremism, terrorism, organised crime. These areas of crime have long been considered as the priorities of the Czech Police. In some situations, a mobile phone may be used as a physical object of attack (for example, it is stolen, misappropriated or damaged), but it is also used as an instrument for committing crimes (blackmail, bullying, communication and planning in a group of offenders up to the bizarre cases of using it as a weapon) and it is increasingly becoming a target of criminal activity (risk of installing malicious applications).

Even if a mobile phone does not play any of these roles, it can at least contain usable information about activities (for example, regular legal ones) of any person or system, e.g. the activities which may have a significant impact on security practice. Although, ideally, traces are used as evidence, even if they are not used as evidence, they may be used as a source of operative information to enable law enforcement authorities to identify additional evidence, relations and regularities of events or groups. Those which would otherwise be discoverable by chance only; or they can also facilitate the process of verification of investigation versions of a case. Some research teams even investigate the consequences of mobile phone proliferation and claim that

¹ See: KOVAŘÍK, Zdeněk and Alena PEJČOCHOVÁ. Ověření správnosti stanovených oblastí při výzkumu kriminality páchané s využitím mobilních telefonů s využitím explorační faktorové analýzy. *Bezpečnostní teorie a praxe*. 2016, č. 3, s. 93–112. ISSN 180-1-8211.

their expansion in society is used as a protective element, especially in cases of rape and various types of assault.¹

Introduction to the Issue Theory

Electronic evidence is increasingly used in the process of evidencing, whereas they should accompany certain claims; they can be of crucial importance for proving any fact under § 89 of the Rules of Criminal Procedure. This evidence does not often have the nature of a thing or any other classical legal category; they are just pieces of information somehow saved in storage place. In order to be used as documents for decision to be made, it is necessary to assemble them by a legally established evidence-making procedure while all the principles set out above are complied with. The legal rules of the Czech Republic do not mention electronic evidence anywhere.² Although the definition is absent, it can be assumed that this fact does not affect their use. According to the Law of Criminal Procedure, any information can be used as evidence. Despite not being explicitly defined in the law, this also includes electronic information.

This digital information must be captured during the preparatory proceeding. In the court, electronic evidence can be made using technical equipment, or by reading the official record of the Police of the Czech Republic dealing with the content. Additionally, evidence may also include viewing part of the electronic evidence in paper form (e.g. it may be a photo or an image of a device display, including an SMS message, for example). The Law of Criminal Procedure does not specify any means of proving certain facts. Proper evidence (e.g. a form of cognition) in connection with mobile phones may be as follows:

- Wiretraps and recording of telecommunication operations
- Data from telecommunication operations
- Interview with an expert
- Examination of a matter
- Digital track (both in material and in paper form)

Problematic Aspects – Vladimír Smejkal finds the following to be the five most significant problematic aspects for providing proof in the case of digital evidence:³

1. Physical and logical presence – it is not possible to determine where an offender was physically located (anonymity within the local network, anonymizers within the Internet; these are usually indirect pieces of evidence). It is always difficult to

¹ KLICK Jonathan, John MACDONALD and Thomas STRATMANN. *Mobile Phones and Crime Deterrence: An Underappreciated Link* [online]. [B.m.]: University of Pennsylvania Law School. Institute for Law and Economics. [quotation 3. 11. 2015]. Available in: <http://ssrn.com/abstract=2130234>

² The term "Electronic Device" is only contained in § 2 c) of Act No. 480/2004 Coll., Certain Information Society Services, as amended. Based on this provision, the electronic products are, in particular, the electronic communication network, electronic communication equipment, terminal equipment, automatic call and communication systems, telecommunication and electronic mails.

³ SMEJKAL, Vladimír. *Kybernetická kriminalita*. Plzeň: Aleš Čeněk, 2015. ISBN 978-80-7380-501-2, p. 502.

connect a certain activity on a digital device to a particular person. This is because it is always possible in the court proceedings to argue that the device was used by someone else.¹

2. Time (time settings can be changed on devices at any time, except for such cases when it is connected to a time normal or other source of unified time and the setting cannot be modified or disabled).
3. Data readability (encryption, password protection, etc.).
4. Identification and authentication (assignment of a document to a person if it does not include an electronic signature).
5. Argumentativeness of evidence (for example, non-compliance with the criminal proceedings procedure, procedure of experts who participated in the proceedings as experts).

It is necessary to add the issue related to transferring information into a sense-sensible form where the court must also deal with the transmission during the evaluation of the evidence aiming at the fact of whether or not there is loss or distortion of some information. The conversion options are, for example:

- 1) Transferring the electronic evidence into a paper documentary form (this may be a photo of a phone's display or an official record related to the examination of a mobile phone which includes information in the phone's memory). Utilisation of an official record is primarily intended for operational purposes; it may only be used as evidence when the statutory conditions are met.
- 2) Making evidence in digital form may include a sound recording. However, official procedures do not exist. See, for example, 5 Tdo 572/2009: *“If there is no doubt about the authenticity of the wiretrap and recording of telecommunication operation, and also about the accuracy of transcription of its content, it is not excluded that the proof is made only by reading the transcript of the telephone conversations, especially when none of the parties insisted on listening to the record. In such case, it is necessary for the transcription to be captured in an objectively retrievable form which allows its reading.”*
- 3) Processing an expert's evaluation where an expert responds to the questions asked by the authority of a criminal suit – where it is permitted by the economics of the criminal proceedings, preparation of an expert's report and interview with the expert are the most appropriate forms, given that the evidence obtained from an

¹ For example, the Resolution of the Supreme Court dated on 15. 2. 2012, File No. 3 Tdo 198/2012, where one of the pieces of evidence was the fact that the accused had a call by a transmitter at the location of perpetration at the time of committing the crime; or the Supreme Court's resolution of 26 June 2013, File No. 4 Tz 24/2013 in the case of threatening phone calls at the main railway station in Prague where M. B. said on the line 112 that there were bombs placed in the locker in the main railway station thus causing closure of the station, delay of trains and failure to complete their routes. The probable reason for that was the termination of relationship with his boyfriend who was a prostitute at the station; and this was how M. B. wanted to make his activities uncomfortable. Then, during his custody, when he could not explain who called the emergency line using his telephone, he began to develop the theory in the court's letters that it was witness M. (ex-boyfriend) who sometimes slept over night with him or someone to whom the witness passed the mobile phone of the accused to use.

independent expert's opinion is naturally more convincing than the evidence arising from the data manually extracted by the police.

Electronic evidence must be sensible and must also have a predicative value. There is an analogy with a document in a foreign language (it is not possible to use it until it is translated into a comprehensible form). The authority of a criminal suit must also assess whether the mobile phone should be taken in a particular case (or simply decide whether submitting information in a different form without the device itself is sufficient). Ideally, the submitted material includes the original device,¹ a copy of the original device, abstract of the device and a record of data analysis. However, it is not necessary to provide the whole source of evidence and to bring it to the court for the sake of efficiency just because of one SMS message. Generally, confiscated mobile phones are perceived in the criminal proceedings as any other material matters and the data stored in them are also assessed in the same manner. This means that the police authorities may legally extract all the data stored on the mobile phone, including documents, diaries, photo albums, etc.

Prof. Smejkal states that, in addition to completing electronization of justice and the progress with introducing electronic signatures, the **training** of all actors in court proceedings is also an important issue. Here, the training must be conducted in such a way so as to ensure that judges, prosecutors and lawyers have an idea of what can and cannot be used as electronic evidence. They must also be aware of the **limits** of computer forensic analysis and how to work with forensic experts.² Other authors, including Porada and Rak, also state that they are not always accepted in the court due to a lack of wider awareness of the possibilities, qualities, reliability, argumentativeness and consequently due to practical use of the digital tracks.³ The same problem is solved abroad, for example, in the case of *Lorraine v. Makel American Insurance Co.* 241 F.R.D. 554 (D. Md. 2007) or *Vinhnee v. American Express Travel Related Services Company, Inc.*, 336 B.R. 437 (9th Cir. BAP 2005) where the court rejected electronic evidences due to their lack of authentication.

This is also related to court's knowledge of the issue processed in this thesis. Although, for example, the topic of digital tracks is also experiencing the development in a process of theoretical development, the topic of how tracks are accepted in court is inadequately dealt with by authors in the field of study. As stated by Ravencroft and McAlister, it is advisable to start thinking without the familiar constructs while in any training in cyberspace or digital environments, e.g. the constructs which normally exist in the physical world.⁴ However, such forms of education are hardly available. One of the papers dealing with the issue of education and perception of digital tracks is, for

¹ Even if information from wiretraps is used as evidence, it is advisable not to lose the original recordings.

² *Electronic evidences - present or future times of the Czech judiciary?* [online]. [quotation 6. 8. 2015]. Available in: <http://www.bulletin-advokacie.cz/elektronicke-dukazy-soucasnost-ci-budoucnost-ceskeho-soudnictvi>

³ RAK, Roman a Viktor PORADA. *Vlastnosti digitálních stop a jejich dopady na forenzní šetření. Soudní inženýrství.* 2008, Vol. 16, No. 4, pp. 91–107. ISSN 1801-2190.

⁴ RAVENSCROFT, Andrew and McALISTER, Simon. *Digital games and learning in cyberspace: A dialogical approach. E-Learning* [online]. Vol. 3, No. 1, pp. 37–50. [quotation 7. 8. 2015]. ISSN-1741-8887. Available in: http://interloc.uel.ac.uk/publications_files/ravenscroft-e-learn06.pdf

example, the dissertation thesis by Gary Craig Kessler, entitled *Judges' Awareness, Understanding, and Application of Digital Evidence*. The results of this thesis show that judges are aware of the importance of evidence obtained from digital resources, but they do not know all of these resources themselves. They believe that digital evidence must be authenticated and verified, as with any other type of evidence. They believe, however, that this is the role of lawyers, who are expected to deny these pieces of evidence appropriately. The research also shows that judges are reasonably well-familiarised with digital evidence, since they recognise that such evidence can be easily manipulated or misinterpreted. Less-technologically-capable judges are more afraid of the evidence than their more knowledgeable colleagues. Research of the above-mentioned author also shows that it would be advisable to support education in computer and Internet technologies. Training in the area would enable judges to better understand the arguments presented by lawyers and to understand testimonies evidenced by technology witnesses. It can be assumed that the same results would be reached in identical research in domestic conditions.

The police authority plays an important role in the successful completion of the entire criminal proceedings. Although the law enforcement authorities have their impact on evidence finding as a whole, the role of the police authority and its conduct in the preparatory stage of criminal proceedings is absolutely crucial. Usually, the police authority determines which means of evidence will be ensured and how. Therefore, they must also have knowledge in the field of legislation and the handling of the obtained items, including their storage. Timely and accurate information is crucial in criminal proceedings.¹ Also, if the data are not obtained in accordance with the law (in the manner and with the means specified in the Law of Criminal Procedure), they may be inadmissible in court proceedings.² If the forensic traces are not obtained immediately, they may not exist after a certain period of time (months and years) when there is a court trial. In order for the Police of the Czech Republic to fulfil their role in society, it is necessary for its members to have sufficient conditions to carry out their activities. The theoretical part of this paper shows how complicated the data acquisition process is, given that the digital space is increasingly more and more difficult and contains an increasing number of data. The specific issue which has been selected for further investigation, therefore, is the role of the police in the provision and use of data from mobile phones. Above all, some evidences may not be provided if the process is violated at the stage when the evidence is manipulated by the police authority; however, in some cases the knowledge about their existence will be lacking. The police authority has a major role in fixing criminally relevant event and information; and the primary influence on timeliness and permanence of information documented. This role is irreplaceable in the vast majority of cases.

¹ LUEN, Tan Woei and Suliman AL-HAWAMDEH. Knowledge management in the public sector: Principles and practices in police work. *Journal of Information Science* [online]. 2001, Vol. 27, No. 5, pp. 311–318. [quotation 7. 10. 2015]. Available in: https://www.researchgate.net/publication/242926400_Knowledge_management_in_the_public_sector_Principles_and_practices_in_police_work

² See § 89, Sec. 3 of the Law of Criminal Procedure.

Research problem

Working in the state administration, in the security department, is highly specific, often very difficult and affected by many factors. It requires specific professional training, special knowledge, skills and personal characteristics. There is no adequately adjusted flexible stimulation system which would create conditions for developing the necessary work motivation of employees. This often results in qualified and experienced employees leaving for the private sector. It also results in the widening of discrepancies between the state and private sectors. This applies to policemen in the Police of the Czech Republic who are still under more and more pressure during their service. Requirements for their work are constantly growing, not only with regard to the increase in work quantity but also, more importantly, the complexity and difficulty of their duties.

As the theoretical part of this paper shows, the process of creating and obtaining information from mobile phones is complex and highly variable. It therefore puts high demands on the professional readiness of policemen and their personality profile, with an emphasis on psychological resistance, motivational focus and their moral profile. We are witnessing clearly increasing demands on policemen and their work, but on the other hand there is no information about how the policemen perceive these aspects during their service, how they assess some important determinants of success of their work related to obtaining evidence from mobile phones and deal with the issues of modern information and communication technologies. In fact, no relevant data are available to allow a deeper understanding of the nature and extent of the field of influence which determine (or at least co-produce) the success of policemen in this field.

This research problem feeds several basic sub-research questions:

- 1) Are the members of SKPV PČR (Criminal Police Service and Investigation) sufficiently ready for development in the field of digital technologies?
- 2) At what level is the knowledge of the issue of digital traces of the current staff of SKPV PČR?
- 3) Are the conditions for obtaining data stored on mobile phones for the purposes of criminal proceedings in the Czech Republic sufficient? What are the problems encountered by investigators and how do they solve them? Do they think that there is any difference between classical traces and digital ones in terms of working with them in criminal proceedings?
- 4) Are the members of the Criminal Police and Investigation open to education and self-education in the branch? What knowledge do they have, and how and where do they acquire it?
- 5) In which cases are the data of mobile phones used and how are they most often obtained?
- 6) To what extent do the current conditions during the processing of digital traces from mobile phones correspond to the needs of members of SKPV PČR (criminal police services and investigations)?

Revealing these white gaps within the empirical research can bring information and knowledge to the division sector and also lower units of management. This will allow for the better synchronisation of individual units of the whole system of providing and processing the traces by police authorities, increasing the quality of work of members of the SKPV of the Police of the Czech Republic.

Object and subject of research, objective of the research

The **object of the research** is represented by the processes through which the policemen of the Police of the Czech Republic provide and use the data during detection of crime using mobile phones and modern information and communication technologies.

The **subject of the research** is represented by selected opinions¹ of the members of SKPV of the Police of the Czech Republic in relation to the processes and conditions of obtaining and use of data during detection of crime using mobile phones and modern information and communication technologies.

The **objective of the research** is to map the field of opinions which reveal some subjective assumptions and objective conditions of work of members of SKPV of the Police of the Czech Republic (criminal police services and investigations), mainly their readiness and further potential development related to use of modern information and communication technologies during detection of criminal activities using mobile phones and transform these pieces of information into functional knowledge needed to improve the current state and optimise the management system of the Police of the Czech Republic in this field.

Objectives of the research

One of the important research objectives was to uncover the impact of policemen's motivation for self-education in digital technologies. The purpose was to verify the established research assumption using the material significance indexes for the categorised variables, namely the Cohen index "d" for comparing the influence of motivation to the average esteemed rough scores of four material areas.

Research prerequisite

To verify the impact of self-education, the following research assumption was formulated.

“Motivation” or “non-motivation” of the policemen related to the selection set for self-learning in the field of digital technologies will not have any substantive significance effect (Cohen's $d \leq 0.2$) on the difference between the values of the average esteemed scores of the four analysed areas (1 – average esteemed score of legislative conditions; 2 – average esteemed score of importance of modern technologies; 3 – average esteemed score of subjective and objective conditions; 4 – average esteemed score of professional readiness of policemen). An acceptable difference will be a value of Cohen's $d \geq 0.2$ provided that the interval of reliability of the materially significant difference does not contain a zero.

¹ The empirical research was only aimed at the opinions of policemen, not their attitudes with emotional and the conative component. For more details, see: VÝROST, Jozef. *Sociálno-psychologický výskum postojov*. Bratislava: Veda, 1989. 344 p. ISBN 80-224-0054-8.

VÝROST, Jozef and Ivan SLAMĚNÍK. *Sociální psychologie*. 2. přeprac. a rozš. vyd. Praha: Grada Publishing 2008. 416 p. ISBN 978-80-247-1428-8.

Concept of empirical research

The method of questioning and the method of controlled interviews were used to implement empirical research.

The empirical research was based on data collection using a non-standardised questionnaire. Advantages of this method mainly include anonymity of the respondents and thus their increased willingness to respond. Also, the possibility to examine a large sample generates a higher probability and objective view of the problem searched. On the other hand, the advantage may be represented by subjective responses, or risk of low percentage of return of the questionnaires.

Prior to the distribution of the questionnaires, a pilot study was carried out on a sample of 5 members of SKPV OHK department of economic crime, Prague III, where respondents' answers to questions, questioning formulation and understanding were examined. Then, the final version of the questionnaire was made. The questionnaire was sent via intranet accounts to individual respondents using the .xls format. The questionnaire was distributed through an intranet email account to all available mailboxes found on service intranet. Sending occurred on 15. 2. 2016, whereas the cover letter included the deadline for sending responses before 1. 3. 2016. An email included a cover letter informing the respondent of the purpose of the research. Data collection took place from 15. 2. 2016 to 1. 3. 2016.

A questionnaire was based on 40 statements, with a seven-step scale of possible answers (1 – completely agree, 2 – agree, 3 – rather agree, 4 – neither agree nor disagree, 5 – rather disagree, 6 – disagree, 7 – completely disagree).

In the next part of the questionnaire, 15 selected aspects were monitored, with the intention of determining the degree of importance the respondents attribute to these aspects. A five-step scale was used (1 – very important, 2 – rather important, 3 – neither important nor unimportant, 4 – rather unimportant, 5 – completely unimportant).

In addition to the estimated "importance", these aspects are also monitored in terms of how "satisfied" the respondents are with these aspects (again using the five-step scale: 1 – definitely satisfied, 2 – rather satisfied, 3 – neither satisfied nor dissatisfied, 4 – rather dissatisfied, 5 – definitely dissatisfied).

In the third part of the questionnaire, the respondents are asked for additional information in 11 (closed and semi-closed questions and one open question). The last part contains identification signs, characteristics of respondents (age, duration of service, work orientation, employment position and achieved education).

The purpose of the questionnaire was to find out the opinion level of the respondents of the Criminal Police Service and Investigation of the Police of the Czech Republic within the selection set in relation to selected aspects of the whole process of providing data from modern technologies in criminal proceedings, finding quantified bases for the purpose of searching the relations, mutual ties among the selected identification signs and the own variable values of the questionnaire, mainly with regard to the verification of the research assumptions.

The **quantitative approach** is represented in tables and graphs while in the final processing the results of the analysis of absolute and relative frequencies and the results of verification of the research assumptions are presented.

The **qualitative approach** is reflected in the utilisation of knowledge from conducted controlled interviews, mainly in the interpretation of data which assess the variables and concretise the aspects of current and desirable practice.

Characteristics of the surveyed selection set

As the basic research sample to be examined, processors from District Departments of the Criminal Police Service and Investigation of the Police of the Czech Republic were selected; independent and dependent variables were identified in them by questionnaire survey. All the available email addresses of the processors (3803 processors) were individually copied from the directory of the intranet network of the Police of the Czech Republic (the basic set is $N=3803$); those the questionnaires were sent to. Only members of SKPV PČR were selected from the list, those from all regional headquarters, classified under the departments of general and economic crimes. From these, the processors were approached (the addresses of the file and administrative staff and the heads of individual units were removed from the sample), since the fact that such the sample corresponds best to the opinions of those who practically process the files both in the framework of verification and in the framework of investigation. In total, 3247 e-mails were delivered to these addresses (if they were undelivered, it means they were invalid or the boxes were full). In total, 1161 messages were read (out of 3247). Of these, 238 questionnaires were returned. Incomplete data from the questionnaires were completed via emails or telephone calls. The definitive set of 238 responses was determined (the selection set is therefore $N=238$). Therefore, the selection set was chosen on the basis of availability; it is not random selection where this factor naturally affects the data analysis methods used. Of the 1161 questionnaires which were read, 238 responses were received, which means a return rate of **20,50 %**.¹ Although the return rate is not high, it can be assumed that provides enough to draw conclusions about the phenomena investigated.

Basic methodological aspect for data analysis from non-random selections

The selection set was made on the basis of availability. For this reason, the conclusions cannot be generalised to a base set; they will only be applicable for a particular selection set. The above-mentioned facts show that the statistical significance (p -value²) loses its main meaning in this case; it can only be used for estimation of sufficiency of the range of a selection set.

¹ The rate of return cannot be determined using undelivered or unread e-mails, as these respondents cannot be considered to be addressed.

² The level of significance (p -value) reflects the strength of the relationship (association rate) and it is closely related to the size of the selection set. Sometimes it also reflects the influence of other parameters. Therefore, within the random selection, it is possible to have a relationship between the variables which express strong association. However, this is not statistically significant because the range is very small. On the other hand, there may be relationships which show extremely weak association but they are statistically very significant.

It is also seen in the previous point¹ that statistical hypothesis testing cannot be used to verify relationships between the variables, precisely because of the absence of a random selection. Therefore, the term “**verification of research assumptions**” (this term is not restricted by the conditions of inductive statistics) will be used to verify relationships between the variable values.

A) Analysis of dependencies for interval variables

In the verification of the research assumptions, the concept of so-called substantive significance (effect size) is used. The concept of substantive significance (size of effect, power of dependence) is increasingly being promoted as a „non-static“ size of effect. Conceptually, it comes from applications in controlled experiments where the most striking difference between statistical significance as generalizability and the true „substantial size of an experimental effect“ was demonstrated.

The dominant consideration in analysing the relationship between the variable values of the interval nature was to determine the size of the effect or, in other words, to determine the so-called substantive significance of difference in a mean value.¹ The following rates were used for our needs:

Cohen's "d", Cohen's "r". Cohen's standard has several variants which try to address some of its shortcomings.

Hedges's "g" standardises the difference between groups via so-called associated standard deviation to eliminate the effect of inhomogeneous variance in both groups. This approach provides the so-called associated standard deviation calculated on the basis of both the groups compared, where it is not necessary to assume homogeneity of variance in both groups.

Glass's Delta is based on the standardisation of the difference where the difference between the averages compared is divided by the standard deviation of the control group (second group).

The CLES statistics express a statistical estimate of probability (in per cent), with which a randomly selected individual from the first group (Police of the Czech Republic) has a higher or lower average esteemed score than a randomly selected individual from the second group (Fire Rescue Team of the Czech Republic). The conventionally recognised values² of the substantive significant difference of Cohen's "d" and "r" are included in Table 1a.

¹ For the term "substantive significance", the English language includes these expressions: effect of size, effect size, practical significance, substantive significance, logical significance, scientific significance, result importance or result meaningfulness.

² Jacob Cohen warned against the uselessness of the sizes of effect. A researcher should justify the acceptable substantive significance of the difference. However, it is sometimes difficult, and therefore the convention is being held.

Table 1a

	Effect Size Magnitude		
	Small	Medium	Large
<i>d</i>	0.20	0.50	0.80
<i>r</i>	0.10	0.30	0.50

The concept of substantive significance is further dealt with in literature.¹ Blahuš has recently been one of the promoters of substantive significance in our country. Jan Hendl takes a closer look at the issue in his book.²

2.8 Records for validation of the research assumption – influence of respondents' motivation on self-education in digital technologies

The results of data analysis have shown that “motivation of respondents to engage in self-learning in digital technologies” is the determining aspect having the most important substantive significance on the variables studied. The following results prove the statement in detail.

The values in Table 2.8a and Table 2.8b provide the results of verification.

Table 2.8a

Věcné oblasti	Motivovaní		Vybrané popisné statistiky			Nemotivovaní		
	Průměr 1. sk	Počet 1. sk	SD 1. sk	Interval spolehlivosti pro rozdíl průměrů (Bootstrap)		Průměr 2. sk	Počet 2. sk	SD 2. sk
Položky		n		Dolní	Horní		n	
Legislativní podmínky	3,245	79	1,206	0,01	0,69	2,896	111	1,136
Význam modern. techn.	2,156	79	0,816	-0,65	-0,15	2,556	111	0,873
Subj. a objekt. podmínky	4,472	79	1,068	-1,21	-0,69	5,423	111	0,759
Profesní připravenost	3,081	79	0,796	-0,82	-0,34	3,661	111	0,839

¹ See, for example: KOVAŘÍK, Zdeněk. Problémy profesní motivace pracovníků Policie České republiky. Brno: Tribun EU, 2012. pp. 23–41. LEDESMA, R. D., MACBETH, G., KOHAN, N. C. Computing Effect Size Measures with ViSta – The Visual Statistics System. *Tutorials in Quantitative Methods for Psychology* 2009, Vol. 5(1), pp. 25–34. Available in World Wide Web. <<http://www.tqmp.org/Content/vol05-1/p025/p025.pdf>> or: COE, R. It's the effect size, stupid. What effect size is and why it is important. Paper presented at the Annual Conference of the British Educational Research Association, University of Exeter, England, pp. 12–14, September 2002. Available in World Wide Web: <<http://www.leeds.ac.uk/educol/documents/00002182.htm>>

² HENDL, Jan. *Přehled statistických metod zpracování dat*. Praha: Portál, 2004. 583 pp. ISBN 80-7367-123-9.

věcné oblasti	subject areas
motivovaní – nemotivovaní	motivated – unmotivated
položky	items
legislativní podmínky	legislative conditions
význam moderní technologie	significance of modern technology
subjektivní a objektivní podmínky	subjective and objective conditions
profesní připravenost	profession readiness
vybrané popisné statistiky	selected descriptive statistics
sk.	group
počet	number
průměr	average
interval spolehlivosti pro rozdíl průměrů	confidence interval for difference of averages
dolní	lower
horní	upper

A lower value of arithmetic mean represents a more favourable rating. The SD sign shown in Table 2.8a is a standard deviation.

Table 2.8b

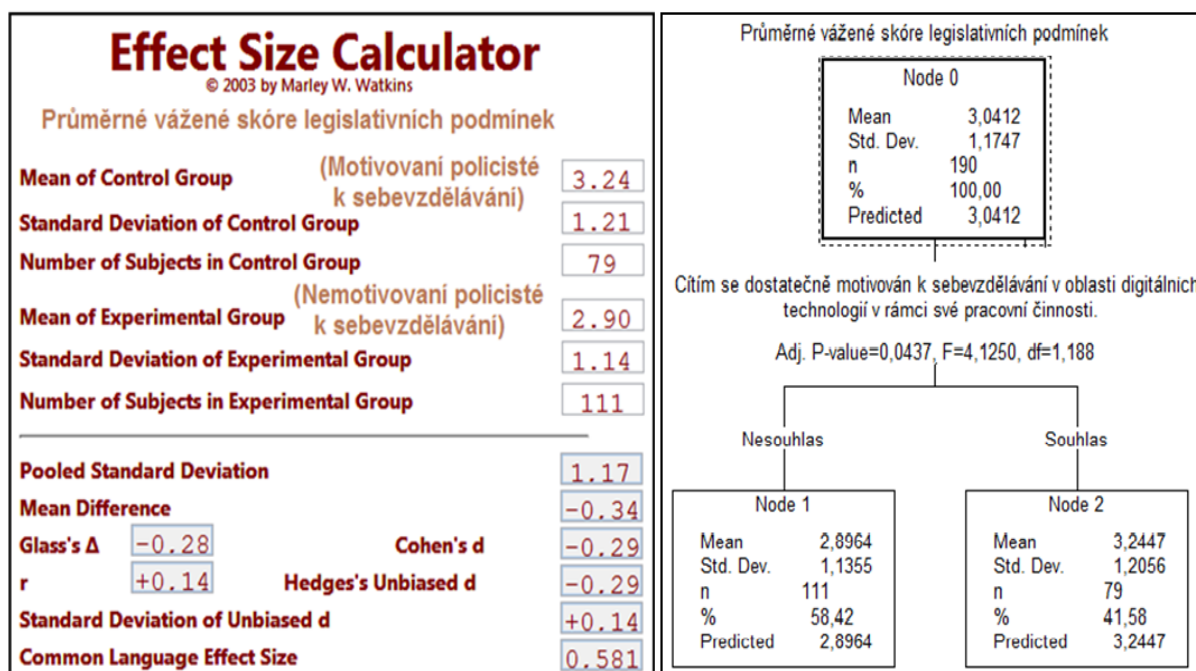
Věcné oblasti	STANDARDISED EFFECT SIZE							
	Effect Size	Bias corrected (Hedges) g	Standard Error of E.S. estimate	Confidence Interval for Effect Size		Effect Size based on control gp SD Glass's Δ	Effect Size correlation r	Statistika CLES
				lower	upper			
Položky	d	g						CLES
Legislativní podmínky	0,30	0,30	0,15	0,01	0,59	0,31	0,148	0,581
Význam modern. techn.	-0,47	-0,47	0,15	-0,76	-0,18	-0,46	0,229	0,631
Subj. a objekt. podmínky	-1,06	-1,05	0,16	-1,36	-0,74	-1,25	0,467	0,765
Profesní připravenost	-0,71	-0,70	0,15	-1,00	-0,41	-0,69	0,333	0,677

věcné oblasti	subject areas
motivovaní – nemotivovaní	motivated – unmotivated
položky	items
legislativní podmínky	legislative conditions
význam moderní technologie	significance of modern technology
subjektivní a objektivní podmínky	subjective and objective conditions
profesní připravenost	profession readiness
statistika	statistics

In Figures 2.8a to 2.8d there are all the necessary above-standard records for decision-making.

Influence of respondents' motivation to self-education in digital technologies proved to be materially significant in all four areas monitored (legislative conditions, importance of modern technologies, subjective and objective conditions, professional readiness of policemen).

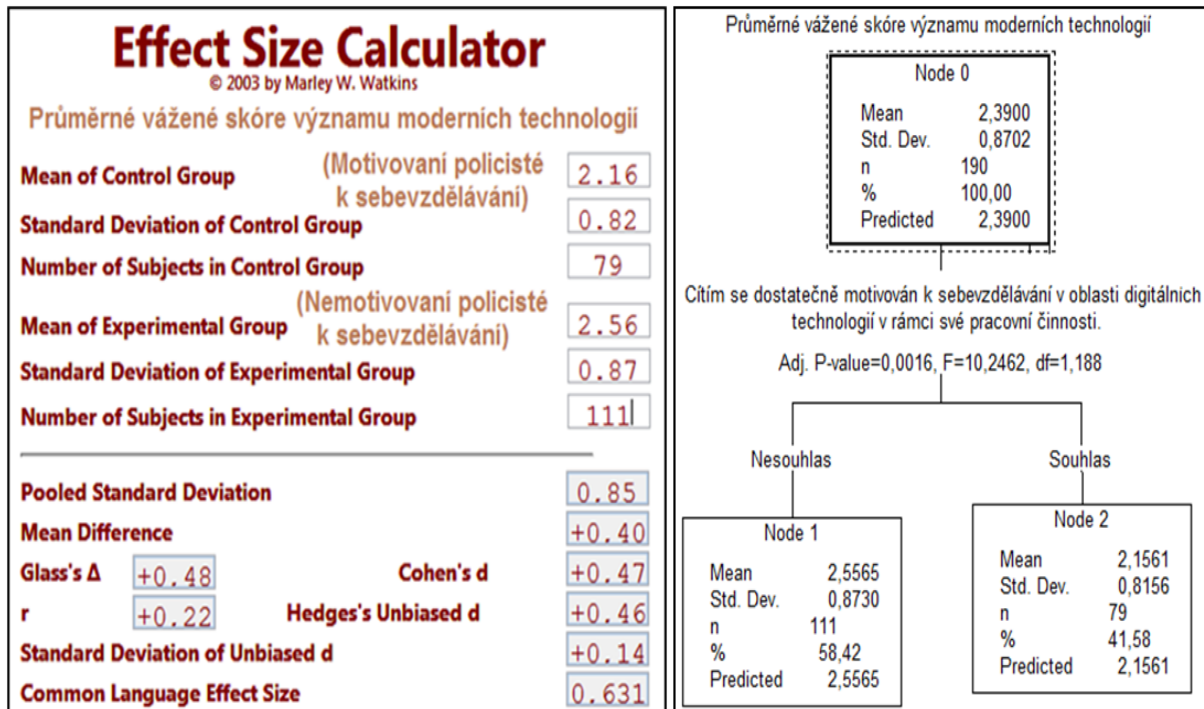
Fig. 2.8a



průměrné vážené skóre legislativních podmínek	average esteemed score of legislative conditions
motivovaní policisté k sebevzdělávání	policemen motivated to engage in self-education
nemotivovaní policisté k sebevzdělávání	policemen non-motivated to engage in self-education
cítím se dostatečně motivován k sebevzdělávání v oblasti digitálních technologií v rámci své pracovní činnosti	I feel motivated enough to engage in self-education in the field of digital technologies within my working activities
nesouhlas	disagreement
souhlas	agreement

The records in Table 2.8a, in Table 2.8b and in Fig. 2.8a **allow the possibility to reject the research assumption** (Cohen's "d" = -0.29, e.g. Cohen's "d" > 0.2). Confidence interval of the materially significant difference does not contain the point of zero. The data clearly show that the policemen of the selection set motivated to engage in self-learning in digital technologies reached a considerably higher score on the particular aspect than non-motivated policemen. In other words, they find the legislative conditions for investigation of criminal activities using mobile phones as less negative than police officers not motivated to engage in self-education.

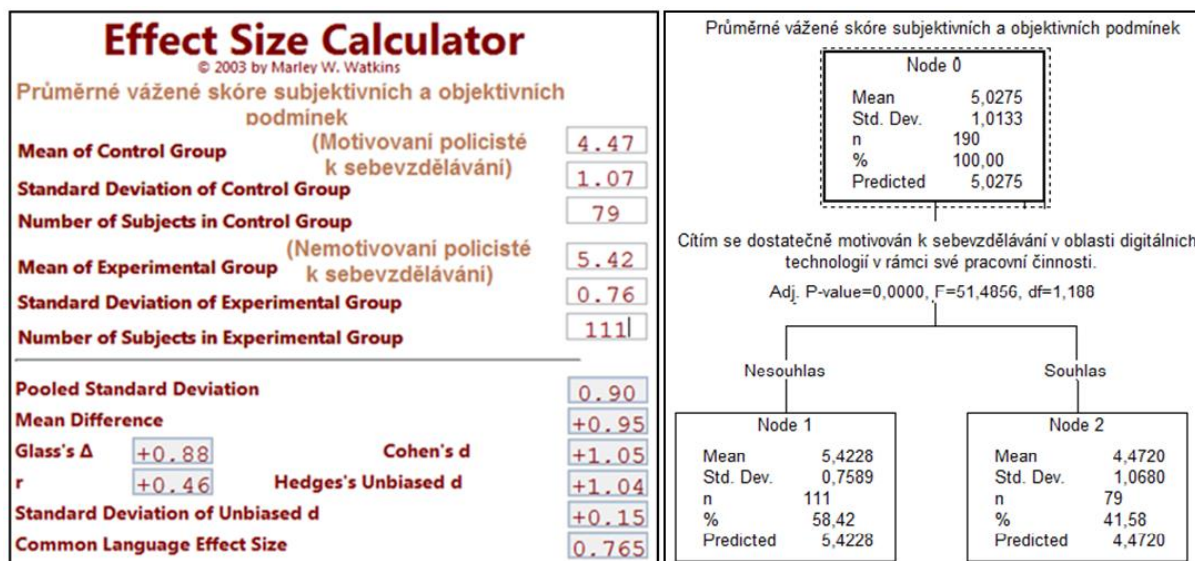
Fig. 2.8b



průměrné vážené skóre významu moderních technologií	average esteemed score of the modern technologies significance
motivovaní policisté k sebevzdělávání	policemen motivated to engage in self-education
nemotivovaní policisté k sebevzdělávání	policemen non-motivated to engage in self-education
cítím se dostatečně motivován k sebevzdělávání v oblasti digitálních technologií v rámci své pracovní činnosti	I feel motivated enough to engage in self-education in the field of digital technologies within my working activities
nesouhlas	disagreement
souhlas	agreement

The records in Table 2.8a, in Table 2.8b and in Fig. 2.8b **allow the possibility** to reject the research assumption (Cohen's $d = 0.47$; they are getting significantly closer to the intermediate materially significant effect). Confidence interval of the materially significant difference does not contain the point of zero. The data clearly show that the policemen of the selection set motivated to engage in self-learning in digital technologies reached considerably lower score on the particular aspect than non-motivated policemen. It means that they consider the significance of modern technologies for investigation of criminal activities using mobile phones as significantly higher compared to policemen not motivated to engage in self-education.

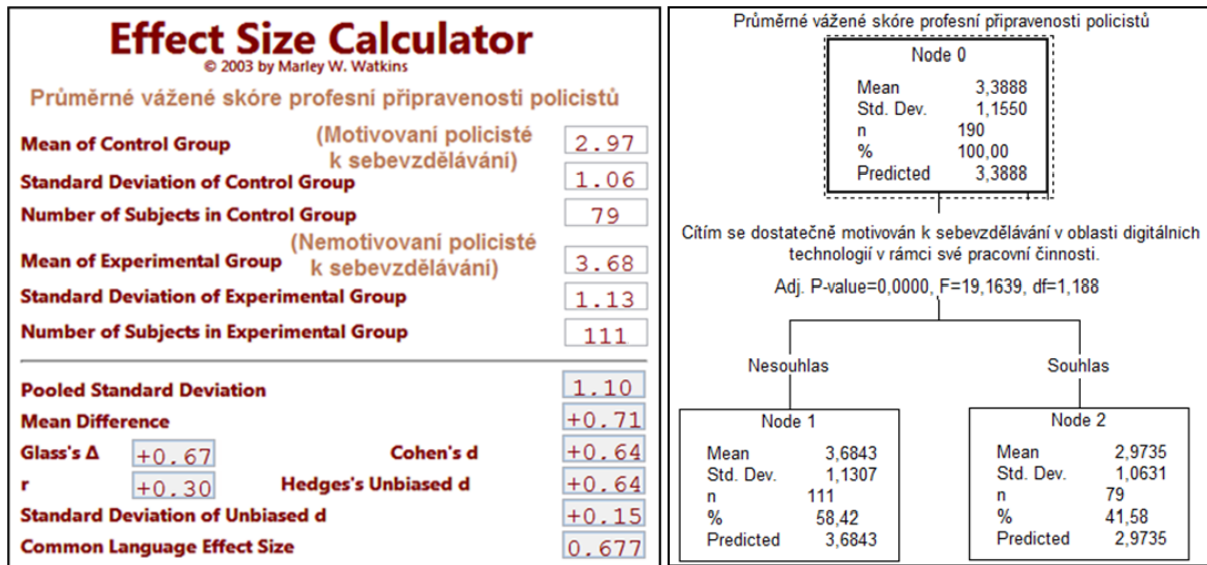
Fig. 2.8c



průměrné vážené skóre subjektivních a objektivních podmínek	average esteemed score of subjective and objective conditions
motivovaní policisté k sebevzdělávání	policemen motivated to engage in self-education
nemotivovaní policisté k sebevzdělávání	policemen non-motivated to engage in self-education
cítím se dostatečně motivován k sebevzdělávání v oblasti digitálních technologií v rámci své pracovní činnosti	I feel motivated enough to engage in self-education in the field of digital technologies within my working activities
nesouhlas	disagreement
souhlas	agreement

The records in Table 2.8a, in Table 2.8b and in Fig. 2.8c **allow the possibility to reject the research assumption** (Cohen's $d = 0.70$ exceeds the value of the intermediate materially significant effect). Confidence interval of the materially significant difference does not contain the point of zero. Figure 2.8c clearly shows that the policemen of the selection set motivated to engage in self-learning in digital technologies reached a considerably lower score on the particular aspect than non-motivated policemen. It can be interpreted, therefore, that they judge the subjective and objective conditions for the investigation of criminal activities using mobile phones far better, as compared with the policemen not motivated to engage in self-education.

Fig. 2.8d



průměrné vážené skóre profesní připravenosti policistů	average esteemed score of profession readiness of policemen
motivovaní policisté k sebevzdělávání	policemen motivated to engage in self-education
nemotivovaní policisté k sebevzdělávání	policemen non-motivated to engage in self-education
cítím se dostatečně motivován k sebevzdělávání v oblasti digitálních technologií v rámci své pracovní činnosti	I feel motivated enough to engage in self-education in the field of digital technologies within my working activities
nesouhlas	disagreement
souhlas	agreement

The records in Table 2.8a, in Table 2.8b and in Fig. 2.8d allow the possibility to reject the research assumption (Cohen's $d = 0.70$ exceeds the value of the intermediate materially significant effect). Confidence interval of the materially significant difference does not contain the point of zero.

Figure 1.4 clearly shows that the policemen of the selection set motivated to engage in self-learning in digital technologies reached a considerably lower score on the particular aspect than non-motivated policemen. This means that they consider the professional readiness for investigation of criminal activities using mobile phones as far better, as compared with policemen not motivated to engage in self-education.

The overall results of the analysis presented in Tables 2.8a and 2.8b, and in Figures 2.8a to 2.8d, prove that the positive motivation for self-learning in digital technologies has an acceptable material impact on all four analysed areas while considering our policemen (1 – averagely esteemed score of legislative conditions, 2 – averagely esteemed score of importance of modern technologies, 3 – averagely esteemed score of subjective and objective conditions, 4 – averagely esteemed score of professional readiness of policemen).

Fig. 2.8e

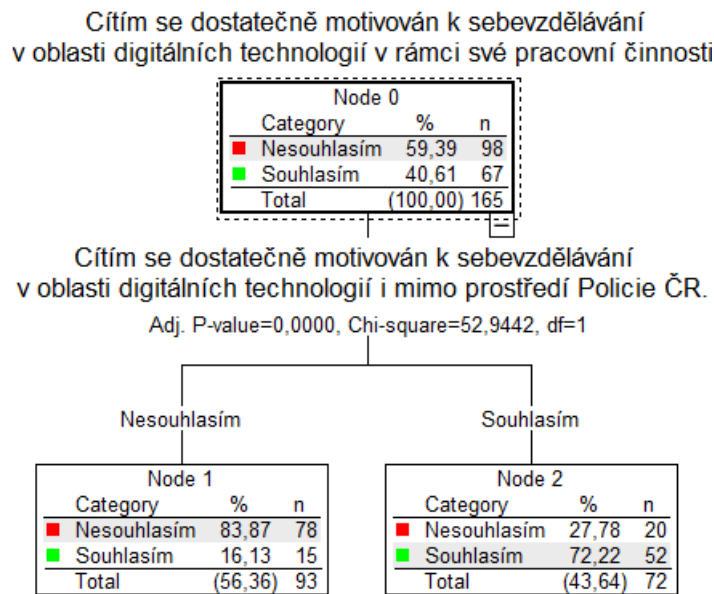


Fig. 2.8e clearly shows that "self-education in digital technologies as part of work activities" is very strongly connected with self-education in the given area, even outside the Police of the Czech Republic.

cítím se dostatečně motivován k sebevzdělávání v oblasti digitálních technologií v rámci své pracovní činnosti	I feel motivated enough to engage in self-education in the field of digital technologies within my working activities
cítím se dostatečně motivován k sebevzdělávání v oblasti digitálních technologií i mimo prostředí Policie ČR.	I feel motivated enough to engage in self-education in the field of digital technologies even outside the environment of Police of the Czech Republic
souhlasím	I agree
nesouhlasím	I disagree

Table 2.8c

Power	N	Goodman-Kruskal's tau	Cohen's w	Chi-Square	DF	Alpha	Beta
0.9389	165	0.321	0.566458	52.944	1	0.00000	0.06111

Table 2.8c shows, among others, that "motivation" and "non-motivation" in self-education in digital technologies have an impact on 32% of the common variance of answers in the field of self-education in the given area even outside the Police of the Czech Republic. It is a strong nominal statistic dependence. We can deduce that the respondents of the sample set of the Police of the Czech Republic who are motivated to engage in self-education in the field of digital technologies within their work are at the same time highly motivated in the given area for self-education, even outside the Police of the Czech Republic. In other words, they are willing to look for ways of promoting self-development in many cases outside the Police of the Czech Republic.

Overall summary of results in the verification of the research assumptions

When verifying the research assumption, the following summary can be made on the basis of this and other records.

Materially significant influence of motivation for self-education - rejection of influence on variables:

- Factor 1 – averagely esteemed score of legislative conditions;
- Factor 2 – averagely esteemed score of importance of modern technologies;
- Factor 3 – averagely esteemed score of subjective and objective conditions;
- Factor 4 – averagely esteemed score of professional readiness of policemen;
- P10 – The current state of conditions inside and outside the Police of the Czech Republic allows me effectively to deal with the modern technologies and the data stored on them;
- P17 – There is high-quality training and education within the Police of the Czech Republic, which has sufficiently prepared me for my work;
- P20 – The Police of the Czech Republic makes a sufficient effort for me to be properly prepared for my workload;
- P21 – Members of the Police of the Czech Republic have sufficient knowledge and technical conditions to use data from modern technologies;
- P22 – There is a conceptual and systemic approach to obtaining data from modern technologies;
- P23 – I have access to high-quality methodical instruments and materials;
- P24 – Access to professional information on the utilisation of modern technologies in criminal proceedings is simple;
- P29 – I have access to the equipment and tools needed to work with modern technologies;
- P30 – There is a good information system within the Police of the Czech Republic, which gives me the information I need in time and of the required quality;
- P31 – I think the opportunities for education in searching, obtaining and examining the digital data provided by the Police of the Czech Republic are sufficient;
- P32 – There is a sufficient knowledge base within the Police of the Czech Republic, from which I can draw the digital data if required;
- P35 – I have the time to devote myself to the self-study of digital data during my working hours;
- P37 – There is good platform for the sharing of practical experience and information within the Police of the Czech Republic;
- P11 – I believe that I am well-familiarised with the issues of modern technologies;
- P13 – My knowledge of the technological aspects of data provision is sufficient to adequately work with information stored in a digital form;
- P15 – I find the procedures for the provision and use of digital data in criminal proceedings clear and understandable;
- P16 – The procedure for getting data from mobile phones is obvious to me;
- P19 – I know how to best retrieve data from a mobile phone.

Conclusion

Analysis of a materially significant influence between the variables examined showed that the decisive position is taken by the motivation of policemen to engage in self-education and self-development. In the overall summary of the results in verification of the research assumption, we can see the materially significant influence of motivation to self-education on the areas of evaluation of legislative, subjective and objective conditions for criminal investigation using mobile phones, assessment of importance of modern technologies and readiness of policemen for investigation of this crime activities. An increase in motivation for education is the key objective, as well as the key prerequisite for an increase in the competence of policemen in the field of modern technologies. This increase may not only be financially valued; there are many other instruments in the field of so-called "soft management", such as recognition and praise. Although they seem unimportant for the militarily organised corps, they may encourage the motivation of processors. The reached results of the analysis show that there is a need to verify further possibilities and tools of the positive influence of the head employees in creating conditions for development of desirable motivation for self-education of policemen. It is also possible to recommend and provide more attention to identifying motivation of applicants for the police profession prior to their admission to the Police of the Czech Republic.

Literature

- COHEN, Jacob. *Statistical Power Analysis for the Behavioral Sciences*. Taylor&Francis Group, LLC Reprinted 2009, New Yourk. 567 p. ISBN 978-0-8058-0283-2.
- KIRK, Roger, E. *Statistics an introduction*. Belmont: T. H. Education 2007. 645 p. ISBN 978-0-534-56478-0.
- KIRK, Roger, E. *Statistic An Introduction*. fifth edition. Balmont: Printed in the United States of America, 2008, s. 475. ISBN-13:978-0-534-56478-0.
- HENDL, Jan. *Přehled statistických metod zpracování dat*. Praha: Portál, 2004. 583 s. ISBN 80-7367-123-9.
- KLICK Jonathan, John MACDONALD a Thomas STRATMANN. *Mobile Phones and Crime Deterrence: An Underappreciated Link* [online]. [B.m.]: University of Pennsylvania Law School. Institute for Law and Economics. [cit. 3. 11. 2015]. Dostupné z: <http://ssrn.com/abstract=2130234>
- KOLOUCH, Jan a Petr VOLEVECKÝ. *Trestněprávní ochrana před kybernetickou kriminalitou*. Praha: Policejní akademie České republiky v Praze, 2013. 117 s. ISBN 978-80-7251-402-1.
- KOVAŘÍK, Zdeněk a Alena PEJČOCHOVÁ. Ověření správnosti stanovených oblastí při výzkumu kriminality páchané s využitím mobilních telefonů s využitím explorační faktorové analýzy. *Bezpečnostní teorie a praxe*. 2016, č. 3, s. 93-112. ISSN 180-1-8211.
- KOVAŘÍK, Zdeněk. *Problémy profesní motivace pracovníků Policie České republiky*. Brno: Tribun EU, 2012, s. 23-41.
- LUEN, Tan Woei a Suliman AL-HAWAMDEH. Knowledge management in the public sector: Principles and practices in police work. *Journal of Information Science* [online]. 2001, Vol. 27, No. 5, s. 311-318. [cit. 7. 10. 2015]. Dostupné z: https://www.researchgate.net/publication/242926400_Knowledge_management_in_the_public_sector_Principles_and_practices_in_police_work.
- POLČÁK, Radim a Tomáš GRIVNA. *Kyberkriminalita a právo*. Praha: Auditorium, 2008. 220 s. ISBN: 978-80-903786-7-4.

- RAK, Roman a Viktor PORADA. Vlastnosti digitálních stop a jejich dopady na forenzní šetření, *Soudní inženýrství*. 2008, Vol. 16, No. 4, s. 91-107. ISSN 1801-2190.
- RAVENS-CROFT, Andrew a Simon McALISTER. Digital games and learning in cyberspace: A dialogical approach. *E-Learning* [online]. Vol. 3, No. 1, s. 37-50. [cit. 7. 8. 2015]. ISSN-1741-8887. Dostupné z: http://interloc.uel.ac.uk/publications_files/ravenscroft-e-learn06.pdf
- SMEJKAL, Vladimír. *Kybernetická kriminalita*. Plzeň: Aleš Čeněk, 2015, s. 502. ISBN 978-80-7380-501-2.
- VÝROST, Jozef. *Sociálno-psychologický výskum postojov*. Bratislava: Veda, 1989. 344 s. ISBN 80-224-0054-8.
- VÝROST, Jozef; SLAMĚNÍK, Ivan. *Sociální psychologie*. 2. přeprac. a rozš. vyd. Praha: Grada Publishing 2008. 416 s. ISBN 978-80-247-1428-8.

RESUMÉ

Předložený článek zveřejňuje některá vybraná zjištění z výzkumu optimalizace činnosti Policie ČR při řešení kriminality páchané s využitím mobilních telefonů. Přináší evidenci potřebnou k přijetí rozhodnutí při ověřování vlivu motivace policistů výběrového souboru k sebevzdělávání v oblasti digitálních technologií. Výzkumný předpoklad je ověřován s využitím indexu věcné významnosti pro intervalové proměnné, konkrétně Cohenovo „d“. Uvedená evidence svědčí o tom, že motivace policistů výběrového souboru k sebevzdělávání v oblasti digitálních technologií představuje jeden z hlavních subjektivních předpokladů pro optimalizaci činnosti Policie ČR při řešení kriminality páchané s využitím mobilních telefonů.

Klíčová slova: Důkaz; mobilní telefon, dokazování, digitální stopa; elektronický důkaz; trestní řízení; orgán činný v trestním řízení, elektronický důkazní prostředek, výzkumný předpoklad, věcná významnost, index věcné významnosti pro intervalové proměnné.

SUMMARY

The presented article publishes some selected findings from the research related to optimising the activities of the Police of the Czech Republic in dealing with crimes committed while using mobile phones. It provides the records needed to make a decision whilst verifying of the impact of the motivation of a selective set policemen in relation to self-education in digital technologies. The research assumption is verified using an index of substantive significance for the interval variables, namely Cohen's "d". These records indicate that the motivation of the policemen of the selection set in relation to self-education in the field of digital technologies represents one of the main subjective prerequisites for optimising the work of the Police of the Czech Republic in dealing with crimes committed while using mobile phones.

Keywords: Evidence; mobile phone, argumentation, digital trace; electronic evidence; criminal proceedings; law enforcement authority, electronic evidence, research assumption, substantive significance, index of substantive significance for interval variables.